



UNDERGRADUATE EDUCATION COMMITTEE (UEC)
December 18, 2015 - 10:00 AM
A225

AGENDA

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Page

**1. APPROVAL OF THE AGENDA**

**2. APPROVAL OF UEC MINUTES**

3 - 5      **2.1.** UEC draft minutes: Nov. 27, 2015

**3. COURSE OUTLINES**

6 - 17      **3.1. Adult Education**

Changes including title and prerequisites: ADED 365

Regularization of special topics course: ADED 325 (formerly ADED 330R)

Regularization of special topics course: ADED 425 (formerly ADED 330P)

Regularization of special topics course: ADED 435 (formerly ADED 330Q)

New course: ADED 473, Adult Education Practicum

MOTION: To approve the ADED course outlines as presented.

18 -      **3.2. Chemistry**

25      Changes including prerequisites and total hours: CHEM 113

Review with changes: CHEM 114

MOTION: To approve the CHEM 113 and 114 course outlines as presented.

**4. PROGRAMS**

26 -      **4.1. Biochemistry**

50      New program: Biochemistry major (BSc)

New cross-listed course: BIOC 401/CHEM 401, Enzymes, Coenzymes, and Inhibitors

New course: BIOC 402, Advanced Metabolism

New course: BIOC 408, Directed Studies in Biochemistry I

New course: BIOC 409, Directed Studies in Biochemistry II

New cross-listing as BIOC: BIO 320/BIOC 320, CHEM 350/BIOC 350, BIO

Page

403/BIOC 403, BIO 414/BIOC 414  
Changes including prerequisites: CHEM 324

MOTION: To recommend approval of the new Biochemistry major for the Bachelor of Science degree as presented.

MOTION: To approve the new course designation BIOC (Biochemistry).

MOTION: To approve the BIO, BIOC, and CHEM course outlines as presented.

## **5. OTHER BUSINESS/DISCUSSION ITEMS**

51 -  
66

### **5.1. English Language Proficiency Requirement policy (99)**

### **5.2. Policy Subcommittee report**

67 -  
85

### **5.3. Academic Program and Unit Reviews policy (189)**

### **5.4. Admissions Subcommittee report**

### **5.5. Curriculum Quality Subcommittee report**

### **5.6. Transfer Credit Subcommittee report**

## **6. INFORMATION ITEMS**

86 -  
102

### **6.1. Teacher Education Program**

## **7. ADJOURNMENT**



## **UNDERGRADUATE EDUCATION COMMITTEE (UEC) MEETING**

November 27, 2015  
10:00 AM - A225  
Abbotsford Campus

### **DRAFT MINUTES**

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**PRESENT:** Maria Bos-Chan, Gurbir Brar, Sue Brigden, Rhonda Colwell, Heather Compeau, Darren Francis, Peter Geller, Nancy Goad, Shirley Hardman, Arlene Leon, Stan Manu, Steven Marsh, David McGuire, Rod McLeod, Lisa Moy, Sylvie Murray, Samantha Patridge, Kirsten Robertson, Maureen Wideman, Simon Xi  
**ABSENT:** Vlad Dvoracek, John English, Kate McCulloch, Eric Spalding  
**GUESTS:** Lucki Kang  
**RECORDER:** Amanda Grimson

#### **1. APPROVAL OF THE AGENDA**

**MOTION:**

To approve the agenda as amended:

- Removal of GEOG 315

CARRIED

#### **2. APPROVAL OF UEC MINUTES**

**2.1. UEC draft minutes: October 30, 2015**

**MOTION:**

To approve the draft minutes as presented.

CARRIED

#### **3. COURSE OUTLINES**

**3.1. Communications**

Changes including title and prerequisites: CMNS 312

**MOTION:**

To approve the CMNS 312 course outline as presented.

CARRIED

**3.2. Geography**

~~Review with changes including prerequisites: GEOG 315~~

Changes including prerequisites: GEOG 419/BIO 419

**MOTION:**

To approve the GEOG 419/BIO 419 course outline as presented.

CARRIED

**3.3. Biology**

Changes including title and prerequisites: BIO 202

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27 Nov 2015

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**MOTION:**

To approve the BIO 202 course outline as presented.

CARRIED

**4. PROGRAMS**

**4.1. Social Work and Human Services**

Change to entrance and graduation requirements: Bachelor of Social Work

There were a number of questions about this proposal, and ultimately UEC asked that it be revised and resubmitted to a future UEC meeting.

Among the issues discussed:

- Weighting of specific criteria should be available on the department website and should be referenced in the calendar. L. Kang (School of Social Work and Human Services representative) noted that the type of interview questions and the criteria would be communicated to students in the admission package.
- There should be a means to accommodate students who cannot travel for the interview, such as online interviews.
- Notice should be given for increases in entrance requirements.
- Changes to entrance criteria may affect students at a partner institution in China.
- Guidelines for "Educational Equity" have not yet been developed. If some language can be provided to explain this, it can remain. Otherwise, it should be removed.
- Social Work may need to revisit the entrance requirements for the diploma, so that students don't spend two years completing that program before finding out that they cannot get into the BSW.

This discussion prompted the suggestion that a subcommittee be created to look into interviews and basis for admission decisions. L. Moy, D. Francis, N. Goad, and D. McGuire agreed to sit on this subcommittee. It was also suggested that someone from Visual Arts and/or Teacher Education be invited to participate.

**MOTION:**

To recommend the changes to the Bachelor of Social Work entrance and graduation requirements as presented, effective September 2017.

DEFEATED

**MOTION:**

To strike an ad hoc subcommittee to investigate the criteria for interviews and clarify the process for the basis for admission decisions.

CARRIED

**5. OTHER BUSINESS/DISCUSSION ITEMS**

**5.1. Extended Studies certificates**

The Short Program Subcommittee report, which was accepted by UEC on January 30, 2015, included a recommendation that extended studies certificates be discontinued unless there was a compelling reason to retain them. As this

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falls under APPC's purview, it was suggested that UEC request that APPC review these programs. R. McLeod will look into this further.

**5.2. Admissions Subcommittee report**

There was no report from this subcommittee.

**5.3. Curriculum Quality Subcommittee report**

UEC's recommendations have been incorporated into the draft document. Supporting materials will be prepared before this is sent out for wider consultation.

**5.4. Transfer Credit Subcommittee report**

There was no report from this subcommittee.

**5.5. Policy Subcommittee report**

Policy 105 (Assignment of Course Credit) is almost complete. The Graduate Studies Committee will be consulted, and then this will be sent on to the Senate Governance Committee. Policy 101 (Grading System) has been revised significantly to address some concerns. The revised policy will be sent back out for consultation. Policy 99 (English Language Proficiency Requirements) is being revised and should be coming to UEC in December.

**6. INFORMATION ITEMS**

- 6.1. Minor course changes** (outlines will be available at [www.ufv.ca/calendar/courseoutlines](http://www.ufv.ca/calendar/courseoutlines))  
BUS 100, 120, 143, 144, 145  
CMNS 300, 351, 353, 375, 376, 385, 480  
GEOG 116

**7. ADJOURNMENT**

- 7.1.** The meeting was adjourned at 11:48 am

## **MEMO**

To: Amanda Grimson, UEC assistant, Undergraduate Education Committee (UEC) and Tracy Ryder Glass, Dean of Professional Studies

From: Seonaigh MacPherson, Adult Education Department Head, and Corinne Richardson, Program Advisor

Date: December 4<sup>th</sup>, 2015

Re: Resubmit ADED 365 Adult Education in Canada: Indigenous Peoples

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The Adult Education department is resubmitting ADED 365 Adult Education in Canada: Indigenous Peoples course outline which was denied approval at the August, 2014 UEC meeting.



ORIGINAL COURSE IMPLEMENTATION DATE: September 2007  
 REVISED COURSE IMPLEMENTATION DATE: September 2016  
 COURSE TO BE REVIEWED: (six years after UEC approval) March 2018  
 Course outline form version: 05/29/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

**Course Code and Number:** ADED 365

**Number of Credits:** 3 [Course credit policy \(105\)](#)

**Course Full Title:** Adult Education in Canada: Indigenous Peoples

**Course Short Title (if title exceeds 30 characters):** Adult Ed in Cda: Indigenous Ppls

**Faculty:** Faculty of Professional Studies

**Department (or program if no department):** Adult Education

### Calendar Description:

First Nations, Metis, and Inuit adult learners challenge some of the assumptions, principles, and practices of mainstream Canadian adult education. This course explores the history of and movements associated with adult education as they impact Indigenous peoples in Canada.

**Note: Students with credit for ADED 330G cannot take this course for further credit.**

**Prerequisites (or NONE):** One of the following: (30-university-level credits) or (enrolment in an Adult Education program) or (permission of the Adult Education department). Note: Students who do not have 30 university-level credits will need to contact the Adult Education program advisor for permission to register.

**Corequisites (if applicable, or NONE):**

### Equivalent Courses (cannot be taken for additional credit)

Former course code/number: **ADED 330G**

Cross-listed with:

Equivalent course(s): **ADED 330G**

*Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.*

### Transfer Credit

Transfer credit already exists: ☐ Yes ☒ No

Transfer credit requested (OREg to submit to BCCAT):

☐ Yes ☒ No (if yes, fill in transfer credit form)

Resubmit revised outline for articulation: ☐ Yes ☒ No

To find out how this course transfers, see [bctransferguide.ca](http://bctransferguide.ca).

**Total Hours: 45**

### Typical structure of instructional hours:

|                                            |           |
|--------------------------------------------|-----------|
| Lecture hours                              |           |
| Seminars/tutorials/workshops               | 12        |
| Laboratory hours                           |           |
| Field experience hours                     |           |
| Experiential (practicum, internship, etc.) | 3         |
| Online learning activities                 | 30        |
| Other contact hours:                       |           |
| <b>Total</b>                               | <b>45</b> |

### Special Topics

Will the course be offered with different topics?

☐ Yes ☒ No

If yes, different lettered courses may be taken for credit:

☐ No ☐ Yes, repeat(s) ☐ Yes, no limit

*Note: The specific topic will be recorded when offered.*

**Maximum enrolment (for information only): 25**

**Expected frequency of course offerings (every semester, annually, every other year, etc.):** annual

**Department / Program Head or Director:** Seonaigh MacPherson

**Date approved:** May 2014

**Campus-Wide Consultation (CWC)**

**Date of posting:** February, 2014

**Faculty Council approval**

**Date approved:** May 23, 2014

**Dean/Associate VP:** Rosetta Khalideen

**Date approved:** May 23, 2014

**Undergraduate Education Committee (UEC) approval**

**Date of meeting:** December 18, 2015

ADED 365

University of the Fraser Valley Official Undergraduate Course Outline

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## Learning Outcomes

Upon successful completion of this course, students will be able to:

- Identify common and unique educational issues and needs facing Canadian Indigenous peoples
- Explain the role of adult education in support of the equity and sustainability struggles of Indigenous peoples
- Critique adult education in Canada with respect to the treatment and inclusion of Indigenous Peoples
- Develop case studies (real or reasoned) of effective adult education for Indigenous learners and communities in Canada
- Use principles from the Truth and Reconciliation Commission's recommendations to inform your own professional position on Indigenous learners and adult education in Canada.
- Apply Indigenous ways of knowing and representing knowledge in research.

## Prior Learning Assessment and Recognition (PLAR)

☒ Yes      ☐ No, PLAR cannot be awarded for this course because

## Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

Seminars, Discussion of assigned readings, Written assignments, Presentations

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

## Typical Text(s) and Resource Materials (if more space is required, download supplemental Texts and Resource Materials form)

| Author Surname, Initials                         | Title (article, book, journal, etc.)                                                                                     | Current Ed.              | Publisher                 | Year |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|------|
| 1. Battiste, M.                                  | <i>Decolonizing Education: Nourishing the Learning Spirit</i>                                                            | <input type="checkbox"/> | Purich Publishing         | 2013 |
| 2. Truth and Reconciliation Commission of Canada | Final Report of the Truth and Reconciliation Commission of Canada: Volume One                                            | <input type="checkbox"/> | Lorimer                   | 2015 |
| 3. Silver, J.                                    | <i>Moving Forward, Giving Back: Transformative Aboriginal Adult Education</i>                                            | <input type="checkbox"/> | Fernwood Publishing       | 2013 |
| 4. Welton, M.                                    | Cunning Pedagogics: The Encounter between the Jesuit Missionaries and Amerindians in 17 <sup>th</sup> Century New France | <input type="checkbox"/> | Adult Education Quarterly | 2005 |
| 5. Marlene Atleo                                 | 3 chapters in edited books                                                                                               | <input type="checkbox"/> |                           |      |

## Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)

## Typical Evaluation Methods and Weighting

|                |   |              |      |                   |   |            |      |
|----------------|---|--------------|------|-------------------|---|------------|------|
| Final exam:    | % | Assignments: | 100% | Midterm exam:     | % | Practicum: | %    |
| Quizzes/tests: | % | Lab work:    | %    | Field experience: | % | Total:     | 100% |

### Details (if necessary):

Seminar Presentation 10%

Presentation 25%

Case Study of an Effective Indigenous Adult Education Initiative, Model, or Approach 20%

Position Paper 10%

Research Report and Presentation 35%

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☐

## Typical Course Content and Topics

Week one: Introductions, course overview, course objectives; identification of "stance" as educator; thinking "historically"

Week two: Traditional ways of knowing and learning: sundances, potlatches, winter ceremonies, public gatherings (longhouses)

Week three: Indigenous and modern ways of knowing: Intercultural spaces

Week four: Historical injustices and the residential school legacy

Week five: Indigenous adult education: Guest Speaker

Week six: Innovations in adult educational practices for cultural sustainability for Indigenous peoples

Week seven: Innovations in adult educational practices for equity for Indigenous peoples

Week eight: Site visit

Week nine: Identity and autonomy in adult education: Indigenous leadership in Indigenous adult education

Week ten: Life skills and skills training for employment; drug and alcohol counseling; job readiness

Week eleven & twelve: Learning styles; culturally appropriate curriculum; the electronic highway

Week thirteen: Small group presentations of final project; course review



**Adult Education**

The following courses were originally submitted to the UEC Screening Subcommittee and CWC as part of a new program, which will not be going forward right now. The Faculty of Professional Studies has confirmed that these courses can proceed through the approval process without the proposed program, as they will be offered as part of the Bachelor of Arts (Adult Education) program.

- ADED 325 (formerly ADED 330R)
- ADED 425 (formerly ADED 330P)
- ADED 435 (formerly ADED 330Q)
- ADED 473 (new course)



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 05/29/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------|----|------------------|--|------------------------|--|--------------------------------------------|--|----------------------------|----|----------------------|--|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> ADED 325                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Full Title:</b> Teaching Adults                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty:</b> Faculty of Professional Studies                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Department (or program if no department):</b> Adult Education                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Calendar Description:</b><br>Developing theoretical understanding and practical skills to teach adults, focusing on course design, lesson planning, flipped classrooms, teaching face-to-face, blended, and online, developing teaching personas and teaching philosophies, and creating professional development plans. Emphasis is on collaborative learning and reflective practice.                                                                                                                                                                                                                                                                                                                             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Note: Students with credit for ADED 330R cannot take this course for further credit.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Prerequisites (or NONE):</b> One of the following: (30-university-level credits) or (enrolment in an Adult Education program) or (permission of the Adult Education department). Note: Students who do not have 30 university-level credits will need to contact the Adult Education program advisor for permission to register.                                                                                                                                                                                                                                                                                                                                                                                    |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number: <b>ADED 330R</b><br>Cross-listed with:<br>Equivalent course(s): <b>ADED 330R</b><br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                                                                                                                                                               |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total Hours: 45</b><br><b>Typical structure of instructional hours:</b> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr><td>Lecture hours</td><td></td></tr> <tr><td>Seminars/tutorials/workshops</td><td style="text-align: center;">12</td></tr> <tr><td>Laboratory hours</td><td></td></tr> <tr><td>Field experience hours</td><td></td></tr> <tr><td>Experiential (practicum, internship, etc.)</td><td></td></tr> <tr><td>Online learning activities</td><td style="text-align: center;">33</td></tr> <tr><td>Other contact hours:</td><td></td></tr> <tr><td style="text-align: right;"><b>Total</b></td><td style="text-align: center;"><b>45</b></td></tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  | Seminars/tutorials/workshops | 12 | Laboratory hours |  | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities | 33 | Other contact hours: |  | <b>Total</b> | <b>45</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 12        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 33        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>45</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Maximum enrolment (for information only):</b> 36<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> annually                                                                                                                                                                                                                                                                                                                                                                |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Department / Program Head or Director:</b> Seonaigh MacPherson                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           | <b>Date approved:</b> April 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           | <b>Date of posting:</b> August 14, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date approved:</b> June 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Dean/Associate VP:</b> Tracy Ryder Glass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           | <b>Date approved:</b> December 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Date of meeting:</b> December 15, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |                              |    |                  |  |                        |  |                                            |  |                            |    |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |

## Learning Outcomes

Upon successful completion of this course, students will be able to:

- Develop a course profile for a face-to-face, blended and/or online workshop/course for adult learners
- Create useful, practical lesson plans for teaching adults in all three learning domains and in each mode
- Conduct participatory lessons using appropriate learning and teaching activities in face-to-face, blended and/or online modes
- Implement the concept of the flipped classroom in their face-to-face, blended, and online teaching
- Create learning evaluation and feedback plans for their workshops/courses
- Describe who they are as instructors, who their learners are, and how all aspects of context affect their teaching and their adult students' learning
- Articulate a plan to become a reflective practitioner, using self, peer and student feedback to improve their teaching

## Prior Learning Assessment and Recognition (PLAR)

☒ Yes    ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods** (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

**NOTE:** The following sections may vary by instructor. Please see course syllabus available from the instructor.

## Typical Text(s) and Resource Materials (if more space is required, download supplemental Texts and Resource Materials form)

| Author Surname, Initials    | Title (article, book, journal, etc.)                                              | Current Ed.                         | Publisher                                                               | Year |
|-----------------------------|-----------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------------------|------|
| 1. Spalding, D.             | How to teach adults: Plan your class, teach your students, change the world.      | <input checked="" type="checkbox"/> | San Francisco: Jossey-Bass                                              | 2014 |
| 2. Bergmann, J. & Samms, A. | Flip your classroom: Reach every student in every class every day.                | <input checked="" type="checkbox"/> | Alexandria, Virginia: International Society for Technology in Education | 2012 |
| 3. Fulton, K. P.            | Time for learning: Top 10 reasons why flipping the classroom can change education | <input checked="" type="checkbox"/> | Thousand Oaks, CA: Sage/Corwin                                          | 2014 |
| 4.                          |                                                                                   | <input type="checkbox"/>            |                                                                         |      |
| 5.                          |                                                                                   | <input type="checkbox"/>            |                                                                         |      |

## Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)

Use this section for supplies and materials for all sections of this course.

## Typical Evaluation Methods and Weighting

|                |   |              |      |                   |   |            |      |
|----------------|---|--------------|------|-------------------|---|------------|------|
| Final exam:    | % | Assignments: | 100% | Midterm exam:     | % | Practicum: | %    |
| Quizzes/tests: | % | Lab work:    | %    | Field experience: | % | Total:     | 100% |

### Details (if necessary):

Assignment 1: Teaching Philosophy 10%  
 Assignment 2: Learning about teaching journal 30%  
 Assignment 3: Teaching practice 25%  
 Assignment 4: Course design 25%  
 Assignment 5: Professional development plan 10%

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No

## Typical Course Content and Topics

Week one: Course overview, teaching philosophies  
 Week two: Course design, rationale for the flipped classroom  
 Week three: Lesson planning, overview of learning theories  
 Week four: Review and re-visit early course topics  
 Week five: Working with learners, implementing the flipped classroom  
 Week six: Learning and teaching activities  
 Week seven: Assessing learning and teaching  
 Week eight: Flipped mastery classroom, generative curriculum model  
 Week nine: Constructivism and situated learning  
 Week ten: Reflection: Who are you as a teacher?  
 Week eleven: Professional development: Becoming a reflective practitioner  
 Week twelve: Adult education and the future  
 Week thirteen: Course wrap up, review of professional development plans



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 05/29/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

**Course Code and Number:** ADED 425

**Number of Credits:** 3 [Course credit policy \(105\)](#)

**Course Full Title:** Curriculum Design for Adult Learning

**Course Short Title (if title exceeds 30 characters):** Curric Design: Adult Learning

**Faculty:** Faculty of Professional Studies

**Department (or program if no department):** Adult Education

**Calendar Description:**

Course focus is on the exploration of the art, skills, and processes of designing effective curricula for adults including applying design strategies to differentiate and support diverse learners. Emphasis is on working in teams designing learning for particular learners and contexts relevant to students' experiences.

**Note: Students with credit for ADED 330P cannot take this course for further credit.**

**Prerequisites (or NONE):** One of the following: (30-university-level credits) or (enrolment in an Adult Education program) or (permission of the Adult Education department). Note: Students who do not have 30 university-level credits will need to contact the Adult Education program advisor for permission to register.

**Corequisites (if applicable, or NONE):**

**Pre/corequisites (if applicable, or NONE):**

**Equivalent Courses (cannot be taken for additional credit)**

Former course code/number: **ADED 330P**

Cross-listed with:

Equivalent course(s): **ADED 330P**

*Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.*

**Transfer Credit**

Transfer credit already exists: ☐ Yes ☒ No

Transfer credit requested (OREg to submit to BCCAT):

☐ Yes ☒ No (if yes, fill in transfer credit form)

Resubmit revised outline for articulation: ☐ Yes ☒ No

To find out how this course transfers, see [bctransferguide.ca](http://bctransferguide.ca).

**Total Hours: 45**

**Typical structure of instructional hours:**

|                                            |           |
|--------------------------------------------|-----------|
| Lecture hours                              |           |
| Seminars/tutorials/workshops               | 12        |
| Laboratory hours                           |           |
| Field experience hours                     |           |
| Experiential (practicum, internship, etc.) |           |
| Online learning activities                 | 33        |
| Other contact hours:                       |           |
| <b>Total</b>                               | <b>45</b> |

**Special Topics**

Will the course be offered with different topics?

☐ Yes ☒ No

If yes, different lettered courses may be taken for credit:

☐ No ☐ Yes, repeat(s) ☐ Yes, no limit

*Note: The specific topic will be recorded when offered.*

**Maximum enrolment (for information only): 25**

**Expected frequency of course offerings (every semester, annually, every other year, etc.):** annual

**Department / Program Head or Director:** Seonaigh MacPherson

**Date approved:** April 2015

**Campus-Wide Consultation (CWC)**

**Date of posting:** August 14, 2015

**Faculty Council approval**

**Date approved:** June 2015

**Dean/Associate VP:** Tracy Ryder Glass

**Date approved:** December 2015

**Undergraduate Education Committee (UEC) approval**

**Date of meeting:** December 15, 2015

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

- Plan a curriculum for a particular adult learning context using learner-centred, activity-based, and (other) principled approaches.
- Conduct training needs analyses to inform the learning outcomes and instructional methods of a curriculum.
- Collaborate effectively in a team to design curriculum.
- Facilitate learning in team, online, and in class.
- Design & present a practical and professional-quality curriculum
- Apply principles of curriculum design & learning that respect diversity and integrate language, culture and skills training for specific and diverse learners.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes      ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Online instruction, individual and group projects and presentations, group discussions

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download supplemental Texts and Resource Materials form)**

| Author Surname, Initials     | Title (article, book, journal, etc.)                                                                  | Current Ed.                         | Publisher                                 | Year |
|------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------|------|
| 1. Fink, L. Dee              | <i>Creating significant learning experiences: An integrated approach to designing college courses</i> | <input checked="" type="checkbox"/> | San Francisco, CA:<br>Wiley / Jossey-Bass | 2013 |
| 2. Smith, P.L. & Ragan, T.J. | <i>Instructional design</i>                                                                           | <input checked="" type="checkbox"/> | San Francisco, CA:<br>Wiley / Jossey-Bass | 2004 |
| 3.                           |                                                                                                       | <input type="checkbox"/>            |                                           |      |
| 4.                           |                                                                                                       | <input type="checkbox"/>            |                                           |      |
| 5.                           |                                                                                                       | <input type="checkbox"/>            |                                           |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**

Use this section for supplies and materials for all sections of this course.

**Typical Evaluation Methods and Weighting**

|                |   |              |      |                   |   |            |      |
|----------------|---|--------------|------|-------------------|---|------------|------|
| Final exam:    | % | Assignments: | 100% | Midterm exam:     | % | Practicum: | %    |
| Quizzes/tests: | % | Lab work:    | %    | Field experience: | % | Total:     | 100% |

**Details (if necessary):**

Assignment 1: Project plans (10%)  
 Assignment 2: Needs assessment reports (20%)  
 Assignment 3: Curriculum maps (20%)  
 Assignment 4: Curriculum Framework (40%)  
 Assignment 5: Participation (10%)

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**Typical Course Content and Topics**

Week one: What is curriculum?  
 Week two: Why design?  
 Week three: Why begin by assessing training needs?  
 Week four: How do we identify needs (context, learner, tasks)?  
 Week five: Why design for significant learning experiences?  
 Week six: How do we identify learning outcomes from training needs? Why tasks?  
 Week seven: How do we align tasks with learning outcomes?  
 Week eight: How do we design learning experiences?  
 Week nine: What are good approaches for active learning?  
 Week ten: How do we constructively align learning outcomes, curricular tasks, & assessment?  
 Week eleven: How do we move from design to implementation?  
 Week twelve: How do we work with the lived curriculum?  
 Week thirteen: Issues in contemporary curriculum design



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 05/29/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

**Course Code and Number:** ADED 435

**Number of Credits:** 3 [Course credit policy \(105\)](#)

**Course Full Title:** Facilitating Adult Learning

**Course Short Title (if title exceeds 30 characters):** Facilitating Adult Learning

**Faculty:** Faculty of Professional Studies

**Department (or program if no department):** Adult Education

### Calendar Description:

Course focus is on learner-centred or facilitative teaching, including changes in instructor roles and responsibilities, and facilitative approaches creating supportive, challenging, and effective adult learning environments, whether face-to-face, blended, or online. Emphasis is on critical thinking and analysis in the context of practice.

**Note: Students with credit for ADED330Q cannot take this course for further credit.**

**Prerequisites (or NONE):** ADED 325 (formerly ADED 330R)

**Corequisites (if applicable, or NONE):**

**Pre/corequisites (if applicable, or NONE):**

### Equivalent Courses (cannot be taken for additional credit)

Former course code/number: **ADED 330Q**

Cross-listed with:

Equivalent course(s): **ADED 330Q**

*Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.*

### Transfer Credit

Transfer credit already exists: ☐ Yes ☒ No

Transfer credit requested (OREg to submit to BCCAT):

☐ Yes ☒ No (if yes, fill in transfer credit form)

Resubmit revised outline for articulation: ☐ Yes ☒ No

To find out how this course transfers, see [bctransferguide.ca](http://bctransferguide.ca).

**Total Hours:** 45

### Typical structure of instructional hours:

|                                            |           |
|--------------------------------------------|-----------|
| Lecture hours                              |           |
| Seminars/tutorials/workshops               | 12        |
| Laboratory hours                           |           |
| Field experience hours                     |           |
| Experiential (practicum, internship, etc.) |           |
| Online learning activities                 | 33        |
| Other contact hours:                       |           |
| <b>Total</b>                               | <b>45</b> |

### Special Topics

Will the course be offered with different topics?

☐ Yes ☒ No

If yes, different lettered courses may be taken for credit:

☐ No ☐ Yes, repeat(s) ☐ Yes, no limit

*Note: The specific topic will be recorded when offered.*

**Maximum enrolment (for information only):** 25

**Expected frequency of course offerings (every semester, annually, every other year, etc.):** annual

**Department / Program Head or Director:** Seonaigh MacPherson

**Date approved:** April 2015

**Campus-Wide Consultation (CWC)**

**Date of posting:** August 14, 2015

**Faculty Council approval**

**Date approved:** June 2015

**Dean/Associate VP:** Tracy Ryder Glass

**Date approved:** December 2015

**Undergraduate Education Committee (UEC) approval**

**Date of meeting:** December 15, 2015

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

- Critically examine assumptions and beliefs about adult learners
- Identify and critique research evidence that supports learner-centred/facilitative teaching approaches
- Integrate new evidence-based learning with personal and professional experience
- Apply facilitative teaching concepts and skills to their own adult education/teaching practice
- Critically reflect on their own professional development and teaching practice

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes      ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

- Facilitated face-to-face large and small group discussions
- Online large and small group discussions
- Mini-lectures
- Review and critique of relevant videos
- Jigsaw/expert groups
- Student facilitation of lessons
- Reflective activities

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download supplemental Texts and Resource Materials form)**

| Author Surname, Initials | Title (article, book, journal, etc.)                                                                                  | Current Ed.                         | Publisher                                                  | Year |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------------------------------------------------|------|
| 1. Weimer, Maryellen     | Learner-centered teaching: Five key changes to practice (2 <sup>nd</sup> ed)                                          | X                                   | San Francisco: Jossey-Bass                                 | 2013 |
| 2. Blumberg, Phyllis     | Developing learner-centered teaching: A practical guide for faculty                                                   | <input checked="" type="checkbox"/> | San Francisco: Jossey-Bass                                 | 2009 |
| 3. Ball, J.              | As if indigenous knowledge and communities mattered: Transformative education in First Nations communities in Canada. | <input type="checkbox"/>            | <i>The American Indian Quarterly</i> , 28(3 & 4), 454-479. | 2004 |

**Typical Evaluation Methods and Weighting**

|                |   |              |      |                   |   |            |      |
|----------------|---|--------------|------|-------------------|---|------------|------|
| Final exam:    | % | Assignments: | 100% | Midterm exam:     | % | Practicum: | %    |
| Quizzes/tests: | % | Lab work:    | %    | Field experience: | % | Total:     | 100% |

**Details (if necessary):**

Assignment one: Your current thinking about the course topic – 10%

Assignment two: Reflective paper – 30%

Assignment three: Lesson plan with critical reflection and analysis paper – 30%

Assignment four: Group project - 30%

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**Typical Course Content and Topics**

Week one: Introduction to course, beliefs about facilitating adult learning, review of facilitative teaching lesson planning

Week two: Key elements of learner-centred facilitative teaching

Week three: Review of current evidence supporting facilitative teaching

Week four: Roles and responsibilities of a facilitative teacher/adult educator

Week five: The balance of power – helping students become independent self-directed learners

Week six: Using content – developing a knowledge base and learning skills

Week seven: Creating classrooms where students take responsibility for their own learning

Week eight: Evaluation – a better balance between grades and learning

Week nine: Responding to resistance in facilitative, learner-centred teaching

Week ten: A developmental approach – promoting learning skills and autonomous self-directed learners

Week eleven: Developing learning skills – trying some examples

Week twelve: Highlights, key points, and application to specific teaching contexts

Week thirteen: Looking to the future – ourselves as facilitative learner-centred adult educators, closing activities



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 05/29/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

**Course Code and Number:** ADED 473

**Number of Credits:** 3 [Course credit policy \(105\)](#)

**Course Full Title:** Adult Education Practicum

**Course Short Title (if title exceeds 30 characters):** Adult Education Practicum

**Faculty:** Faculty of Professional Studies

**Department (or program if no department):** Adult Education

### Calendar Description:

This course provides a supervised adult education practicum experience. The practicum is self-designed, with students arranging both the site and on-site supervisor. Evaluation criteria focus on reflective practice: the ability to critically reflect on the practice of adult education within a supervised instructional experience.

**Prerequisites (or NONE):** ADED 325 (formerly ADED 330R), ADED 408, ADED 425 (formerly ADED 330P), and ADED 435 (formerly ADED 330Q)

**Corequisites (if applicable, or NONE):**

**Pre/corequisites (if applicable, or NONE):** The other four required courses of the Instructional Design certificate.

### Equivalent Courses (cannot be taken for additional credit)

Former course code/number:

Cross-listed with:

Equivalent course(s):

*Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.*

### Transfer Credit

Transfer credit already exists: ☐ Yes ☒ No

Transfer credit requested (OREg to submit to BCCAT):

☐ Yes ☒ No (if yes, fill in transfer credit form)

Resubmit revised outline for articulation: ☐ Yes ☒ No

To find out how this course transfers, see [bctransferguide.ca](http://bctransferguide.ca).

**Total Hours: 80**

### Typical structure of instructional hours:

|                                            |           |
|--------------------------------------------|-----------|
| Lecture hours                              |           |
| Seminars/tutorials/workshops               |           |
| Laboratory hours                           |           |
| Field experience hours                     |           |
| Experiential (practicum, internship, etc.) | 35        |
| Online learning activities                 | 25        |
| Other contact hours:                       |           |
| <b>Total</b>                               | <b>80</b> |

### Special Topics

Will the course be offered with different topics?

☐ Yes ☒ No

If yes, different lettered courses may be taken for credit:

☐ No ☐ Yes, repeat(s) ☐ Yes, no limit

*Note: The specific topic will be recorded when offered.*

**Maximum enrolment (for information only):** 15

**Expected frequency of course offerings (every semester, annually, every other year, etc.):** annual

**Department / Program Head or Director:** Seonaigh MacPherson

**Date approved:** April 2015

**Campus-Wide Consultation (CWC)**

**Date of posting:** August 14, 2015

**Faculty Council approval**

**Date approved:** June 2015

**Dean/Associate VP:** Tracy Ryder Glass

**Date approved:** December 2015

**Undergraduate Education Committee (UEC) approval**

**Date of meeting:** December 15, 2015



**Learning Outcomes**

Upon successful completion of this course, students will be able to:

- Arrange an appropriate and relevant practicum site with a qualified and experienced adult education instructor & supervisor
- Observe and reflect on an experienced adult educator's instructional skills, strategies, and approaches
- Relate what is observed and encountered on the practicum to theories and research learned in other ADED courses.
- Design & plan lessons, tasks, and activities, including assessment strategies, for adult learner
- Instruct adult learners effectively using a range of adult educational strategies and skills
- Critically reflect on their instructional experience and explain how they will adapt their teaching accordingly based on these reflections

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes      ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Online instruction, individual and group projects and presentations, group discussions.

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download supplemental Texts and Resource Materials form)**

| Author Surname, Initials | Title (article, book, journal, etc.) | Current Ed.              | Publisher | Year |
|--------------------------|--------------------------------------|--------------------------|-----------|------|
| 1.                       |                                      | <input type="checkbox"/> |           |      |
| 2.                       |                                      | <input type="checkbox"/> |           |      |
| 3.                       |                                      | <input type="checkbox"/> |           |      |
| 4.                       |                                      | <input type="checkbox"/> |           |      |
| 5.                       |                                      | <input type="checkbox"/> |           |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**

Use this section for supplies and materials for all sections of this course.

**Typical Evaluation Methods and Weighting**

|                |   |                  |     |                   |   |            |      |
|----------------|---|------------------|-----|-------------------|---|------------|------|
| Final exam:    | % | Assignments:     | %   | Midterm exam:     | % | Practicum: | 50%  |
| Quizzes/tests: | % | Lab work:        | %   | Field experience: | % | Shop work: | %    |
| Other:         | % | Other:Reflection | 50% | Other:            | % | Total:     | 100% |

**Details (if necessary):**

Assignment 1: Reflection on Observation (20%)

Assignment 2: Unit Plan for Practicum (20%)

Assignment 3: Teaching Log (30%)

Assignment 4: Response to Supervisory Feedback (20%)

Assignment 5: Final Reflection (10%)

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**Typical Course Content and Topics**

**Memo for Course Changes**

To: UEC

From: David Fenske

Date: May 2015

**Subject: Proposal for revision of CHEM 113**

1. Summary of changes (select all that apply):

- ☒ Six-year review
- ☐ Number and/or course code
- ☐ Credits and/or total hours
- ☐ Title
- ☒ Calendar description
- ☐ Prerequisites and/or co-requisites
- ☐ Frequency of course offering
- ☒ Learning outcomes
- ☐ Delivery methods and/or texts and resource materials
- ☐ PLAR options, grading system, and/or evaluation methods
- ☐ Discontinuation of course
- ☐ Other – Please specify:

2. Rationale for change:

This is a 6-year review.

The calendar description has been changed to conform to the UFV standard.

The learning outcomes have been shortened and revised to include several pertaining to the labs.

3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s): The addition of learning outcomes pertaining to the labs align with Chemistry Program Learning Outcomes 5-7 (listed in recent program review).
4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs? n/a
5. Which program areas have been consulted about the change(s)? n/a
6. What consideration has been given to indigenizing the curriculum? Indigenization is encouraged at the program level through breadth/elective requirements where students can choose from courses where indigenization is appropriate to the course content and discipline.
7. If this course is not eligible for PLAR, explain why: n/a
8. If any of the following items on the official course outline have changed, explain how the change will affect the budget for your area or any other area: n/a
- a. Credit value
  - b. Class size limit

- c. Frequency of offering
- d. Resources required (labs, equipment)
- 9. Are field trips required for this course? (Field trip requirements must be announced in the timetable.) How are the trips funded? n/a
- 10. Estimate of the typical costs for this course, including textbooks and other materials: \$300



ORIGINAL COURSE IMPLEMENTATION DATE: September 2002  
 REVISED COURSE IMPLEMENTATION DATE: September 2016  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------|----|------------------|----|------------------------|--|--------------------------------------------|--|----------------------------|--|----------------------|--|--------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> CHEM 113                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            | <b>Number of Credits:</b> 5 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Full Title:</b> Principles of Chemistry I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Calendar Description:</b><br>An introduction to chemistry with emphasis on theory of atomic and molecular structure and bonding. Work performed in the laboratory complements lecture material. Completion of CHEM 113 and 114 will satisfy the requirements for honours, majors, or minors programs in science.                                                                                                                                                                                                                                                                                                                                                                                                               |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            | (One of Chemistry 12 or CHEM 110) and (one of the following: Principles of Mathematics 12, Pre-calculus 12, MATH 094/095, or MATH 096).                                                                                                                                                                                                                                                                                                                                                                               |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            | NONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | NONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number: CHEM 111<br>Cross-listed with:<br>Equivalent course(s): CHEM 111<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                                                                                                                                                                                          |            | <b>Transfer Credit</b><br>Transfer credit already exists: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total Hours: 102</b><br><b>Typical structure of instructional hours:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Lecture hours</td><td style="text-align: right;">45</td></tr> <tr><td>Seminars/tutorials/workshops</td><td style="text-align: right;">12</td></tr> <tr><td>Laboratory hours</td><td style="text-align: right;">45</td></tr> <tr><td>Field experience hours</td><td></td></tr> <tr><td>Experiential (practicum, internship, etc.)</td><td></td></tr> <tr><td>Online learning activities</td><td></td></tr> <tr><td>Other contact hours:</td><td></td></tr> <tr><td style="text-align: right;"><b>Total</b></td><td style="text-align: right;"><b>102</b></td></tr> </table> |            | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 45 | Seminars/tutorials/workshops | 12 | Laboratory hours | 45 | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: |  | <b>Total</b> | <b>102</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 45         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 45         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>102</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            | <b>Maximum enrolment (for information only):</b> 36<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> annually                                                                                                                                                                                                                                                                                                                                                     |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Department / Program Head or Director:</b> David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            | <b>Date approved:</b> September 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            | <b>Date approved:</b> September 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            | <b>Date of posting:</b> November 20, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            | <b>Date approved:</b> September 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                      |  |              |            |                                                                                                                                                                                                                                                                                                                                                                                                  |  |

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Discuss critically the nature of light, using the concepts of frequency, wavelength, energy, and wave-particle duality.
2. Describe the Bohr model of the hydrogen atom, and explain its inadequacies compared to the quantum model of the hydrogen atom.
3. Explain the concept of atomic orbitals and describe the shapes of the s, p, and d orbitals.
4. Explain how the periodic table is determined by the electronic configuration of the elements.
5. Explain several periodic properties of elements using the concepts of shielding and penetration.
6. Generate Lewis dot diagrams of molecules.
7. Predict the three-dimensional shapes of simple molecules.
8. Describe the bonding in a simple molecule using qualitative valence bond theory.
9. Describe the bonding in diatomic gases using molecular orbital theory.
10. Describe and name simple organic molecules containing common functional groups (alkanes, alkenes, alkynes, alcohols, alkyl halides, ethers, aldehydes, ketones, carboxylic acids, esters, amines and amides).
11. Draw diagrams of the conformations of alkane derivatives.
12. Identify and name different stereoisomers of organic molecules.
13. Safely and efficiently perform basic chemical procedures in the laboratory.
14. Accurately record experimental data and observations in the laboratory.
15. Work efficiently and respectfully as a team with other students to complete selected laboratory experiments.
16. Communicate experimental results and analyses clearly through written laboratory reports.
17. Demonstrate laboratory knowledge and skills including the use of quantitative glassware and analytical balances with acceptable precision, and the application of basic spectrophotometric techniques.
18. Exhibit rudimentary skills with Gaussian Molecular Modelling software.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes      ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lectures, labs, group problem-solving sessions.

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☒ No ☐

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.)                 | Current ed.                         | Publisher | Year    |
|----------------------------|------------------------------------------------------|-------------------------------------|-----------|---------|
| 1. Petrucci R.H., et al.   | General Chemistry: Principle and Modern Applications | <input checked="" type="checkbox"/> | Pearson   | 2010    |
| 2. Fritzke, G., Webb, J.   | Chemistry 114 Lab Manual                             | <input checked="" type="checkbox"/> | UFV       | Current |
| 3.                         | Molecular Model Kit (available in the UFV Bookstore) | <input type="checkbox"/>            |           |         |

**Typical Evaluation Methods and Weighting**

|                |     |              |     |                   |     |            |      |
|----------------|-----|--------------|-----|-------------------|-----|------------|------|
| Final exam:    | 40% | Assignments: | 10% | Midterm exam:     | 20% | Practicum: | %    |
| Quizzes/tests: | 10% | Lab work:    | 20% | Field experience: | %   | Total:     | 100% |

**Typical Course Content and Topics**

1. Atomic structure and atomic spectra. Introduction to quantum theory.
2. Electronic structure of many-electron atoms, Periodic trends in atomic properties.
3. Chemical bonding. Ionic and covalent bonds. Lewis diagrams.
4. Molecular structure. VSEPR model. Valence bond and molecular orbital theories.
5. Intermolecular interactions. Interactions involving ions, dipoles and induced dipoles, and their relation to physical properties of matter.
6. Introduction to organic chemistry. Nomenclature, functional groups, structure and bonding, stereochemistry, and conformational analysis.

Typical laboratory experiments include:

- Qualitative Analysis of Anions
- Gravimetric Analysis of Ni
- Redox Titration
- Back Titration
- Spectrophotometry of Cr(III) Ions
- Molecular Geometries
- Periodic Properties
- Introduction to Chromatography
- Naming and Structure of Organic Molecules

**Memo for Course Changes**

To: UEC

From: David Fenske

Date: May 2015

**Subject: Proposal for revision of CHEM 114**

1. Summary of changes (select all that apply):

- ☒ Six-year review
- ☐ Number and/or course code
- ☐ Credits and/or total hours
- ☐ Title
- ☒ Calendar description
- ☐ Prerequisites and/or co-requisites
- ☐ Frequency of course offering
- ☒ Learning outcomes
- ☒ Delivery methods and/or texts and resource materials
- ☐ PLAR options, grading system, and/or evaluation methods
- ☐ Discontinuation of course
- ☐ Other – Please specify:

2. Rationale for change:

The calendar description has been changed to conform to the UFV standard.

The learning outcomes have been revised.

The delivery methods have been updated.

3. If there are substantial changes to the learning outcomes, explain how they align with the learning outcomes of the program(s): The learning outcomes now align with Chemistry Program Learning Outcomes (listed in recent program review).
4. Is this course required by any program beyond the discipline? If so, how will this change affect that program or programs? n/a
5. Which program areas have been consulted about the change(s)? n/a
6. What consideration has been given to indigenizing the curriculum? Indigenization is encouraged at the program level through breadth/elective requirements where students can choose from courses where indigenization is appropriate to the course content and discipline.
7. If this course is not eligible for PLAR, explain why: n/a
8. If any of the following items on the official course outline have changed, explain how the change will affect the budget for your area or any other area: n/a
- a. Credit value
  - b. Class size limit

- c. Frequency of offering
- d. Resources required (labs, equipment)
- 9. Are field trips required for this course? (Field trip requirements must be announced in the timetable.) How are the trips funded? n/a
- 10. Estimate of the typical costs for this course, including textbooks and other materials: \$300



**ORIGINAL COURSE IMPLEMENTATION DATE:** September 2002  
**REVISED COURSE IMPLEMENTATION DATE:** September 2016  
**COURSE TO BE REVIEWED: (six years after UEC approval)** December 2021  
**Course outline form version:** 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------|----|------------------|----|------------------------|--|--------------------------------------------|--|----------------------------|--|-------------------------------|---|--------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> CHEM 114                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | <b>Number of Credits:</b> 5 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Course Full Title:</b> Principles of Chemistry II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Calendar Description:</b><br><br>Topics include chemical thermodynamics and kinetics, aqueous equilibria, and the reactivity of organic molecules. Work performed in the laboratory complements lecture material. With CHEM 113, this course satisfies the requirements for honours, majors, or minors programs in science.                                                                                                                                                                                                                                                                                                                                                                                                                                |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            | CHEM 113.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | NONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            | NONE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number: CHEM 112<br>Cross-listed with:<br>Equivalent course(s): CHEM 112<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                                                                                                                                                                                                                      |            | <b>Transfer Credit</b><br>Transfer credit already exists: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No<br><br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input type="checkbox"/> No (if yes, fill in transfer credit form)<br><br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input type="checkbox"/> No<br><br>To find out how this course transfers, see <a href="#">bctransferguide.ca</a> . |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Total Hours: 102</b><br><b>Typical structure of instructional hours:</b> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr><td>Lecture hours</td><td style="text-align: right;">45</td></tr> <tr><td>Seminars/tutorials/workshops</td><td style="text-align: right;">12</td></tr> <tr><td>Laboratory hours</td><td style="text-align: right;">45</td></tr> <tr><td>Field experience hours</td><td></td></tr> <tr><td>Experiential (practicum, internship, etc.)</td><td></td></tr> <tr><td>Online learning activities</td><td></td></tr> <tr><td>Other contact hours: Tutorial</td><td style="text-align: center;">-</td></tr> <tr><td><b>Total</b></td><td style="text-align: right;"><b>102</b></td></tr> </table> |            | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 45 | Seminars/tutorials/workshops | 12 | Laboratory hours | 45 | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: Tutorial | - | <b>Total</b> | <b>102</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 45         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 12         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 45         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Other contact hours: Tutorial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>102</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            | <b>Maximum enrolment (for information only):</b> 36<br><br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> Winter and Summer                                                                                                                                                                                                                                                                                                                 |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Department / Program Head or Director:</b> David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            | <b>Date approved:</b> September 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |            | <b>Date approved:</b> September 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            | <b>Date of posting:</b> November 20, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            | <b>Date approved:</b> September 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                      |    |                              |    |                  |    |                        |  |                                            |  |                            |  |                               |   |              |            |                                                                                                                                                                                                                                                                                                                                                                                                          |  |



**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Define the basic terminology, conventions, and laws of thermodynamics.
2. Explain concepts of enthalpy, entropy, and free energy, and how they relate to spontaneity and equilibrium.
3. Apply thermodynamic principles to solve problems involving simple chemical and physical systems.
4. Describe the properties and theories of acids and bases, and solve quantitative problems related to acid/base equilibria.
5. Explain the basic terminology and concepts of chemical kinetics.
6. Derive rate laws and apply them quantitatively to solve problems in chemical kinetics.
7. Explain and predict the kinetics, mechanisms, and stereochemical outcomes of organic substitution reactions.
8. Exhibit safe handling and disposal of chemicals.
9. Write formal chemistry laboratory reports.
10. Use basic chemical equipment and techniques to measure or analyze acid dissociation constants, thermodynamic values, partition coefficients, kinetic rate constants, rate orders, equilibrium constants and solution concentrations.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes      ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lectures, labs, group problem-solving sessions, computer-based problem solving.

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☒ No ☐

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.)                 | Current ed.                         | Publisher | Year    |
|----------------------------|------------------------------------------------------|-------------------------------------|-----------|---------|
| 1. Petrucci R.H., et al.   | General Chemistry: Principle and Modern Applications | <input checked="" type="checkbox"/> | Pearson   | 2010    |
| 2.                         |                                                      | <input type="checkbox"/>            |           |         |
| 3. Fritzke, G., Webb, J.   | Chemistry 114 Lab Manual                             | <input checked="" type="checkbox"/> | UFV       | Current |
| 4.                         | Molecular Model Kit (available in the UFV Bookstore) | <input type="checkbox"/>            |           |         |

**Typical Evaluation Methods and Weighting**

|                        |     |              |     |                   |     |            |     |
|------------------------|-----|--------------|-----|-------------------|-----|------------|-----|
| Final exam:            | 40% | Assignments: | 10% | Midterm exam:     | 20% | Practicum: | %   |
| Quizzes/tests:         | 10% | Lab work:    | 20% | Field experience: | %   | Shop work: | %   |
| Assignments and tests: |     | Other:       | %   | Other:            | %   | Total:     | 100 |

**Typical Course Content and Topics**

1. **Principles of thermodynamics.** Thermodynamic terminology and definitions. Gas Laws. Heat, work, enthalpy and the First Law of Thermodynamics. Entropy and the Second law of Thermodynamics. Gibbs free energy and the relationship to spontaneity and equilibrium. Application of these principles to problems involving physical and chemical systems.
2. **Equilibria.** Thermodynamics of aqueous equilibria, Le Châtelier's principle, and relationship to kinetics. Solubility equilibria. Brønsted Lowry and Lewis theories of acids and bases. Weak and strong acids, monoprotic and polyprotic acids, buffers, and titrations.
3. **Chemical Kinetics.** Concepts of reaction order and molecularity, elementary reaction steps, reaction mechanisms, rate-limiting steps, transition states and reaction coordinate diagrams. Derivation of zeroth, first, and second order rate laws and their application to chemical reactions. The effect of temperature on reaction rates.
4. **Organic Chemistry.** Introduction to organic reactivity through the study of nucleophilic substitution reactions of alkyl halides. Properties, kinetics, and mechanisms of SN1 and SN2 reactions of alkyl halides. Effect on substitution reaction rates of the properties of the nucleophile, leaving group, solvent, and substrate structure. Stereochemical outcomes of substitution mechanisms.

**LABORATORY CONTENT:**

[Choice of experiments may vary by instructor. An example of experiments for this course might be:]

1. Determination of sodium, calcium and magnesium ions in a sample of seawater
2. Chemical Equilibrium: Reversible reactions and chemical equilibrium
3. Determination of an equilibrium constant
4. Potentiometric acid-base titrations and identification of a weak acid
5. Investigation of buffer systems
6. Thermodynamics: The entropy and enthalpy of solution for potassium hydrogen tartrate in water
7. Rates of Chemical Reactions: The iodination of acetone
8. Determination of the Universal Gas Constant
9. Preparation and analysis of benzoic acid
10. Extraction: The determination of a partition coefficient



## MEMO

To: Amanda Grimson for UEC  
From: Sylvie Murray, Program Development Coordinator  
CC: Rod McLeod, Jason Thomas, Lucy Lee  
Date: Dec 9, 2015  
Re: BSc, Major in Biochemistry program proposal

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Please find attached the proposal, appendices, calendar copy, course outlines and response to comments for submission to UEC.

The proposal, calendar copy and course outlines were reviewed by the UEC Screening subcommittee on Nov 25, 2015. The course outlines along with comments from UEC Screening were posted to CWC Dec 1 2015, and the proposal was posted for information. The PWG's responses to comments are shown in the attached document, and have been incorporated in the course outlines as appropriate, with changes tracked.

The concept paper for the BSc, Major in Biochemistry was approved by the Board as part of the 2013 Education Plan update.

**Note:** The proposal and additional documents are available in *S:\Groups\UEC\2015-12-18...* and in the shared UEC Dropbox folder.

**Program Working Group members:**

|                     |              |
|---------------------|--------------|
| Jason Thomas, chair | Allan Arndt  |
| James Bedard        | David Fenske |
| Ron Wilen           |              |

**Program summary:**

The proposed new major within the Bachelor of Science degree will offer UFV students highly relevant preparation for entry into professional training programs for physicians, dentists, pharmacists and veterinarians. It will also prepare them for further study, research, or employment in the vast array of fields that rely on biotechnology and molecular life sciences, such as agriculture, food science, medicine and environmental science. A biochemistry program can address the interdisciplinary nature of the growing biotechnology and biomedical research sectors—hotbeds of innovation, entrepreneurship, and economic growth, locally and world-wide. Hands-on training and student research opportunities, combined with the theoretical aspects of biochemistry taught by a strong contingent of faculty members with specific expertise in biochemistry and molecular biology, will provide students with a rigorous and relevant program of study.



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note:** The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------|----|------------------|--|------------------------|--|--------------------------------------------|--|----------------------------|--|----------------------|--|--------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> BIOC 401                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Course Full Title:</b> Enzymes, Coenzymes, and Inhibitors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Course Short Title (if title exceeds 30 characters):</b> Enzymology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Calendar Description:</b><br><p>Topics include protein structure and function, theoretical principles of catalysis, strategies that enzymes use to catalyze reactions, and physical techniques used to study enzyme mechanisms. Chemical mechanisms for representative enzymes, coenzymes, enzyme inhibitors, and drugs are explored in detail.</p> <p>Note: This course is offered as BIOC 401 and CHEM 401. Students may take only one of these for credit. Students with credit for CHEM 412C cannot take this course for further credit.</p>            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | CHEM 214.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number: <b>CHEM 412C</b><br>Cross-listed with: <b>CHEM 401</b><br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                        |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Total Hours: 45</b><br><b>Typical structure of instructional hours:</b> <table border="1"> <tr> <td>Lecture hours</td> <td>33</td> </tr> <tr> <td>Seminars/tutorials/workshops</td> <td>12</td> </tr> <tr> <td>Laboratory hours</td> <td></td> </tr> <tr> <td>Field experience hours</td> <td></td> </tr> <tr> <td>Experiential (practicum, internship, etc.)</td> <td></td> </tr> <tr> <td>Online learning activities</td> <td></td> </tr> <tr> <td>Other contact hours:</td> <td></td> </tr> <tr> <td><b>Total</b></td> <td><b>45</b></td> </tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 33 | Seminars/tutorials/workshops | 12 | Laboratory hours |  | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: |  | <b>Total</b> | <b>45</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br>No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 33        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>45</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Maximum enrolment (for information only):</b> 24<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> annually                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Department / Program Head or Director:</b> David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           | <b>Date approved:</b> Sept 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                         |  |

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Characterize enzymatic catalysis within the framework of chemical kinetics and thermodynamics.
2. Explain the general mechanistic strategies that enzymes use to catalyze chemical reactions.
3. Explain the mechanistic basis for the function of several major classes of enzymes, coenzymes, inhibitors, and drugs.
4. Explain how laboratory experiments are used to elucidate enzyme mechanisms.
5. Propose enzyme or inhibitor mechanisms that are consistent with experimental data.
6. Propose biosynthetic pathways for the assembly of common natural product classes (terpenes and polyketides) that are consistent with structural features and experimental data.
7. Critically analyze recent enzymological research literature.
8. Deliver an oral presentation in a manner suitable to a scholarly audience based on analysis of recent enzymological research literature.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lectures, oral presentations.

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.)                | Current ed.                         | Publisher      | Year |
|----------------------------|-----------------------------------------------------|-------------------------------------|----------------|------|
| 1. Bugg, T.D.H.            | Introduction to Enzyme and Coenzyme Chemistry       | <input checked="" type="checkbox"/> | Blackwell      | 2012 |
| 2. Silverman, R.B.         | The Organic Chemistry of Enzyme-Catalyzed Reactions | <input checked="" type="checkbox"/> | Academic Press | 2002 |
| 3.                         |                                                     | <input type="checkbox"/>            |                |      |
| 4.                         |                                                     | <input type="checkbox"/>            |                |      |
| 5.                         |                                                     | <input type="checkbox"/>            |                |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**

**Typical Evaluation Methods and Weighting**

|                       |     |              |     |                    |     |            |      |
|-----------------------|-----|--------------|-----|--------------------|-----|------------|------|
| Final exam:           | 40% | Assignments: | 15% | Midterm exams: (2) | 30% | Practicum: | %    |
| Quizzes/tests:        | %   | Lab work:    | %   | Field experience:  | %   | Shop work: | %    |
| Project/Presentation: | 15% | Other:       | %   | Other:             | %   | Total:     | 100% |

**Details (if necessary):**

**Typical Course Content and Topics**

Module 1: Introductory topics: protein structure/folding, non-covalent interactions, enzyme classification and nomenclature

Module 2: General catalytic strategies used by enzymes: non-enzymatic and enzymatic examples of catalysis via acid/base, covalent metal cation-mediated, proximity and orientation, and electrostatic mechanisms.

Module 3: Experimental methods in enzymology: physical methods used to study enzyme mechanisms, stereochemical methods in enzymology, types of enzyme inhibitors, enzyme and inhibition kinetics, transition state theory

Module 4: Enzyme catalyzed group transfer and hydrolysis reactions: phosphate transfer, acyl transfer, glycosyl transfer, methyl transfer involving SAM and tetrahydrofolate, case studies of HIV protease and influenza sialidase enzymes and inhibitors.

Module 5: Enzymatic chemistry involving pyridoxal: non-enzymatic model reactions, racemases, decarboxylases, amino transferases, side chain-modifying enzymes, inhibitors.

Module 6: Enzymatic chemistry involving thiamine: benzoin condensation, decarboxylases, pyruvate dehydrogenase, transketolases, inhibitors

Module 7: Enzymatic redox chemistry involving nicotinamide and flavins: alcohol dehydrogenases, acyl-CoA dehydrogenase, amine-oxidases, flavin oxidases, mono-oxygenases, transient oxidations in selected isomerization and elimination reactions, inhibitors.

Module 8: Enzymatic carbon-carbon bond formation: carboxylation reactions involving biotin and vitamin K, Rubisco, fattyacid/polyketide biosynthesis, aldolases, mevalonate pathway/terpenes.

Module 9: Student presentations on examples of enzyme mechanism and/or inhibition taken from the recent research literature.



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE CROSS-LISTED COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Code and Number:</b> CHEM 401                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Course Full Title:</b> Enzymes, Coenzymes, and Inhibitors<br><b>Course Short Title (if title exceeds 30 characters):</b> Enzymology                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Official Course Outline:</b><br>This is a cross-listed course. Please refer to <b>BIOC 401</b> for the official course outline.                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Calendar Description:</b><br>Topics include protein structure and function, theoretical principles of catalysis, strategies that enzymes use to catalyze reactions, and physical techniques used to study enzyme mechanisms. Chemical mechanisms for representative enzymes, coenzymes, enzyme inhibitors, and drugs are explored in detail.<br><br>Note: This course is offered as BIOC 401 and CHEM 401. Students may take only one of these for credit. Students with credit for CHEM 412C cannot take this course for further credit. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CHEM 214.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number: <b>CHEM 412C</b><br>Cross-listed with: <b>BIOC 401</b><br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                      | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br><br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |
| <b>Department / Program Head or Director:</b> David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Date approved:</b> Sept 28, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note:** The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------|----|------------------|--|------------------------|--|--------------------------------------------|--|----------------------------|--|----------------------|--|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> : BIOC 402                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Full Title:</b> Advanced Metabolism                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Calendar Description:</b><br><p>The course provides a detailed examination of selected primary and secondary metabolic pathways and their relationship to human health and diseased states.</p>                                                                                                                                                                                                                                                                                                                                                             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | BIO320/BIOC 320 and 6 credits of 200-level or higher Chemistry.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with:<br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                                         |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total Hours: 45</b><br><b>Typical structure of instructional hours:</b> <table border="1"> <tr> <td>Lecture hours</td> <td>33</td> </tr> <tr> <td>Seminars/tutorials/workshops</td> <td>12</td> </tr> <tr> <td>Laboratory hours</td> <td></td> </tr> <tr> <td>Field experience hours</td> <td></td> </tr> <tr> <td>Experiential (practicum, internship, etc.)</td> <td></td> </tr> <tr> <td>Online learning activities</td> <td></td> </tr> <tr> <td>Other contact hours:</td> <td></td> </tr> <tr> <td><b>Total</b></td> <td><b>45</b></td> </tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 33 | Seminars/tutorials/workshops | 12 | Laboratory hours |  | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: |  | <b>Total</b> | <b>45</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 33        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>45</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Maximum enrolment (for information only):</b> 24<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> annually                                                                                                                                                                                                                                                                                                                                                     |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Department / Program Head or Director:</b> David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           | <b>Date approved:</b> Sept 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |

**BIOC 402**

**University of the Fraser Valley Official Undergraduate Course Outline**

Page 2 of 2

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Describe the metabolic pathways associated with primary metabolite synthesis and degradation.
2. Explain how primary metabolic pathways are interconnected.
3. Explain the importance of secondary metabolism and why it differs between species.
4. Discuss the relationship between hormones, metabolism, and human health.
6. Predict the metabolic consequence of a defect in a specific biochemical pathway.
7. Analyze metabolic data sets in the context of human health.
8. Collaborate with a team of other students to analyze metabolic data sets.
9. Communicate conclusions drawn from metabolic data analysis in a written report.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lectures, problem sets, group research and presentation assignments

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☒ No ☐

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.) | Current ed.                         | Publisher | Year |
|----------------------------|--------------------------------------|-------------------------------------|-----------|------|
| 1. Berg et al.             | Biochemistry                         | <input checked="" type="checkbox"/> | Freeman   | 2015 |
| 2. Nelson and Cox          | Lehninger Biochemistry               | x <input type="checkbox"/>          | Freeman   | 2013 |
| 3. Garrett et al.          | Biochemistry                         | x <input type="checkbox"/>          | Nelson    | 2013 |
| 4.                         |                                      | <input type="checkbox"/>            |           |      |
| 5.                         |                                      | <input type="checkbox"/>            |           |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**

Use this section for supplies and materials for all sections of this course.

**Typical Evaluation Methods and Weighting**

|                      |     |              |     |                   |     |            |      |
|----------------------|-----|--------------|-----|-------------------|-----|------------|------|
| Final exam:          | 40% | Assignments: | 15% | Midterm exam:     | 25% | Practicum: | %    |
| Quizzes/tests:       | %   | Lab work:    |     | Field experience: | %   | Shop work: | %    |
| Other: Group Project | 20% | Other:       | %   | Other:            | %   | Total:     | 100% |

**Details (if necessary):** Team work is evaluated as part of group project and is based upon peer evaluation, team workload plan, and the quality of the final report.

**Typical Course Content and Topics**

Week 1: Review of the central role of the TCA cycle  
 Week 2: Amino acid metabolism in plants and microbes  
 Week 3: Amino acid metabolism in mammals  
 Week 4: Nucleic acid metabolism  
 Week 5: Carbohydrate metabolism and human diseases  
 Week 6: Pentose phosphate pathway and NADPH synthesis  
 Week 7: Biosynthesis of respiratory and photosynthetic pigments  
 Week 8 – 10: Secondary metabolism including synthesis and function of vitamins, and selected antibiotic, alkaloid, and terpene synthesis  
 Week 11: Hormonal integration of human metabolism  
 Week 12 -13: Composition of blood plasma and urine as an indication of human health



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------|--|------------------|--|------------------------|--|--------------------------------------------|--|----------------------------|--|---------------------------------------|----|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> BIOC 408                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Full Title:</b> Directed Studies in Biochemistry I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Calendar Description:</b><br><p>An opportunity for Biochemistry major students to apply scientific principles in a creative, hands-on research experience outside the usual course format. Students will develop their own research projects in biochemistry under the supervision of a faculty member.</p>                                                                                                                                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | BIOC 350/CHEM 350.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with:<br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                                |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total Hours: 45</b><br><b>Typical structure of instructional hours:</b> <table border="1"> <tr><td>Lecture hours</td><td></td></tr> <tr><td>Seminars/tutorials/workshops</td><td></td></tr> <tr><td>Laboratory hours</td><td></td></tr> <tr><td>Field experience hours</td><td></td></tr> <tr><td>Experiential (practicum, internship, etc.)</td><td></td></tr> <tr><td>Online learning activities</td><td></td></tr> <tr><td>Other contact hours: Student Directed</td><td>45</td></tr> <tr><td><b>Total</b></td><td><b>45</b></td></tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | Seminars/tutorials/workshops |  | Laboratory hours |  | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: Student Directed | 45 | <b>Total</b> | <b>45</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Other contact hours: Student Directed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 45        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>45</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | <b>Maximum enrolment (for information only):</b> 6<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> every semester                                                                                                                                                                                                                                                                                                                                                |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Department / Program Head or Director:</b> Dr. David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date approved:</b> Sept 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Dean/Associate VP:</b> Dr. Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |



**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Propose a creative scientific research project.
2. Search and summarize scholarly research literature.
3. Formulate a hypothesis.
4. Design experiments to test a hypothesis.
5. Perform laboratory experiments independently, safely, and skillfully.
6. Present results and conclusions in written and oral formats in a clear and scholarly way.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Faculty-supervised, self-directed research, written reports, oral presentations

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.)                                                                                                                | Current ed.              | Publisher | Year |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------|------|
| 1.                         | The student will have the opportunity to access original literature. Literature surveys will be conducted using database searches at UFV libraries. | <input type="checkbox"/> |           |      |
| 2.                         |                                                                                                                                                     | <input type="checkbox"/> |           |      |

**Typical Evaluation Methods and Weighting**

|                     |     |                       |     |                   |     |            |      |
|---------------------|-----|-----------------------|-----|-------------------|-----|------------|------|
| Final exam:         | %   | Assignments:          | %   | Midterm exam:     | %   | Practicum: | %    |
| Quizzes/tests:      | %   | Lab work:             | %   | Field experience: | %   | Shop work: | %    |
| Other: Final Report | 70% | Other: Interim Report | 10% | Other: Proposal   | 20% | Total:     | 100% |

**Details (if necessary):** All students will be required to deliver an interim report or presentation to the supervising instructor. The final report will be delivered to a committee consisting of the supervisor a minimum of one other instructor. This committee will be responsible for assigning the final grade.

**Typical Course Content and Topics**

Selection of a Suitable Area

The student may already have a specific area of research in mind or a specific instructor with whom he or she would like to interact. In this case, the student and instructor will strike an agreement depending on:

- (i) available equipment and space
- (ii) budget for consumables
- (iii) availability of appropriate faculty and staff

Otherwise, an instructor may suggest a project to a suitable student. In all cases, it will be the instructor's responsibility to ensure that the proposed project is appropriate for an upper level student to accomplish in the proposed time. It is also the responsibility of the instructor to ensure that equipment, funding, and space are available for the project.

Design of Research Project

The student will survey the literature in a particular field under the guidance of the appropriate instructor. The student will be assisted to build on the literature to formulate a testable hypothesis and design an appropriate experimental approach. The student will address questions such as: novelty of the approach, statistical analysis to be carried out, use of controls, use of replicates. Because of the nature of biochemical science, not all projects will fit neatly into one semester. Student and instructor will have the option of extending the course into a second semester, although the credit value of the course will remain 3 credits.

Perform Research

The instructor will aid the student in mastery of the techniques necessary to carry out the research. The student will be responsible for scheduling time for the various stages of the project, making sure equipment is available, reporting to the instructor. Regular meetings of student and instructor are required for all projects.

Production of Research Paper

The student will be expected to produce a research paper that is clear and scholarly and written in the style of a major journal. The instructor will aid the student in producing a quality piece of science communication.

Laboratory Experiments

Appropriate experiments will be determined by the supervising instructor and student. Cost and space considerations will be considered on an ad hoc basis.



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note:** The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------|--|------------------|--|------------------------|--|--------------------------------------------|--|----------------------------|--|---------------------------------------|----|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> BIOC 409                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           | <b>Number of Credits:</b> 6 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Full Title:</b> Directed Studies in Biochemistry II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Calendar Description:</b><br><p>An opportunity for Biochemistry major students to apply scientific principles in a creative, hands-on research experience outside the usual course format. Students will develop their own research projects in biochemistry under the supervision of a faculty member.</p>                                                                                                                                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | BIOC 350/CHEM 350.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with:<br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                                |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total Hours: 90</b><br><b>Typical structure of instructional hours:</b> <table border="1"> <tr><td>Lecture hours</td><td></td></tr> <tr><td>Seminars/tutorials/workshops</td><td></td></tr> <tr><td>Laboratory hours</td><td></td></tr> <tr><td>Field experience hours</td><td></td></tr> <tr><td>Experiential (practicum, internship, etc.)</td><td></td></tr> <tr><td>Online learning activities</td><td></td></tr> <tr><td>Other contact hours: Student Directed</td><td>90</td></tr> <tr><td><b>Total</b></td><td><b>90</b></td></tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | Seminars/tutorials/workshops |  | Laboratory hours |  | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: Student Directed | 90 | <b>Total</b> | <b>90</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Other contact hours: Student Directed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 90        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>90</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | <b>Maximum enrolment (for information only):</b> 6<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> every semester                                                                                                                                                                                                                                                                                                                                                |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Department / Program Head or Director:</b> Dr. David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date approved:</b> Sept 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Dean/Associate VP:</b> Dr. Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |                              |  |                  |  |                        |  |                                            |  |                            |  |                                       |    |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Propose a creative scientific research project.
2. Search and summarize scholarly research literature.
3. Formulate a hypothesis.
4. Design experiments to test the hypothesis.
5. Perform laboratory experiments independently, safely, and skillfully.
6. Present results and conclusions in written and oral formats in a clear and scholarly way.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes    ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Faculty-supervised, self-directed research

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.)                                                                                                                | Current ed.              | Publisher | Year |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------|------|
| 1.                         | The student will have the opportunity to access original literature. Literature surveys will be conducted using database searches at UFV libraries. | <input type="checkbox"/> |           |      |
| 2.                         |                                                                                                                                                     | <input type="checkbox"/> |           |      |

**Typical Evaluation Methods and Weighting**

|                     |     |                       |     |                   |     |            |      |
|---------------------|-----|-----------------------|-----|-------------------|-----|------------|------|
| Final exam:         | %   | Assignments:          | %   | Midterm exam:     | %   | Practicum: | %    |
| Quizzes/tests:      | %   | Lab work:             | %   | Field experience: | %   | Shop work: | %    |
| Other: Final Report | 70% | Other: Interim Report | 10% | Other: Proposal   | 20% | Total:     | 100% |

**Details (if necessary):** All students will be required to deliver an interim report or presentation to the supervising instructor. The final report will be delivered to a committee consisting of the supervisor and a minimum of one other instructor. This committee will be responsible for assigning the final grade.

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Selection of a Suitable Area

The student may already have a specific area of research in mind or a specific instructor with whom he or she would like to interact. In this case, the student and instructor will strike an agreement depending on:

- (i) available equipment and space
- (ii) budget for consumables
- (iii) availability of appropriate faculty and staff

Otherwise, an instructor may suggest a project to a suitable student. In all cases, it will be the instructor's responsibility to ensure that the proposed project is appropriate for an upper level student to accomplish in the proposed time. It is also the responsibility of the instructor to ensure that equipment, funding, and space are available for the project.

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The student will survey the literature in a particular field under the guidance of the appropriate instructor. The student will be assisted to build on the literature to formulate a testable hypothesis and design an appropriate experimental approach. The student will address questions such as: novelty of the approach, statistical analysis to be carried out, use of controls, use of replicates. Because of the nature of biochemical science, not all projects will fit neatly into one semester. Student and instructor will have the option of extending the course into a second semester, although the credit value of the course will remain 3 credits.

Perform Research

The instructor will aid the student in mastery of the techniques necessary to carry out the research. The student will be responsible for scheduling time for the various stages of the project, making sure equipment is available, reporting to the instructor. Regular meetings of student and instructor are required for all projects.

Production of Research Paper

The student will be expected to produce a research paper that is clear and scholarly and written in the style of a major journal. The instructor will aid the student in producing a quality piece of science communication.

Laboratory Experiments

Appropriate experiments will be determined by the supervising instructor and student. Cost and space considerations will be considered on an ad hoc basis.



ORIGINAL COURSE IMPLEMENTATION DATE: September 1995  
 REVISED COURSE IMPLEMENTATION DATE: September 2015  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2017  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note:** The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------|--|------------------|--|------------------------|--|--------------------------------------------|--|----------------------------|--|----------------------|--|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> BIO 320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Full Title:</b> Biochemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           | <b>Department (or program if no department):</b> Biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Calendar Description:</b><br><p>This course deals with the structures, function, and metabolic interactions of lipids, steroids, vitamins, nucleotides, nucleic acids, amino acids, and proteins. An emphasis will be placed on metabolic processes that have an impact on human diseases.</p> <p>Note: This course is offered as BIO 320 and BIOC 320. Students may take only one of these for credit.</p>                                                                                                                                               |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           | BIO 201 and CHEM 213.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with: <b>BIOC 320</b><br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                       |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total Hours: 45</b><br><b>Typical structure of instructional hours:</b> <table border="1"> <tr> <td>Lecture hours</td> <td>45</td> </tr> <tr> <td>Seminars/tutorials/workshops</td> <td></td> </tr> <tr> <td>Laboratory hours</td> <td></td> </tr> <tr> <td>Field experience hours</td> <td></td> </tr> <tr> <td>Experiential (practicum, internship, etc.)</td> <td></td> </tr> <tr> <td>Online learning activities</td> <td></td> </tr> <tr> <td>Other contact hours:</td> <td></td> </tr> <tr> <td><b>Total</b></td> <td><b>45</b></td> </tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 45 | Seminars/tutorials/workshops |  | Laboratory hours |  | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: |  | <b>Total</b> | <b>45</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 45        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>45</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           | <b>Maximum enrolment (for information only):</b> 36<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> every semester                                                                                                                                                                                                                                                                                                                                                          |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Department / Program Head or Director:</b> Allan Arndt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           | <b>Date approved:</b> October 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Dean/Associate VP:</b> Dr. Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                              |  |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |

**BIO 320**

**University of the Fraser Valley Official Undergraduate Course Outline**

Page 2 of 2

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Identify the structure and function of principal biomolecules
2. Analyze the changes to biomolecule structure and function in response to changes in cellular environment
3. Predict how protein structure and function can be related to various human disease states
4. Recognize and classify enzymatic mechanisms
5. Compare the regulatory mechanisms controlling major metabolic pathways and relate these mechanisms to cell state
6. Solve free energy equations associated with various metabolic pathways

**Prior Learning Assessment and Recognition (PLAR)**

X Yes ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lecture

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.) | Current ed.              | Publisher | Year |
|----------------------------|--------------------------------------|--------------------------|-----------|------|
| 1. Berg, Tymoczko & Stryer | Biochemistry 6th ed                  | <input type="checkbox"/> | Freeman   | 2007 |
| 2.                         |                                      | <input type="checkbox"/> |           |      |
| 3.                         |                                      | <input type="checkbox"/> |           |      |
| 4.                         |                                      | <input type="checkbox"/> |           |      |
| 5.                         |                                      | <input type="checkbox"/> |           |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**

Use this section for supplies and materials for all sections of this course.

**Typical Evaluation Methods and Weighting**

|                |      |              |      |                   |      |            |       |
|----------------|------|--------------|------|-------------------|------|------------|-------|
| Final exam:    | 40 % | Assignments: | 10 % | Midterm exam:     | 30 % | Practicum: | %     |
| Quizzes/tests: | %    | Lab work:    | %    | Field experience: | %    | Shop work: | %     |
| Other: paper   | 20 % | Other:       | %    | Other:            | %    | Total:     | 100 % |

**Details (if necessary):**

**Typical Course Content and Topics**

Week 1 Chapter 2: Amino Acids & Protein Structure Week 2 Chapter 3: Proteins: Analytical Techniques  
 Week 3 Chapter 7: Hemoglobin & Myoglobin  
 Week 4 & 5 Chapter 8: Properties of Enzymes/ Vitamins Chapters 9 & 10: Enzymes: Catalytic & Regulatory Strategies  
 Week 6 Chapter 11: Carbohydrates  
 Week 7 Chapter 12& 13: Lipids & Cell Membranes  
 Week 8 Chapter 17: Citric Acid Cycle/ Urea Cycle  
 Week 9 Chapter 21 Glycogen Metabolism  
 Week 10 Chapter 22: Fatty Acid Metabolism  
 Week 11 Chapter 26: Lipid Metabolism: Cholesterol Synthesis  
 Week 12 Chapters 22, 26: Lipid Metabolism: Plasma Lipoproteins  
 Week 13 Chapter 25: Nucleotide Biosynthesis


**ORIGINAL COURSE IMPLEMENTATION DATE:**

September 2016

**REVISED COURSE IMPLEMENTATION DATE:**
**COURSE TO BE REVIEWED:** (six years after UEC approval)

December 2017

**Course outline form version: 09/15/14**

## OFFICIAL UNDERGRADUATE CROSS-LISTED COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

|                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Code and Number:</b> BIOC 320                                                                                                                                                                                                                                                                                                                                                                     | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Course Full Title:</b> Biochemistry                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                          | <b>Department (or program if no department):</b> Biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Official Course Outline:</b><br>This is a cross-listed course. Please refer to <b>BIO 320</b> for the official course outline.                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Calendar Description:</b><br><br>This course deals with the structures, function, and metabolic interactions of lipids, steroids, vitamins, nucleotides, nucleic acids, amino acids, and proteins. An emphasis will be placed on metabolic processes that have an impact on human diseases.<br><br>Note: This course is offered as BIO 320 and BIOC 320. Students may take only one of these for credit. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                             | BIO 201 and CHEM 213.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with: <b>BIO 320</b><br>Equivalent course(s): <b>BIO 320</b><br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                        | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Transfer credit requested (OReg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |
| <b>Department / Program Head or Director:</b> Allan Arndt                                                                                                                                                                                                                                                                                                                                                   | <b>Date approved:</b> October 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                             | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                       | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                          | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                     | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |



ORIGINAL COURSE IMPLEMENTATION DATE: September 2007  
 REVISED COURSE IMPLEMENTATION DATE: September 2016  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 07/07/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note:** The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------|--|------------------|----|------------------------|--|--------------------------------------------|--|----------------------------|--|----------------------|--|--------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> CHEM 350                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Course Full Title:</b> Introductory Biochemistry Laboratory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Calendar Description:</b><br>Introduction to biochemical laboratory techniques; lectures provide theoretical background. Topics include spectrophotometry, chromatography, enzyme kinetics, protein and lipid assays, protein characterization, model membrane systems, and lipid-based systems for biomedical applications.<br><br>Note: This course is offered as CHEM 350 and BIOC 350. Students may take only one of these for credit.                                                                                                                        |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             | CHEM 214 or BIO 320/BIOC 320.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number: N/A<br>Cross-listed with: <b>BIOC 350</b><br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                           |             | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br><br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="#">bctransferguide.ca</a> . |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Total Hours:</b> 67.5<br><b>Typical structure of instructional hours:</b> <table border="1"> <tr> <td>Lecture hours</td> <td>22.5</td> </tr> <tr> <td>Seminars/tutorials/workshops</td> <td></td> </tr> <tr> <td>Laboratory hours</td> <td>45</td> </tr> <tr> <td>Field experience hours</td> <td></td> </tr> <tr> <td>Experiential (practicum, internship, etc.)</td> <td></td> </tr> <tr> <td>Online learning activities</td> <td></td> </tr> <tr> <td>Other contact hours:</td> <td></td> </tr> <tr> <td><b>Total</b></td> <td><b>67.5</b></td> </tr> </table> |             | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 22.5 | Seminars/tutorials/workshops |  | Laboratory hours | 45 | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: |  | <b>Total</b> | <b>67.5</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 22.5        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 45          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>67.5</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             | <b>Maximum enrolment (for information only): 24</b><br><br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> Every year                                                                                                                                                                                                                                                                                                                                          |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Department / Program Head or Director:</b> David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             | <b>Date approved:</b> Oct. 14, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |             | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |             |                                                                                                                                                                                                                                                                                                                                                                                                          |  |

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Explain the theoretical concepts that underlie modern biochemical laboratory techniques.
2. Apply knowledge of molecular structure and function in the context of laboratory experiments and data analysis.
3. Apply the scientific method to laboratory experiments and data analysis.
4. Explain the strengths and limitations of modern biochemical instrumentation.
5. Perform basic laboratory techniques used in modern biochemistry and molecular biology such as spectrophotometry, chromatography, gel electrophoresis, protein and lipid analysis.
6. Communicate newly acquired data and knowledge through written laboratory reports.
7. Demonstrate technical acumen as it relates to computers, appropriate software, and the organization and analysis of data.
8. Cooperate with a team of other students to complete selected laboratory experiment.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes      ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lectures, lab experiments, lab reports

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.)      | Current ed.              | Publisher | Year |
|----------------------------|-------------------------------------------|--------------------------|-----------|------|
| 1. Stryer                  | Biochemistry, 8 <sup>th</sup> edition     | <input type="checkbox"/> |           |      |
| 2.                         | and laboratory handout (this may change). | <input type="checkbox"/> |           |      |
| 3.                         |                                           | <input type="checkbox"/> |           |      |
| 4.                         |                                           | <input type="checkbox"/> |           |      |
| 5.                         |                                           | <input type="checkbox"/> |           |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**

Use this section for supplies and materials for all sections of this course.

**Typical Evaluation Methods and Weighting**

|                |     |                  |     |                     |     |            |      |
|----------------|-----|------------------|-----|---------------------|-----|------------|------|
| Final exam:    | 25% | Assignments:     | %   | Midterm exam:       | 15% | Practicum: | %    |
| Quizzes/tests: | %   | Lab work:        | 5%  | Field experience:   | %   | Shop work: | %    |
| Formal Report: | 10% | Results Reports: | 40% | Other: Presentation | 5%  | Total:     | 100% |

**Details (if necessary):** Teamwork is evaluated as part of the lab work grade and is based upon peer evaluation, team workload plan, and the quality of the final report. Communication is evaluated through formal and results reports.

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☒ No ☐

**Typical Course Content and Topics**

An appropriate number of experiments will be selected from the following list. Topics may change from year to year depending on availability of instrumentation and feedback from previous years.

The course will consist of weekly lectures in which the biochemical basis theoretical concepts, instrumentation strengths and limitations, and data analysis techniques relevant to of the week's experiment will be summarized and discussed. These lectures will include discussions of the structure and function of biomolecules, and key metabolic pathways, and relevant experimental techniques. The labs will constitute the main part of the course, and will follow directly from the lectures. Students will hand in one two formal reports, and smaller results reports for the experiments which do not require formal reports. There will also be a written midterm and final exams.

Check-in, pipetting exercises, lab notebook and report expectations, use of computer programs to organize and analyze quantitative data.

Spectrophotometry  
Gel filtration chromatography  
Proteolytic enzymes  
Enzyme kinetics  
Sequencing of a dipeptide  
Basic liposomology

Other possible experiments may include:

- Purification of a protein or enzyme
- Determination of fatty acid profiles of natural & commercial fats (saturated, unsaturated, and trans fatty acids).
- Carbohydrates and polarimetry
- Characterization of a protein by SDS-PAGE





ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE CROSS-LISTED COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Code and Number:</b> BIOC 350                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Course Full Title:</b> Introductory Biochemistry Laboratory<br><b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Official Course Outline:</b><br>This is a cross-listed course. Please refer to <b>CHEM 350</b> for the official course outline.                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Calendar Description:</b><br>Introduction to biochemical laboratory techniques; lectures provide theoretical background. Topics include spectrophotometry, chromatography, enzyme kinetics, protein and lipid assays, protein characterization, model membrane systems, and lipid-based systems for biomedical applications.<br><br>Note: This course is offered as CHEM 350 and BIOC 350. Students may take only one of these for credit. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                               | CHEM 214 or BIO 320/BIOC 320.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with: <b>CHEM 350</b><br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                        | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br><br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |
| <b>Department / Program Head or Director:</b> Dr. David Fenske                                                                                                                                                                                                                                                                                                                                                                                | <b>Date approved:</b> Sept 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Dean/Associate VP:</b> Dr. Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                       | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



ORIGINAL COURSE IMPLEMENTATION DATE: May 2005  
 REVISED COURSE IMPLEMENTATION DATE: September 2016  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note:** The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------|--|------------------|----|------------------------|--|--------------------------------------------|--|----------------------------|--|----------------------|--|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> BIO 403                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           | <b>Number of Credits:</b> 4 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Full Title:</b> Molecular Techniques I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Department (or program if no department):</b> Biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Calendar Description:</b><br><p>This is an intensive laboratory course that introduces students to the methodology used in recombinant DNA technology using an integrated series of molecular biology techniques. This course prepares students for careers in research or the biotechnology/pharmaceuticals industry.</p> <p>Note: This course is offered as BIO 403 and BIOC 403. Students may take only one of these for credit.</p>                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | BIO 202, BIO 220, BIO 309 (formerly BIO 203), and one of the following: BIO 312, BIO 320, BIO 425 (formerly BIO 325), or BIO 401.                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with: <b>BIOC 403</b><br>Equivalent course(s): <b>BIOC 403</b><br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                         |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total Hours: 90</b><br><b>Typical structure of instructional hours:</b> <table border="1"> <tr> <td>Lecture hours</td> <td>25</td> </tr> <tr> <td>Seminars/tutorials/workshops</td> <td></td> </tr> <tr> <td>Laboratory hours</td> <td>65</td> </tr> <tr> <td>Field experience hours</td> <td></td> </tr> <tr> <td>Experiential (practicum, internship, etc.)</td> <td></td> </tr> <tr> <td>Online learning activities</td> <td></td> </tr> <tr> <td>Other contact hours:</td> <td></td> </tr> <tr> <td><b>Total</b></td> <td><b>90</b></td> </tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 25 | Seminars/tutorials/workshops |  | Laboratory hours | 65 | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: |  | <b>Total</b> | <b>90</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 25        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 65        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>90</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Maximum enrolment (for information only):</b> 24<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> biennially                                                                                                                                                                                                                                                                                                                                                              |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Department / Program Head or Director:</b> Allan Arndt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           | <b>Date approved:</b> October 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |

**BIO 403**

**University of the Fraser Valley Official Undergraduate Course Outline**

Page 2 of 2

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

1. Work independently within a laboratory setting and.
2. Demonstrate familiarity with the use of laboratory equipment.
3. Prepare chemicals and media used in their projects.
4. Record, interpret, and present scientific data to support their ongoing projects and aid in troubleshooting.
5. Describe the biochemistry and biophysics of a symbiotic relationship.
6. Isolate and clone DNA from an operon which encodes proteins responsible for a defined phenotype.
7. Manipulate DNA using recombinant DNA technology, including restriction analysis, agarose gel electrophoresis, ligations, transformation, preparation and screening a genomic library, and Southern blotting and hybridizations.
8. Use bioinformatics to screen genomic and protein data bases to understand the structure/function of the genes and gene products from the operon under study.

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Laboratory exercises, lectures, maintaining a laboratory manual and completing problem sets.

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

|    | Author (surname, initials)     | Title (article, book, journal, etc.)                 | Current ed.                         | Publisher | Year |
|----|--------------------------------|------------------------------------------------------|-------------------------------------|-----------|------|
| 1. | MR Winfrey, MA Rott, A Wortman | Unraveling DNA: Molecular Biology for the Laboratory | <input checked="" type="checkbox"/> | Cummings  | 1997 |
| 2. |                                |                                                      | <input type="checkbox"/>            |           |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**

Students are required to supply a lab coat and a bound laboratory note book.

**Typical Evaluation Methods and Weighting**

|                             |     |              |     |                   |     |            |      |
|-----------------------------|-----|--------------|-----|-------------------|-----|------------|------|
| Final exam:                 | 35% | Assignments: | %   | Midterm exam:     | 20% | Practicum: | %    |
| Quizzes/tests:              | 20% | Lab work:    | 10% | Field experience: | %   | Shop work: | %    |
| Maintenance of lab journal: | 15% | Other:       | %   | Other:            | %   | Total:     | 100% |

**Typical Course Content and Topics**

1. Laboratory techniques:
  - Introduction to the laboratory, basic equipment, and bacteriological techniques
  - Preparation of media and reagents used in molecular biology
  - Proper use of micropipettes
2. DNA Isolation and analysis:
  - Isolation of chromosomal DNA from *Vibrio fischeri*
  - Large scale purification of plasmid DNA
  - Spectrophotometric analysis of DNA
3. Cloning of the lux operon:
  - Restriction digestion of genomic and plasmid DNA
  - Ligation of restriction fragments of genomic DNA to a plasmid vector
  - Preparation of competent *Escherichia coli*
  - Transformation of competent *E. coli* with recombinant plasmids
  - Screening of the genomic library for light producing clones
4. Restriction mapping and Southern blotting:
  - Small scale plasmid isolations (mini-preps) from bioluminescent clones
  - Southern blotting and hybridization to detect the luxA gene
5. Subcloning the luxA gene:
  - Restriction mapping of lux plasmids and cloning vector for subcloning luxA
  - GEI purification of DNA restriction fragments containing luxA
  - Subcloning luxA into a plasmid vector
  - Transformation of competent *E. coli* with subcloned DNA
  - Colony hybridization to screen for luxA subclones
  - Small scale plasmid isolations (mini-preps) from luxA subclones
6. Use of bioinformatics in analysis of DNA sequence
  - Computer analysis of the lux operon DNA sequence
  - Computer analysis of the lux protein sequences



ORIGINAL COURSE IMPLEMENTATION DATE: September 2016  
 REVISED COURSE IMPLEMENTATION DATE:  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE CROSS-LISTED COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Code and Number:</b> BIOC 403                                                                                                                                                                                                                                                                                                                                                                                             | <b>Number of Credits:</b> 4 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Course Full Title:</b> Molecular Techniques I<br><b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Department (or program if no department):</b> Biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Official Course Outline:</b><br>This is a cross-listed course. Please refer to <b>BIO 403</b> for the official course outline.                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Calendar Description:</b><br>This is an intensive laboratory course that introduces students to the methodology used in recombinant DNA technology using an integrated series of molecular biology techniques. This course prepares students for careers in research or the biotechnology/pharmaceuticals industry.<br><br>Note: This course is offered as BIO 403 and BIOC 403. Students may take only one of these for credit. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                     | BIO 202, BIO 220, BIO 309 (formerly BIO 203), and one of the following: BIO 312, BIO 320, BIO 425 (formerly BIO 325), or BIO 401.                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with: <b>BIO 403</b><br>Equivalent course(s): <b>BIO 403</b><br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>Transfer credit requested (OReg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br><br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |
| <b>Department / Program Head or Director:</b> Allan Arndt                                                                                                                                                                                                                                                                                                                                                                           | <b>Date approved:</b> October 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                               | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                             | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



ORIGINAL COURSE IMPLEMENTATION DATE: January 2008  
 REVISED COURSE IMPLEMENTATION DATE: September 2016  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------|----|------------------|--|------------------------|--|--------------------------------------------|--|----------------------------|--|----------------------|--|--------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> BIO 414                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Course Full Title:</b> Genomics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Department (or program if no department):</b> Biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Calendar Description:</b><br>This course examines how genetic information is encoded, ordered, and expressed in whole organisms. Methods for obtaining, assembling, and annotating genomic sequences are explored. Students gain hands-on computer experience using various bioinformatics tools to handle and interpret genomic sequence data.<br><br>Note: This course is offered as BIO 414 and BIOS 414. Students may take only one of these for credit.                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | BIO 201, BIO 202, and BIO 220.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with: BIOC 414<br>Equivalent course(s): <b>BIOC 414</b><br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br><br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Total Hours: 45</b><br><b>Typical structure of instructional hours:</b> <table border="1"> <tr> <td>Lecture hours</td> <td>25</td> </tr> <tr> <td>Seminars/tutorials/workshops</td> <td>20</td> </tr> <tr> <td>Laboratory hours</td> <td></td> </tr> <tr> <td>Field experience hours</td> <td></td> </tr> <tr> <td>Experiential (practicum, internship, etc.)</td> <td></td> </tr> <tr> <td>Online learning activities</td> <td></td> </tr> <tr> <td>Other contact hours:</td> <td></td> </tr> <tr> <td><b>Total</b></td> <td><b>45</b></td> </tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 25 | Seminars/tutorials/workshops | 20 | Laboratory hours |  | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: |  | <b>Total</b> | <b>45</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 25        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 20        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>45</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Maximum enrolment (for information only):</b> 24<br><br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> annually                                                                                                                                                                                                                                                                                                                                                                    |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Department / Program Head or Director:</b> Allan Arndt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           | <b>Date approved:</b> October 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                              |    |                  |  |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                      |  |

BIO 414

University of the Fraser Valley Official Undergraduate Course Outline

Page 2 of 2

**Learning Outcomes**

Upon successful completion of this course, students will be able to:

- 1) Compare various methods used in the sequencing of DNA
- 2) Examine the challenges and strategies associated with the sequencing of whole genomes
- 3) Evaluate a contiguous sequence of genomic DNA using gene annotation and comparative genomics
- 4) Devise methods and strategies for searching and mapping molecular databases
- 5) Describe the use of microarrays for examining proteomes and transcriptomes
- 6) Explain how changes in the metabolic signatures of cells can lead to greater understanding of cell function
- 7) Thoroughly explain genomics and its applications in modern biological research

**Prior Learning Assessment and Recognition (PLAR)**

☒ Yes ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lectures, in-class discussions, sequence retrieval and analysis and other computer-based assignments, presentations.

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**

**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.)          | Current ed.                         | Publisher          | Year |
|----------------------------|-----------------------------------------------|-------------------------------------|--------------------|------|
| 1. A. Lesk                 | Introduction to Genomics, 2 <sup>nd</sup> ed. | <input checked="" type="checkbox"/> | Oxford Univ. Press | 2012 |
| 2.                         |                                               | <input type="checkbox"/>            |                    |      |
| 3.                         |                                               | <input type="checkbox"/>            |                    |      |
| 4.                         |                                               | <input type="checkbox"/>            |                    |      |
| 5.                         |                                               | <input type="checkbox"/>            |                    |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**

Part of the course would need to be offered in a computer lab.

**Typical Evaluation Methods and Weighting**

|                |      |                    |      |                   |      |            |    |
|----------------|------|--------------------|------|-------------------|------|------------|----|
| Final exam:    | 40 % | Assignments:       | 15 % | Midterm exam:     | 20 % | Practicum: | %  |
| Quizzes/tests: | %    | Lab work:          | %    | Field experience: | %    | Shop work: | %  |
| Term paper:    | 15 % | Oral presentation: | 10 % | Other:            | %    | Total:     | 0% |

**Details (if necessary):**

**Typical Course Content and Topics**

Week 1 - 2 Introduction to genomics and genomic research  
 Week 3 - 5 Mapping, sequencing, annotation, and databases  
 Week 6 - 7 Comparative genomics  
 Week 8 Evolution and genomic change  
 Week 9 Microarrays and transcriptomics  
 Week 10 Proteomics  
 Week 11 Metabolomics  
 Week 12 - 13 Presentations


**ORIGINAL COURSE IMPLEMENTATION DATE:**

September 2016

**REVISED COURSE IMPLEMENTATION DATE:**
**COURSE TO BE REVIEWED:** (six years after UEC approval)

December 2021

**Course outline form version: 09/15/14**

## OFFICIAL UNDERGRADUATE CROSS-LISTED COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course Code and Number:</b> BIOC 414                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Number of Credits:</b> 3 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Course Full Title:</b> Genomics                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Course Short Title (if title exceeds 30 characters):</b>                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Department (or program if no department):</b> Biology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Official Course Outline:</b><br>This is a cross-listed course. Please refer to <b>BIO 414</b> for the official course outline.                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Calendar Description:</b><br>This course examines how genetic information is encoded, ordered, and expressed in whole organisms. Methods for obtaining, assembling, and annotating genomic sequences are explored. Students gain hands-on computer experience using various bioinformatics tools to handle and interpret genomic sequence data.<br><br>Note: This course is offered as BIO 414 and BIOS 414. Students may take only one of these for credit. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                 | BIO 201, BIO 202, and BIO 220.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with: <b>BIO 414</b><br>Equivalent course(s): <b>BIO 414</b><br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                            | <b>Transfer Credit</b><br>Transfer credit already exists: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br><br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br><br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |
| <b>Department / Program Head or Director:</b> Allan Arndt                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Date approved:</b> October 16, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Date of posting:</b> December 11, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |



ORIGINAL COURSE IMPLEMENTATION DATE: September 2001  
 REVISED COURSE IMPLEMENTATION DATE: September 2016  
 COURSE TO BE REVIEWED: (six years after UEC approval) December 2021  
 Course outline form version: 09/15/14

## OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

**Note: The University reserves the right to amend course outlines as needed without notice.**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------|--|------------------|----|------------------------|--|--------------------------------------------|--|----------------------------|--|----------------------|--|--------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Course Code and Number:</b> CHEM 324                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Number of Credits:</b> 4 <a href="#">Course credit policy (105)</a>                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Full Title:</b> Chemical Kinetics and Thermodynamics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Course Short Title (if title exceeds 30 characters):</b> Chem.Kinetics&Thermodynamics                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty:</b> Faculty of Science                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Department (or program if no department):</b> Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Calendar Description:</b><br><p>Topics include an introduction to thermodynamics with applications to phase and chemical equilibria, and the principles of chemical kinetics including enzyme kinetics and reaction rate theory. Laboratory experiments and computational exercises illustrate lecture material.</p>                                                                                                                                                                                                                                        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Prerequisites (or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | CHEM 113, CHEM 114, (one of PHYS 105 or PHYS 111), MATH 111, and (one of MATH 112 or MATH 118). MATH 211 is recommended.                                                                                                                                                                                                                                                                                                                                                                                |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Equivalent Courses (cannot be taken for additional credit)</b><br>Former course code/number:<br>Cross-listed with:<br>Equivalent course(s):<br><i>Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.</i>                                                                                                                                                                                                         |           | <b>Transfer Credit</b><br>Transfer credit already exists: <input checked="" type="checkbox"/> Yes No<br>Transfer credit requested (OREg to submit to BCCAT):<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (if yes, fill in transfer credit form)<br>Resubmit revised outline for articulation: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>To find out how this course transfers, see <a href="http://bctransferguide.ca">bctransferguide.ca</a> . |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total Hours: 90</b><br><b>Typical structure of instructional hours:</b> <table border="1"> <tr> <td>Lecture hours</td> <td>45</td> </tr> <tr> <td>Seminars/tutorials/workshops</td> <td></td> </tr> <tr> <td>Laboratory hours</td> <td>45</td> </tr> <tr> <td>Field experience hours</td> <td></td> </tr> <tr> <td>Experiential (practicum, internship, etc.)</td> <td></td> </tr> <tr> <td>Online learning activities</td> <td></td> </tr> <tr> <td>Other contact hours:</td> <td></td> </tr> <tr> <td><b>Total</b></td> <td><b>90</b></td> </tr> </table> |           | Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 45 | Seminars/tutorials/workshops |  | Laboratory hours | 45 | Field experience hours |  | Experiential (practicum, internship, etc.) |  | Online learning activities |  | Other contact hours: |  | <b>Total</b> | <b>90</b> | <b>Special Topics</b><br>Will the course be offered with different topics?<br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, different lettered courses may be taken for credit:<br><input type="checkbox"/> No <input type="checkbox"/> Yes, repeat(s) <input type="checkbox"/> Yes, no limit<br><i>Note: The specific topic will be recorded when offered.</i> |  |
| Lecture hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 45        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Seminars/tutorials/workshops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Laboratory hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 45        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Field experience hours                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Experiential (practicum, internship, etc.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Online learning activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Other contact hours:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>90</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Maximum enrolment (for information only):</b> 24<br><b>Expected frequency of course offerings (every semester, annually, every other year, etc.):</b> every other year                                                                                                                                                                                                                                                                                                                               |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Department / Program Head or Director:</b> David Fenske                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           | <b>Date approved:</b> Sept 28, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Faculty Council approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Campus-Wide Consultation (CWC)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           | <b>Date of posting:</b> December 12, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Dean/Associate VP:</b> Lucy Lee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | <b>Date approved:</b> November 6, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Undergraduate Education Committee (UEC) approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           | <b>Date of meeting:</b> December 18, 2015                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |                              |  |                  |    |                        |  |                                            |  |                            |  |                      |  |              |           |                                                                                                                                                                                                                                                                                                                                                                                                  |  |



**CHEM 324**
**University of the Fraser Valley Official Undergraduate Course Outline**
**Page 2 of 3**
**Learning Outcomes**

Upon successful completion of this course, students will be able to:

- Describe the laws of thermodynamics.
- Apply the laws of thermodynamics to problems of physical, chemical, and biochemical interest.
- Explain the relationship between thermodynamic potentials, spontaneity, and equilibrium under different thermodynamic conditions.
- Derive reaction rate laws from reaction mechanisms, and apply them to kinetics in chemical and biochemical systems.
- Explain collision theory, transition state theory, and Marcus theory in the context of chemical kinetics.
- Use chromatographic and spectroscopic techniques and instruments to collect experimental kinetic data.
- Record experimental the results obtained in a laboratory notebook.
- Quantitatively analyze experimental data in the context of theoretical principles learned through the lectures.
- Communicate experimental results and conclusions through written lab reports.

**Prior Learning Assessment and Recognition (PLAR)**
☒ Yes    ☐ No, PLAR cannot be awarded for this course because

**Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)**

Lectures, lab experiments, group problem solving sessions, computer-based lessons and problem solving.

**Grading system:** Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☒ No ☐
**NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.**
**Typical Text(s) and Resource Materials (if more space is required, download Supplemental Texts and Resource Materials form)**

| Author (surname, initials) | Title (article, book, journal, etc.)   | Current ed.              | Publisher      | Year |
|----------------------------|----------------------------------------|--------------------------|----------------|------|
| 1. Atkins                  | Physical Chemistry, 9 <sup>th</sup> ed | X                        | Freeman and Co | 2010 |
| 2.                         |                                        | <input type="checkbox"/> |                |      |
| 3.                         |                                        | <input type="checkbox"/> |                |      |
| 4.                         |                                        | <input type="checkbox"/> |                |      |
| 5.                         |                                        | <input type="checkbox"/> |                |      |

**Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)**
**Typical Evaluation Methods and Weighting**

|                |     |                     |     |                   |     |            |      |
|----------------|-----|---------------------|-----|-------------------|-----|------------|------|
| Final exam:    | 35% | Assignments:        | 10% | Midterm exam:     | 20% | Practicum: | %    |
| Quizzes/tests: | %   | Lab work:           | 25% | Field experience: | %   | Shop work: | %    |
| Other:         | %   | Other: Computer lab | 10% | Other:            | %   | Total:     | 100% |

**Details (if necessary):**
**Typical Course Content and Topics**
**Kinetics:**

- Reaction rate. Rate law. Rate constant. Order of reaction. Integrated rate laws (simple cases). Linearizing coordinates for the zeroth, first, and second order.
- Collision theory. Reactive and elastic collisions. Elementary processes. Molecularity. Relationship between orders of elementary processes and their molecularity and stoichiometric coefficients. Multistep processes. Intermediates. Steady state approximation. Chain reactions.
- Unimolecular reactions. Lindemann mechanism. Reversible reactions at equilibrium. Relationship between rate and equilibrium constants. Pre-equilibria.
- Homogeneous catalysis. Enzymes. Michaelis-Menten mechanism. Michaelis constant. Maximum velocity. Maximum turnover number. Lineweaver-Burk plot. Inhibition.
- Determination of reaction orders. Method of initial rates. Pseudo-n-th-order. Half-life and its relation to the rate constant. Dependence of the half-life on the initial concentration. Integrated rate laws (more complex cases). Reversible reactions approaching equilibrium.
- Temperature dependence of the rate constant. Arrhenius equation. Preexponential factor and activation energy. Relationship between reaction enthalpy and activation energies of forward and reverse reactions. Potential energy surface. Transition state theory. Enthalpy, entropy, and Gibbs energy of activation. Relationship between reaction enthalpy and enthalpy of activation. Marcus relation. Evans-Polanyi rule. Hammond postulate.

**Thermodynamics:**

- System and surroundings. State. Parameters. Volume. Pressure. Zeroth law. Temperature. Equation of state. Ideal gas equation. Van der Waals equation.
- Processes. Cyclic, isobaric, isochoric, isothermal, and adiabatic processes. Infinitesimal change. Reversible and irreversible processes. Energy. Work. Heat. First law. Work of expansion. Indicator diagrams of isobaric, isochoric, and isothermal

processes.

- Heat capacity. Molar heat capacity. Heat of isochoric and isobaric processes. Isobaric and isochoric heat capacities. Enthalpy. Energy and enthalpy of an ideal gas. Relationship between isobaric and isochoric heat capacities of an ideal gas.
- Work, heat, energy, and enthalpy calculations for cyclic, isochoric, isobaric, isothermal, and adiabatic processes.
- Exact and inexact differentials. State functions. Energy and enthalpy as state functions.
- Reaction enthalpy. Endothermic, exothermic, and thermoneutral processes. Standard conditions. Standard enthalpy of formation. Standard enthalpy of combustion.
- Change of enthalpy with temperature: cases of constant and variable isobaric heat capacity. Effect of temperature on reaction enthalpy (Kirchhoff's law).
- Kinetic model of ideal gas. Equation of state. Equipartition theorem. Translational, rotational, and vibrational degrees of freedom. Molar energy and isochoric molar heat capacity. Internal pressure and internal volume. Intermolecular interactions and equations of state: ideal gas; gas of non-interacting hard spheres, liquid of hard spheres with constant attraction, van der Waals gas. Compression factor. Virial equation.
- Indicator diagrams of isobaric, isochoric, and isothermal processes. Graphs of these processes in (T,V) and (T,P) coordinates.
- Entropy. Calculation of entropy change for isobaric, isochoric, and isothermal (ideal gas and phase transition) processes. Fundamental equation of thermodynamics. Free energy. Gibbs energy. Thermodynamic potentials. Criteria of spontaneity and equilibria. Maxwell relations. Thermodynamic equations of state.
- Third law. Relative stability of solid, liquid, and gas phases at different temperatures and pressures. Phase diagram. Triple and critical points. Supercritical fluid. Polymorphism.
- Chemical potential. Molar and partial molar quantities. Chemical potential and its relation to Gibbs energy, free energy, enthalpy and energy. Pressure dependence of chemical potential for ideal and real gases. Fugacity; fugacity coefficient.
- Mixing. Gibbs energy, enthalpy, and entropy of mixing for ideal gas systems (binary and multi-component). Ideal solutions. Chemical potential of a component of an ideal solution. Gibbs energy, enthalpy, and entropy of mixing. Nonideal systems. Fugacity. Activity. Fugacity and activity coefficients.
- Chemical reactions. Extent of reaction. Gibbs energy of a reaction system. Reaction Gibbs energy. Standard reaction Gibbs energy. Calculation of standard reaction Gibbs energy from standard Gibbs energies of formation. Relation between reaction Gibbs energy and standard reaction Gibbs energy. Reaction quotient. Equilibrium. Equilibrium constant.

**Lab Experiments:**

Experiment 1: Kinetics of fading of phenolphthalein in alkaline solution  
 Experiment 2: Kinetics of two-step oxidation of glutathione  
 Experiment 3: Enzyme kinetics: oxidation of o-phenylenediamine  
 Experiment 4: Regioselectivity in keto-enol tautomerization of butanone  
 Experiment 5: Enthalpy of vaporization  
 Experiment 6: Bomb calorimetry  
 Experiment 7: Literature research  
 Experiments 8-9: Computer modeling of complex reactions

## Review of English Language Proficiency standards

A request to review the English Language Proficiency Requirement policy (99) was submitted to the SGC policy subcommittee in June 2015. The SGC policy subcommittee assigned the policy to the UEC policy subcommittee and requested the committee also review the English Language Proficiency (ELP) standards by November 1.

Research was compiled on what other institutions require to meet the English language requirement and a working group consisting of Samantha Pattridge (Communications), Maria Bos-Chan (ESL), Sue Brigden (UUP), Elaine Harris (OReg/University Secretariat), Hilary Turner (English), and Karen Davies (International Education) reviewed the English language proficiency standards. This document reflects the issues and recommendations of the working group.

### I. The levels of English language proficiency standards

Current UFV standards (shown in Appendix 1) include some ways of meeting requirements that do not provide an exact measure of language skills, such as English as a first language (see subsection a., *Non-measurable standards*) as well as a variety of specific course grades and test scores. Most course grades and scores in the current standards meet ENGL 105/CMNS 125/155 prerequisites, represented by an English Language Proficiency value (ELPV) score of 100, while English as a first language, two years of education in English, and the Accuplacer scores provide only entrance proficiency (ELPV score of 80). Some programs require only entrance proficiency, while others require ENGL 105/CMNS 125/155 prerequisites. There are, in practice, two different levels of proficiency used at UFV but the list of standards does not clearly distinguish which items result in an ELPV of 100 and which do not. The committee proposes more transparency and rationalization of the standards.

UFV's current minimum scores are somewhat on the high side. Although they do not exceed those at universities such as UBC or SFU, they are higher than at some other universities and many colleges in Canada. They were set to meet the prerequisites for ENGL 105 and CMNS 125/155. Some institutions, e.g. KPU, BCIT, U Lethbridge, and Selkirk, have varied language requirements for different types of post-secondary programs but UFV's policy applies to all post-secondary programs.

As a university that offers a wide range of post-secondary programs, it seems logical to set the *minimum* entrance proficiency at a level that would allow a student to begin post-secondary studies while upgrading in English. It is also useful to define a higher level of proficiency that meets ENGL 105/CMNS 125/155 prerequisites, since many programs require these prerequisites for admission.

**Recommendation 1:** Establish two distinct levels of English language entrance proficiency, as follows:

1. The higher level, University-level language proficiency (referred to as "University-level") will include the course grades and test scores that currently meet ENGL 105/CMNS 125 or 155 prerequisites (ELPV 100) with minor changes. This level would be appropriate for degree programs or any other programs with comparable academic requirements.
2. The lower level, Post-secondary entry-level language proficiency (referred to as "Entry-level") will be the minimum entrance proficiency for UFV post-secondary programs.

- This level would be appropriate for programs that are less academic or writing-oriented, that have provision for upgrading in English (such as Qualifying Studies), and/or that do not require completion of ENGL or CMNS courses in the first year of the program.
- It will include lower test scores and course grades. Those proposed are comparable to other universities and colleges with slightly lower language scores than UFV, and/or they meet or exceed the prerequisites to ENGL 091 or 099.
- The objective is that students would enter with a level of English that would allow them to upgrade their English skills to the University-level of proficiency within a semester or two.

See Appendix 1 for the proposed items for each level.

**Recommendation 2:** That University-level proficiency be established as the minimum level of proficiency for degrees, associate degrees, post-degree programs and it would be recommended for any other program where the student is expected to complete first year ENGL or CMNS in the first year. The lower level would be acceptable for Qualifying Studies, vocational programs, and other programs that do not require the prerequisites for first year ENGL or CMNS for admission.

**Recommendation 3:** That the developmental area consider including the Entry-level test scores and grades as prerequisites for ENGL 081, 091 and 099, to expand the prerequisite options for these courses, and for Foundations level 2 admission requirements.

## II. Non-measurable standards

These currently include

- first language of English,
- two years high school plus graduation in a school taught in English, or
- completion of a diploma or degree or two years of university study in English, with a 2.0 CGA.

These ways of meeting language proficiency result only in entrance proficiency (ELPV 80) and would be considered only for Entry-level proficiency. The following issues were identified:

- Accepting first language of English does not give assurance of English proficiency; it does not ensure the student was educated in English, lived in an English speaking country, or is literate in English. It is accepted at some institutions, but many do not accept it.
- Two years of education in an English language school does not seem sufficient to assure a reasonable level of language skills.

**Recommendation 4:** Eliminate English as a first language as a way to meet language proficiency.

**Recommendation 5:** Increase and more clearly define the years of study in English necessary to meet the proficiency requirement for Entry-level proficiency. Specific changes include:

- Requiring three consecutive years of full-time education (high school and/or post-secondary) in English rather than two years in total.
- Requiring completion of the equivalent to at least BC high school graduation or first year post-secondary (minimum 30 post-secondary credits recognized by UFV) with a minimum 2.0 CGPA or C average.

- Defining full-time education as a minimum of three non-ESL courses per semester.
- Requiring that the education take place in an English language school in a country where English is a principal language (with acceptable countries listed on the website). BC or Canadian offshore schools or international schools operating in countries not listed would not meet this requirement, however, their students could meet the proficiency requirement through the equivalent of BC English 12 (EN12).
- Allowing a combination of three years high school and/or post-secondary, so a student who does not have the equivalent of BC high school graduation (e.g. a student with British O levels but not A levels) but has been successful in a year or more of post-secondary studies can still be considered.

Note that this could provide the only way domestic students might be admitted on the basis of self-reporting, at least initially, which would facilitate admission of late applicants and local adult students who have been out of school for years.

However, with the above recommendations, mature students (i.e. students without high school graduation or previous post-secondary) would not be able to enter post-secondary programs without either language testing or a satisfactory EN12 or equivalent grade.

Publishing a list of acceptable countries ensures that students and staff have the necessary information. UFV does not have the expertise or resources to evaluate the language and educational system of each country world-wide, but UBC publishes a comprehensive list that is comparable to other institutions and seems a reasonable reference institution.

**Recommendation 6:** Adopt UBC's list of acceptable countries (see Appendix 2).

### III. Modifications to current test scores and grades

The test scores and course grades that currently meet language proficiency standards and meet the prerequisites for ENGL 105/CMNS 125/155 generally will be retained for the University-level proficiency, however, there were several concerns:

1. Inclusion of any first year CMNS course is not appropriate. CMNS includes oral, group, and intercultural communications, not simply written communications.
2. For the paper-based TOEFL (PBT), the TWE score of 4.0 seems low for direct entry into English.
3. There seems no reason to include "Completion of any course or test score with grades that meet the prerequisites for ENGL 105, ENGL 120, CMNS 125, or CMNS 155" since the scores/grades for University-level proficiency are designed to meet those prerequisites.

**Recommendation 7:** Specify that only written CMNS courses (which will be specified) meet language proficiency.

**Recommendation 8:** Increase the TWE score from 4.0 to 4.5 for University-level, along with the 570 PBT total score, and require 550 PBT plus TWE 4.0 for Entry-level.

**Recommendation 9:** Remove the statement in #3, above.

#### IV. Addition of other test scores

UFV's list of accepted tests is fairly comprehensive, but there are several test scores that are accepted quite widely that could be included to aid in recruiting international students.

**Recommendation 10:** Add the following tests to the list of standards:

- Pearson Test of English (PTE)
- EIKEN (Test in Practical English Proficiency)
- Cambridge tests of English: Advanced (CAE) and First for schools (FCE)

Appropriate scores have been discussed and added to the proposed standards in Appendix 1. Further information on each test is in Appendix 3.

#### V. Special consideration for individual students

The policy allows students to request special consideration on an individual basis. That is to remain unchanged but students may be unaware of this option.

TRU and UNBC indicate that they will consider other tests that are equivalent to certain levels on the Common European Framework (CEFR). The tests in the proposed University-level correspond roughly with the CEFR level C1 and the standards in Entry-level with CEFR B2. See [https://www.eurocentres.com/sites/default/files/language\\_scale\\_en.pdf](https://www.eurocentres.com/sites/default/files/language_scale_en.pdf) for more information. Other tests at those levels could be considered on a case-by-case basis. Students should be alerted to this option.

**Recommendation 11:** Add a note about the option of individual request, including the CEFR levels that would be appropriate, at the end of the list of standards.

See Appendix 4 for the draft calendar copy.

#### VI. Time limits for test scores

Many language test scores, such as TOEFL, IELTS and EIKEN, are valid only for two years. A number of other institutions accept language proficiency tests only for two years after the date they were taken. UFV did not specify a time limit previously. Since language skills could deteriorate over time, it is best to ensure the assessment is current.

**Recommendation 12:** Accept test scores only for two years after the date taken.

Appendix 1 English Language Proficiency Standards (current and proposed)

| Current Requirements (from UFV calendar)                                                                                                                                                                                                                    | Post-secondary entry-level proficiency (proposed)                                                                                                                                                                                                                                                                                                                                                                                                             | University-level proficiency (proposed)                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. First language is English                                                                                                                                                                                                                                | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                            | NA                                                                                                                                                                            |
| 2. Studied for at least two years in and have graduated from a secondary school in which English is the language of instruction.                                                                                                                            | Completion of 3 consecutive full-time years of education (high school and/or post-secondary) taught in the English language in a country where English is the principal language. Full time is defined as at least 3 non-ESL courses completed per semester and six per academic year. Education must include at least the equivalent of BC high school graduation or completion of first year post-secondary (30 credits) with a CGPA of 2.0 (or C average). | NA                                                                                                                                                                            |
| 3. Graduation from a degree or two-year diploma program, or successful completion of two years of study at the university level with a 2.0 CGPA, at a post-secondary institution recognized by UFV in which English is the primary language of instruction. |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                               |
| 4. TOEFL score of 570 (230 if computer based) plus min TWE of 4.0, or iBT score of 88 with no section below 20.                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                               |
| 5. IELTS academic format score of 6.5 with no band less than 6.0                                                                                                                                                                                            | IELTS academic format score of 6.0 with no band less than 5.5                                                                                                                                                                                                                                                                                                                                                                                                 | TOEFL iBT score of 88 with no section below 20; or 570 plus TWE 4.5 on paper-based TOEFL                                                                                      |
| 6. CPT score of 48 or higher                                                                                                                                                                                                                                | CPT score of 41                                                                                                                                                                                                                                                                                                                                                                                                                                               | IELTS academic format score of 6.5 with no band less than 6.0                                                                                                                 |
| 7. MELAB score of at least 85                                                                                                                                                                                                                               | CPT score of 41                                                                                                                                                                                                                                                                                                                                                                                                                                               | CPT score of 48 or higher                                                                                                                                                     |
| 8. CAEL score of at least 70                                                                                                                                                                                                                                | MELAB score of at least 80                                                                                                                                                                                                                                                                                                                                                                                                                                    | MELAB score of at least 85                                                                                                                                                    |
| 9. CanTest 4.5 in Listening and Reading, 4.0 in Writing                                                                                                                                                                                                     | CAEL score of at least 60                                                                                                                                                                                                                                                                                                                                                                                                                                     | CAEL score of at least 70                                                                                                                                                     |
| 10. CPE level C                                                                                                                                                                                                                                             | CanTest 4.0 in Listening, Reading and Writing                                                                                                                                                                                                                                                                                                                                                                                                                 | CanTest 4.5 in Listening and Reading, 4.0 in Writing                                                                                                                          |
| 11. LPI essay 30 (5)                                                                                                                                                                                                                                        | FCE A or CAE C                                                                                                                                                                                                                                                                                                                                                                                                                                                | CPE C or higher or CAE A                                                                                                                                                      |
| 12. UFV ESL assessment results equivalent to completion of 80-level in writing and grammar.                                                                                                                                                                 | LPI essay 24 (4)                                                                                                                                                                                                                                                                                                                                                                                                                                              | LPI essay 30 (5)                                                                                                                                                              |
| 13. EN12 or equivalent with C+. Equivalents LIT12, EFP12, IB English A SL or HL, AP English                                                                                                                                                                 | UFV ESL assessment results equivalent to completion of 70-level in writing and grammar.                                                                                                                                                                                                                                                                                                                                                                       | UFV ESL assessment results equivalent to completion of 80-level in writing and grammar.                                                                                       |
| 14. Completion of any course or test score that meets prerequisites for ENGL 105 or 120 or CMNS 125 or 155                                                                                                                                                  | EN12, EFP12 LIT12, IB English A SL or HL, AP English or equivalent with C- or better                                                                                                                                                                                                                                                                                                                                                                          | EN12 or equivalent with C+. Equivalents include LIT12, EFP12, IB English A SL or HL, AP English. UFV accepts the blended grade or school grade for EN12, whichever is higher. |
| 15. C- or higher on a course transcribed at UFV as first year English or CMNS                                                                                                                                                                               | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                            | NA                                                                                                                                                                            |
|                                                                                                                                                                                                                                                             | A pass on a course transcribed at UFV as first year English or CMNS 125, 145, 155, 175 or 251                                                                                                                                                                                                                                                                                                                                                                 | C- or higher on a course transcribed at UFV as first year English or CMNS 125, 145, 155, 175 or 251                                                                           |

|                                                                                                                 |                                                                                                          |                                        |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------|
| 16. ENGL 099/CMNS 099 with C or better                                                                          | ENGL 099/CMNS 099                                                                                        | ENGL 099/CMNS 099 with C or better     |
| 17. ENGL 081 or ENGL 091 with C+ or better                                                                      | ENGL 081 or ENGL 091                                                                                     | ENGL 081 or ENGL 091 with C+ or better |
| 18. ESL WG84 with C+ or better                                                                                  | ESL WG74 with C+ or better, or pass in WG84                                                              | ESL WG84 with C+ or better             |
| 19. Accuplacer Reading comprehension 80 or better, with Accuplacer WritePlacer 6 or better on the 8-point scale | Accuplacer Reading comprehension score of 80 or better, with Accuplacer WritePlacer score of 6 or better | NA                                     |
| 20. Pearson Test of English (not currently accepted)                                                            | PTE 56                                                                                                   | PTE 61 with minimum 60 in Writing      |
| 21. EIKEN (not currently accepted)                                                                              | Grade Pre-1                                                                                              | Grade 1                                |

Test scores will be accepted for a maximum of two years after the test date.



Appendix 2 Countries from which education is accepted for language policy at UBC and UVic

| <b>U Vic</b>           | <b>UBC</b>                |
|------------------------|---------------------------|
| Anguilla               | American Samoa            |
| Antigua                | Anguilla                  |
| Australia              | Antigua & Barbuda         |
| Bahamas                | Australia                 |
| Barbados               | Bahamas                   |
| Belize                 | Barbados                  |
| Bermuda                | Belize                    |
| Botswana               | Bermuda                   |
| British Virgin Islands | Botswana                  |
| Cameroon               | British Virgin Islands    |
| Cayman Islands         | Canada (including Quebec) |
| Dominica               | Cayman Islands            |
| Gambia                 | Dominica                  |
| Ghana                  | Falkland Islands          |
| Grenada                | Fiji                      |
| Guyana                 | Gambia                    |
| Ireland                | Ghana                     |
| Jamaica                | Gibraltar                 |
| Kenya                  | Grenada                   |
| Lesotho                | Guam                      |
| Liberia                | Guyana                    |
| Malawi                 | Ireland                   |
| Mauritius              | Jamaica                   |
| Montserrat             | Kenya                     |
| Namibia                | Lesotho                   |
| New Zealand            | Liberia                   |
| Nigeria                | Malta                     |
| Singapore              | Mauritius                 |
| South Africa           | Montserrat                |
| Swaziland              | New Zealand               |
| St. Kitts and Nevis    | Nigeria                   |
| St. Lucia              | Seychelles                |
| St. Vincent            | Sierra Leone              |
| Tanzania               | Singapore                 |
| Trinidad and Tobago    | South Africa              |
| Turks and Caicos       | St. Helena                |
| Uganda                 | St. Kitts & Nevis         |
| United Kingdom         | St. Lucia                 |
| United States          | St. Vincent & the         |
| U.S. Virgin Islands    | Grenadines                |
| Zambia                 | Tanzania                  |
| Zimbabwe               | Trinidad & Tobago         |
|                        | Turks & Caicos            |
|                        | Uganda                    |
|                        | United Kingdom            |
|                        | USA                       |
|                        | US Virgin Islands         |
|                        | Zambia                    |
|                        | Zimbabwe                  |

### Appendix 3 Additional test scores proposed

Although UFV accepts a variety of tests, it is ideal to consider other valid assessments whenever possible, especially as this might assist recruiting students from certain countries. Since we do not have the expertise and means to evaluate the tests at UFV, the proposed scores are based on what other institutions accept, the interpretation of scores as described by the organizations, and comparisons with TOEFL, IELTS, and/or the Common European Framework of Reference for Languages (CEFR) levels.

#### *Pearson Test of English*

Numerous public colleges and universities in Canada accept this score. Scores for 22 institutions were considered. The scores range from 54 to 70. Eight institutions accept 58 or lower, including Capilano U, Mt. Royal, U Manitoba, U. Lethbridge. Eight require 59-60, including MacEwan U, McMaster U, U Alberta, U Calgary, and U Guelph. Seven require 61 or higher, including UBC, KPU, U Saskatchewan, and U Waterloo. It is noted that such scores do not necessarily meet first year English prerequisites.

BCIT accepts a score of 52 in place of EN12 C-, 60 in place of EN12 C+, and 65 in place of EN12 B.

#### **The following scores are recommended for UFV:**

- Entry-level proficiency – 56 with a minimum score of 52 in Writing.
- University-level proficiency – 61 with a minimum score of 60 in Writing.

#### *Cambridge Advanced (CAE) or First for schools (FCE)*

UFV currently accepts the Cambridge Certificate of Proficiency (CPE) C. Some institutions also accept the Cambridge English: Advanced (CAE) and the Cambridge English First (FCE) for entrance proficiency. Cambridge equates CAE level A with CPE C and the CAE C and the FCE A are one level lower.

The TESL ELP reference guide equates a CAE B with TOEFL iBT of 90; CAE C with a TOEFL of 84, and FCE A with a TOEFL of 80 (the proposed score for level 1).

More information is available at [More about Cambridge English Language Assessment and the CEFR](#)

#### **The following tests and scores are recommended for UFV:**

- Entry-level proficiency - CAE C or higher or FCE A
- University-level proficiency – CAE A or CPE C

#### *EIKEN (Test in Practical English Proficiency)*

The EIKEN is a major language test used in Japan. A grade of 1 is accepted by TRU, Douglas, Hawaii U, Dakota State U, a grade of Pre-1 by MacEwan U, UPEI, Selkirk, Algoma U, Niagara College, St. Lawrence College, several private institutions, numerous US colleges and state universities, and a grade of 2A is accepted by a number of US institutions. From the descriptions and comparisons provided on the EIKEN site and the scores accepted at the institutions listed, Pre-1 seems appropriate for Entry-level and a grade of 1 for University-level. See Appendix 3 for the EIKEN site's detailed interpretation of each grade.

The website at <http://www.eiken.or.jp/eiken/en/eiken-tests/> indicates the following EIKEN levels correspond to English-proficiency requirements:

| EIKEN<br>Grade | TEAP | CEFR | TOEFL® score<br>comparison |     | Typical use for admissions                                                          |
|----------------|------|------|----------------------------|-----|-------------------------------------------------------------------------------------|
|                |      |      | PBT                        | iBT |                                                                                     |
| <b>1</b>       | 396  | C1   | 600                        | 100 | Graduate and undergraduate degree programs                                          |
| <b>Pre-1</b>   | 334  | B2   | 550                        | 80  | Graduate and undergraduate degree programs, diploma courses, and foundation studies |
| <b>2A</b>      | 276  | B1+  | 500                        | 61  |                                                                                     |
| <b>2</b>       | 226  | B1   | 450                        | 45  | Conditional admission and ESL                                                       |

**The following scores are recommended for UFV:**

- Entry-level proficiency - EIKEN Pre-1
- University-level proficiency - EIKEN (Grade 1)

## Appendix 4 Draft calendar copy

## English language proficiency standards (draft)

## A. Entry-level post-secondary English language proficiency

This level of proficiency is sufficient for entry into some programs at UFV but does not meet prerequisites for first year English or CMNS courses.

This level may be met by one or more of the following (test scores are accepted up to two years after the test date):

1. Successful completion of three consecutive full-time years of high school and/or post-secondary education taught in the English language in a country where English is the principal language ([see list](#)). Education must include the equivalent of BC high school graduation or completion of first year post-secondary (minimum 30 post-secondary credits recognized by UFV) with a minimum CGPA of 2.00 (or C average). Full-time study is defined as successful completion of at least three non-ESL courses per semester and six non-ESL courses per academic year.
2. TOEFL (Test of English as a Foreign Language) – IBT score of 80 with no section below 19, or paper-based score of 550 with TWE score of 4.0 or higher.
3. IELTS (International English Language Testing System) Academic format– score of at least 6.0, with no band score less than 5.5.
4. UFV CPT (Composition Placement Test) – score of 41 or higher.
5. MELAB (Michigan English Language Assessment Battery) – score of at least 80.
6. CAEL (Canadian Academic English Language) – score of at least 60.
7. CanTEST – overall score of 4.0 in Listening, Reading, and Writing.
8. Cambridge English: Advanced (CAE) – level C or higher.
9. Cambridge English First (FCE) – level A.
10. LPI (Language Proficiency Index) – essay score of 24 (level 4).
11. UFV English as a Second Language Assessment results equivalent to completion of the 70-level of UFV's ESL writing and grammar.
12. Pearson Test of English (PTE) academic – score of 56 with a minimum score of 52 in Writing.
13. EIKEN (Test in Practical English Proficiency) – Grade Pre-1.
14. Accuplacer Reading comprehension 80 or better, with Accuplacer WritePlacer 6 or better on the 8-point scale
15. English 12 (or equivalent course). The following courses are considered equivalent to English 12: English Literature 12, English 12 First Peoples, International Baccalaureate English A (standard level or higher level), Advanced Placement English.
16. A pass in a course transcribed at UFV as first-year English or one of CMNS 125, 145, 155, 175 or 251
17. ENGL 099 or CMNS 099
18. ENGL 081 or ENGL 091
19. ESL WG74 with a C+ or better or ESL WG84

Other test scores equated to the Common European Framework of Reference for Languages (CEFR) English level B2 may be considered on an individual basis by the UEC Admissions subcommittee. Students must submit requests, along with official test scores, to the Office of the Registrar.

## B. University-level English language proficiency

The scores and grades that meet this level of proficiency also meet prerequisites for first year English or CMNS courses. This level is required for admission to many university-level programs such as bachelor degrees, associate degrees, diplomas, etc.

This level of proficiency may be met by one or more of the following scores (accepted up to two years after the test date) or course grades:

1. TOEFL (Test of English as a Foreign Language) –IBT score of 88 with no section below 20, or paper-based score of 570 with a TWE (essay) score of 4.5 or higher.
2. IELTS (International English Language Testing System) Academic format– score of at least 6.5., with no band score less than 6.0.
3. UFV CPT (Composition Placement Test) – score of 48 or higher.
4. MELAB (Michigan English Language Assessment Battery) – score of at least 85.
5. CAEL (Canadian Academic English Language) – score of at least 70.
6. CanTEST – overall score of 4.5 in Listening and Reading, and 4.0 in Writing.
7. Cambridge Certificate of Proficiency – competence level of C or higher.
8. Cambridge English: Advanced – level A.
9. LPI (Language Proficiency Index) – essay score of 30 (level 5).
10. UFV English as a Second Language Assessment results equivalent to completion of the 80-level of UFVs ESL writing and grammar.
11. Pearson Test of English (PTE) academic score of 61 with a minimum score of 60 in Writing.
12. EIKEN (Test in Practical English Proficiency) - Grade 1.
13. English 12 (or equivalent course) with a minimum grade of C+. The following courses are considered equivalent to English 12: English Literature 12, English 12 First Peoples, International baccalaureate English A (standard level or higher level), Advanced Placement English.
14. A minimum grade of C- for a course transcribed at UFV as first-year English or one of CMNS 125, 145, 155, 175 or 251.
15. ENGL 099 or CMNS 099 with a C or better.
16. ENGL 081 or ENGL 091 with a C+ or better.
17. ESL WG84 with a C+ or better.

Other test scores equated to the Common European Framework of Reference for Languages (CEFR) English level C1 or C2 may be considered on an individual basis by the UEC Admissions subcommittee. Students must submit requests, along with official test scores, to the Office of the Registrar.



NUMBER 99

APPROVAL DATE 05-05-2005

LAST AMENDMENT 05-28-2010

LAST REVIEWED

NEXT REVIEW DATE 05-2015

**ENGLISH LANGUAGE PROFICIENCY REQUIREMENT**

|                                       |                                                                                                                                                                         |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Approval Authority</b>             | Senate                                                                                                                                                                  |
| <b>Responsible Executive</b>          | Provost and Vice-President, Academic                                                                                                                                    |
| <b>Related Policies / Legislation</b> | Admissions to Undergraduate Programs (80)<br>Course requisites (84)<br>Change in Admission requirements (87)<br>Placement (83)<br><i>University Act, s. 35.2 (5)(d)</i> |

**PURPOSE**

The purpose of this policy is to define the English language requirements for students applying for admission to the University.

**DEFINITIONS**

In this policy, the following definitions apply:

Post-secondary programs: Programs that are considered university- or college-level.

Post-secondary course: Any course numbered 100 or higher.

University preparatory course: Any course numbered less than 100; that is, courses with an "xx" or "0xx" number. The Communications, English, English as a Second Language, and Upgrading and University Preparation departments, for example, offer courses through which students can upgrade their English language competencies.

University preparatory program: A program for students who need to upgrade their English and/or academic skills in order to meet post-secondary course prerequisites and/or program requirements.

**POLICY**

English is the primary language of instruction at UFV. Students in post-secondary degree, diploma, or certificate programs require at least a minimum level of English language proficiency.

Applicants meet the English language proficiency requirement for post-secondary programs if they can demonstrate English language competence through any one of the options described in the English Language Proficiency Standards published in the UFV calendar and listed on the UFV website. There may be additional program entrance requirements depending on the specific expectations of the programs. Admission to post-secondary programs allows students the opportunity to register for courses numbered 100 or higher, subject to meeting specific course prerequisites and program requirements.

Applicants who do not meet the minimum level of language proficiency for admission to post-secondary programs will be given the opportunity to improve their English language proficiency through UFV's university preparatory programs. As students in university preparatory programs demonstrate increased

English language proficiency, they will have the opportunity to register for selected courses numbered 100 or higher, subject to meeting specific course prerequisites. Post-secondary courses available to students in university preparatory programs will be published in the UFV calendar and listed on the UFV website.

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## **REGULATIONS**

**Note: This policy is expressly for UFV entrance requirements.**

**Continuance and graduation requirements are set by individual programs.**

1. Evidence of English language proficiency may be demonstrated through any of the options listed in the English Language Proficiency Standards published in the UFV Calendar and listed on the UFV website. To be considered valid, evidence must be sent directly from an institution or testing agency to the Office of the Registrar.
  2. Department requests for modification to the English Language Proficiency Standards should be submitted to the Undergraduate Education Committee, or when appropriate the Graduate Studies Committee, and must be accompanied by a rationale and evidence of consultation.
  3. Modifications to the English Language Proficiency Standards will be recommended by the Undergraduate Education Committee to Senate for approval.
  4. Modifications that make it more difficult for students to meet the English language proficiency requirement will follow the same rules for notification as specified in the Change in Admission Requirements policy.
  5. Post-secondary courses available to students in university preparatory programs will be determined by the department offering the course, and submitted to Undergraduate Education Committee for approval. Approved courses will be publicized in the UFV calendar and listed on the UFV website.
  6. Student requests for exceptions to the language policy for admission will be reviewed by a standing committee established by the Undergraduate Education Committee or Graduate Studies Committee.
  7. Student requests for language policy waivers for individual course registration must be approved by the course instructor and the department head.
-



NUMBER 99  
 APPROVAL DATE 05-05-2005  
 LAST AMENDMENT 05-28-2010  
 LAST REVIEWED  
 NEXT REVIEW DATE 05-2015

**ENGLISH LANGUAGE PROFICIENCY REQUIREMENT**

|                                       |                                                                                                                                                                                               |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Approval Authority</b>             | Senate                                                                                                                                                                                        |
| <b>Responsible Executive</b>          | Provost and Vice-President, Academic                                                                                                                                                          |
| <b>Related Policies / Legislation</b> | Admission (80)<br>Course Pre- and Co-requisites (84)<br>Graduate Course and Program Approval (209)<br>Undergraduate Course and Program Approval (21)<br><i>University Act, s. 35.2 (5)(d)</i> |

**PURPOSE**

This policy is to establish minimum English language requirements for admission to post-secondary studies at the University of the Fraser Valley (UFV).

**SCOPE**

This policy applies to all UFV post-secondary programs, excluding continuing education non-credit programs.

**DEFINITIONS**

In this policy, the following definitions apply:

**Post-secondary entry-level language proficiency:** A level of English language proficiency that allows students to begin post-secondary studies at UFV, but is not necessarily sufficient to take first year English or Communications courses, to enter other UFV programs, or to complete a program.

**Post-secondary program:** A program that is considered university or college level.

**Preparatory program:** A program at the pre-undergraduate or developmental level designed to upgrade or enhance English and/or academic skills in preparation for post-secondary studies.

**University-level language proficiency:** A level of English language proficiency that is required for admission to degrees, associate degrees, and other programs with similar academic requirements, and that meets the prerequisites for ENGL 105, CMNS 125 and CMNS 155.

**POLICY**

As English is the primary language of instruction at UFV, students require a minimum level of English language proficiency to be successful in post-secondary studies. To facilitate student success, UFV shall



establish language proficiency requirements for admission to post-secondary programs.

Applicants for admission to any UFV post-secondary program shall be required to meet at least post-secondary entry-level language proficiency. Applicants to bachelor and master's degrees, associate degrees, and any post-degree program shall be required to meet at least University-level language proficiency.

Applicants meet the English language proficiency requirement for a program by providing evidence they have met one of the options listed in the English Language Proficiency Standards published in the UFV academic calendar. Admission to post-secondary programs allows students the opportunity to register for courses numbered 100 or higher, subject to meeting specific course prerequisites and program requirements. Students who meet university-level proficiency will also meet the course prerequisites for ENGL 105, CMNS 125, and CMNS 155.

UFV supports students in improving their language skills while studying at UFV. Applicants who do not meet the minimum level of language proficiency for admission to a post-secondary program will be given the opportunity to improve their English language proficiency through UFV's preparatory programs.

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## **REGULATIONS**

1. Through the program approval process, programs will establish language requirements at the minimum level stated in the policy section or higher, as appropriate to the expectations of the program. Any exception to the minimum language requirements for a program must be approved through the formal program approval process. Usually exceptions are considered only when there is a compelling rationale and the students in the program do not have access to post-secondary courses in other disciplines. The language requirements for each program will be published in the UFV academic calendar.
2. The Undergraduate Education Committee (UEC) is responsible to maintain and review English language proficiency standards. Requests to modify these standards must be submitted to UEC with a rationale and evidence of consultation. UEC will ensure the Graduate Studies Committee has been consulted and will recommend changes to UFV Senate. The standards approved by Senate shall be published in the UFV academic calendar. Modifications that make it more difficult for students to meet the English language proficiency requirement will be published in the UFV calendar at least 12 months prior to the semester they take effect.
3. Students in preparatory programs will have the opportunity to register for selected courses numbered 100 or higher as their language proficiency reaches higher levels. Post-secondary courses available to students in preparatory programs will be approved by the department offering the course and the Undergraduate Education Committee. Approved courses will be publicized in the UFV calendar and/or listed on the UFV website.
4. Student requests for exceptions to the language requirement for admission to a program must be submitted in writing, with evidence of language proficiency to a standing committee established by the Undergraduate Education Committee or Graduate Studies Committee.
5. Student requests for language policy waivers for registration in individual courses must be approved by the course instructor and the department head.

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## **APPENDICES**

English Language Proficiency Standards, published in the UFV academic calendar.

DRAFT



## MEMO

**To:** Secretariat Office  
**From:** Peter Geller, Vice Provost and Associate Vice-President Academic  
**Date:** December 14, 2015  
**Re:** Revised Academic Program and Unit Reviews Policy (Policy 189)

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A request to review Policy 189: Academic Program Reviews was submitted to the Secretariat in March 2014. A working group was formed to review and draft a revised policy, consisting of Sue Brigden, Heidi Cain, Peter Geller, and Sylvie Murray. The revised draft policy was subsequently reviewed by Deans Caucus, and is submitted to the SGC Policy Subcommittee for consultation.

The following were considered in revising the policy:

1. Initial discussion of the current policy at Deans Caucus identified the following key points to consider:
  - Frequency of reviews
  - Need for incorporation of ILO's
2. New policy format, which includes new sections on Purpose and Scope.
3. Incorporating results of a survey of Department Heads and Deans who have been involved in program and unit review(s) in the last five years. The survey was conducted in January to February of 2014. Fifty percent of Heads from Professional Studies, Arts, Science, and Health Sciences responded to the survey (n=9) and 2 Deans. The results revealed general appreciation for the importance of program review and general satisfaction with our process (although it is acknowledged to be very demanding).

Recurring comments were made on the following points:

- Review refers almost exclusively to "the program," effectively equating purpose of the department with the delivery of its own program (e.g., major) and neglecting its contribution to programming in other areas.
- External reviewers who assess a program from their disciplinary perspective pay less attention to program's delivery of institutional outcomes; alignment with UFV goals is not considered in a significant way.
- Methods used for the assessment and evaluation of student progress toward attainment of educational goals needs more consideration.

- Greater clarity is needed about how the review serves professional programs, their strong affiliation to their fields of practice.
  - Disciplinary isolation may be reinforced by typical focus on the major at the expense of general education (i.e., ILOs) and service courses.
  - Degree programs (e.g., BSc, BA) are not included in the way we structure our reviews.
4. Review of policies and practices at other institutions, including:
- Kwantlen Polytechnic University
  - Thompson Rivers University
  - University of Lethbridge
  - University of Victoria
  - Wilfrid Laurier University
  - University of Northern British Columbia
  - Oregon State University
  - Boston University

The latter two are cited in the Education Advisory Board's *Revitalizing the Program Portfolio: Elevating Academic Program Performance and Strategic Alignment*.

Some key points from this review of other policies and practices included:

- Authority of the policy
  - Need to streamline the policy (many of the current Procedures/Guidelines can be separated out from the policy itself)
  - Working towards consistency across reviews
  - Relationship between accreditation and program review
  - Balancing disciplinary/professional standards with institutional priorities.
5. Revisions will need to be made to the Program and Unit Review Process Guide in accordance with the revised policy.



NUMBER 189

APPROVAL DATE 01-2009

LAST AMENDMENT

LAST REVIEWED

NEXT REVIEW DATE 01-2013

## ACADEMIC PROGRAM AND UNIT REVIEWS

|                                       |                                                                                                                         |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Approval Authority</b>             | President                                                                                                               |
| <b>Responsible Executive</b>          | Provost and Vice-President, Academic                                                                                    |
| <b>Related Policies / Legislation</b> | Board policy direction University Educational Directions and Planning (BPD-202)<br><i>University Act, s 35.2 (6)(f)</i> |

### DEFINITIONS

In this policy, the following definitions apply:

**Program:** For the purposes of this policy, a program is defined as a set of courses approved by Senate to constitute all or part of the requirements for an undergraduate or a graduate degree or certificate or diploma offered by UFV.

**Academic unit:** An academic unit is an administrative grouping of faculty and staff and the organizational structure that delivers programs, such as a faculty, department, or school.

**Program goals:** Program goals state for students, instructors and program/course evaluators of what the program expects to achieve.

**Learning objectives:** Learning objectives are a statement of what the student should learn or accomplish at the end of the program or course.

**Learning outcomes:** Learning outcomes demonstrate what the student actually learns or achieves.

### POLICY

Academic program and unit reviews shall be carried out under the general supervision of the Dean responsible for the program or unit and the Provost and Vice-President, Academic.

All academic programs and units will normally undergo a review every five years, although a review may be undertaken at any time if it is requested by the Dean or Provost and Vice-President, Academic.

The process involves the review of two components: the academic program to be reviewed and the unit in which the program is based. Many factors contribute to the academic quality of the program. The administrative setting, the research and scholarly activities of the faculty members, the material resources and physical infrastructure, and the governance mechanisms all affect the quality of academic programs and the educational experiences of students. Reviews are intended to ensure and improve quality of both the programs and the unit and to foster a culture of continuous improvement throughout the institution.

For those programs which are subject to external accreditation reviews, those reviews will normally be considered as fulfilling the requirements of the present policy, unless a additional review is considered

necessary by the Dean responsible for the program or the Provost and Vice-President, Academic.

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## **REGULATIONS**

### **The Purpose of Program Reviews**

Program reviews are designed to:

1. Determine the coherence of the program standards, design, and goals and review the alignment of the program's standards, educational goals and learning objectives with the general goals of the institution, as well as external standards, as they apply.
2. Determine whether the program has been designed, structured and delivered so as to ensure that students have achieved their learning outcomes.
3. Determine the appropriateness of the admission requirements and practices of the method of delivery for achieving the learning outcomes.
4. Determine the appropriateness of the specific curricular and pedagogical policies and practices of the program in relation to the learning outcomes.
5. Determine the appropriateness of the methods used for the assessment and evaluation of student progress.
6. Determine that the number and expertise of the faculty and staff are sufficient to enable students' success.
7. Evaluate the administrative policies and practices of the unit delivering the program, and its efficient and effective utilization of human/physical/financial resources and, where necessary, to suggest improvements for effectiveness and efficiency.
8. Suggest solutions to existing or anticipated problems and offer advice on how the program may be enhanced and its delivery be improved.

### **The Focus of Program and Unit Reviews**

The goals of a program and unit review will form the basis for defining the focus and scope of each review. The curricular content of a program, its admission requirements, its mode of delivery, and the basis of evaluation of student performance are all related to the overall quality of any academic program, as is the commitment of the necessary human and other resources for achieving the program goals and helping students achieve success.

Program reviews will focus on:

1. Indicators that provide evidence of quality of faculty, students and learning outcomes in terms of accepted standards for academic, professional and/or occupational programs:
  - Degree level standards;
  - Credential recognition;
  - Curriculum/program content;
  - Design and structure of the program;
  - Learning objectives and learning outcomes;
  - Pedagogic methodologies/program delivery;
  - Student admission, transfer and residency criteria;
  - Complement of faculty members;
  - Program resources;
  - Program advisory mechanisms;
  - Originality, particularly in relationship to academic programs offered by other post-secondary institutions in British Columbia;

- Research opportunities for students;
- Research productivity of faculty members;
- Quality of research supervision (particularly for graduate programs);
- Quality of supervision of field or clinical practica (where applicable);
- International learning opportunities for students;
- Relationship to university's strategic directions and stated mission in teaching, learning and research;
- Alignment with faculty, school, and/or departmental priorities and stated goals in teaching, research, and community service;
- Alignment with existing academic strengths.

2. Program Administration:

- Administrative structure and support;
- Technical support;
- For graduate programs, research infrastructure;
- Library and related support;
- Teaching and learning assessment;
- Utilization of resources, especially human resource.

3. Alignment with the needs of the community and/or industry:

- Labour market demand;
- Post graduation experience/employment of students.

4. Enrolment, retention and student success:

- Enrolments in the program (effectiveness of existing strategies for student recruitment and projected; student numbers for the coming five years): trends over time;
- FTE generated and other sources of program funding: trends over time;
- Program completion and graduation rates;
- Student demand: current and projected;
- Potential of the program to attract new students (market);
- Strategies for student retention and projected rates of retention and degree completion;
- Availability of financial assistance and awards to students;
- Specialized access programs, and associated costs, if required;
- Access to academic advising.

### **The Review Process**

The goal is that reviews should be open, objective, critical, and constructive. The process for reviewing each program (or set of programs) shall consist of the following main elements:

- 1 The preparation of a self-assessment report by the academic unit delivering the program to be reviewed;
- 2 The selection of a review committee, in consultation with the Dean of Provost and Vice-President, Academic as appropriate. Normally, the committee would consist of one internal member, two external members, of which one external member is appointed chair;
- 3 A site visit by the review committee;
- 4 The preparation of a review report by the review committee;
- 5 An opportunity for the unit delivering the program and the Dean to respond to the review report;

- 6 A review of the response prepared by the academic unit and the Dean by the Provost and Vice-President, Academic; and,
- 7 An action plan for addressing the conclusions and recommendations of the review report and response.

The review process will be supported by the Office of Institutional Research. A budget for academic reviews will reside in the Office of the Provost and Vice-President, Academic and funds will be transferred to respective Deans to cover the costs of the reviews. Normally, the review process is coordinated by the Office of the Dean in consultation with the unit under review.

The order in which programs are reviewed will be determined by the Provost and Vice-President, Academic in consultation with the Deans of the respective Faculties and Faculty Councils, and will form part of an institutional multi-year program review plan. Under exceptional circumstances, a Dean may request a review of a particular program and/or academic unit.

Program reviews are conducted by a review committee and guided by a self-study conducted by the academic unit responsible for a program or set of programs. Additional information may be requested by the committee before or during the site visit by the review committee. A self-study report is an opportunity for the unit to engage in self-reflection and an analysis of the strength and weaknesses of all aspects of a program or set of programs. Review committees are appointed by the Provost and Vice-President, Academic upon the recommendation of the Dean responsible for the program or unit under review. The review committee normally will consist of two reviewers external to UFV, and a third who is a UFV faculty member from outside the Faculty of the program under review. This faculty member should be someone familiar with the operation of the program under review and shall participate fully in the review. The chair of the review committee normally will be selected from the two external members.

The self-study will be developed in cooperation with the Office of Institutional Research.

The purpose of the external review is to:

- Provide an opportunity for the members of a unit to reflect on the quality and possibilities of their programs;
- Provide an external perspective on the program in terms of its comparability with similar programs elsewhere, its stature on a provincial and national scale, and its success in terms of its stated objectives;
- Make constructive recommendations and suggest actions that will improve the program.

#### **Stages in the Review Process**

- 1 An overall multi-year institutional plan for program reviews is developed by the Provost and Vice-President, Academic, in consultation with Deans and Faculty Councils, and is submitted and approved by the Senate.
- 2 The Provost and Vice-President, Academic, in consultation with the Deans of the respective Faculties, confirms annually the programs to be reviewed in the following year. The Dean then informs the academic unit(s) responsible for the program(s) to be reviewed.
- 3 An orientation session is organized for those responsible for self-studies in academic units and programs designated to conduct reviews in the subsequent academic year. This session will include an examination of the process, the required contents of the self-study document and the nature of the data to be provided by the Office of Institutional Research.
- 4 The academic unit establishes a committee to prepare its self-study of its program. This committee may also, where appropriate, seek the advice of others such as representatives of industry, professions and practical training programs.
- 5 The academic unit shall develop a list of at least four potential external and two potential



internal reviewers. The Dean, in consultation with the Provost and Vice-President, Academic, shall appoint the review committee, taking into consideration the recommendations from the department.

- 6 Selection of an external review committee and the Chair by the Dean, in consultation with the Provost and Vice-President, Academic.
- 7 The Office of Institutional Research provides academic units with survey outcomes and enrolment data and other relevant information.
- 8 The academic unit conducts the self-study.
- 9 The academic unit submits the self-study to the Dean, who either accepts or returns it to the unit for further revisions.
- 10 The self-study report is reviewed and assessed by the external review committee.
- 11 The academic unit submits additional documentation if requested by the external committee.
- 12 Site visit.
- 13 The external review committee submits its confidential report to the Dean (within a set period of time after the site visit).
- 14 The Dean forwards the reviewers' report to the unit.
- 15 The academic unit develops its response, within a set period of time, after receiving the reviewers' report, and submits it to the Dean.
- 16 After consultation with the Provost and Vice-President, Academic and the academic unit, the Dean submits to the Senate: a) the self-study; b) the reviewers' report; c) the academic unit's response, and d) his/her executive summary (commenting on the outcomes, findings and conclusions of the review and providing recommendations arising from the review – including an "action plan" for implementing the recommendations emerging from the review).
- 17 When some of the recommendations arising from the review go beyond the purview of the Dean, the Provost and Vice-President, Academic provides a response to Senate.
- 18 The Provost and Vice-President, Academic reports annually to the Senate and the Board of Governors on the results of all program reviews, including copies of the "Dean's Executive Summary" for each review concluded during the previous year.

#### **Program Self-Study by the Academic Unit**

The self-study conducted by the academic unit provides an opportunity to assess every dimension of the program's academic quality. The background and history of the program and the academic unit responsible for the program shall be summarized as a context for the delivery of the program.

The self-study produced by the academic unit should follow a recommended format, and should include:

- A statement of the goals and learning objectives of the program, changes in these since the last review or since the program was initially approved, and their consistency with the mandate and academic priorities of the university.
- The past, present and projected student enrolment in the program, including majors and number of full-time equivalents (FTEs).
- Admissions information, including:
  - admission requirements and qualifications of incoming students;
  - enrolment targets and numbers of students registered; and,
  - enrolment patterns with respect to entrants, transfer students, and/or other categories relevant to the program.
- The program, including:
  - the curriculum as presented in the calendar, incorporating course titles and hours;
  - major options/streams within the program, if applicable; and,
  - the identification of any courses that are not offered on a regularly accessible basis.
- A summary of how each course contributes to achieving the goals and learning objectives of the

program. This may include:

- subject matter, methods of delivery, especially approaches to pedagogy;
  - typical class sizes and trends in student enrolments;
  - all course outlines, as an appendix; and,
  - procedures used to evaluate and address course and instructional quality.
- Student retention and graduation rates.
- The structure, content, and objectives/focus of the program relative to its comparators in universities inside and outside of British Columbia (with an explanation of the rationale for the choice of comparators).
- An explanation of any variations from UFV standard policies on grading, promotion, and academic standing, if applicable.
- Faculty and staff, including:
  - Full-time and part-time instructional resources;
  - Curricula vitae of all faculty members who have been teaching in the program in the last three years; and,
  - A summary of faculty in the program indicating:
    - name
    - highest earned degree and year
    - tenure status
    - teaching assignments
    - summary of teaching evaluations
    - scholarly activity, which could include a listing of peer-reviewed and other journal articles (current and preceding five years), chapters, monographs, policy papers, reports, presentations, conferences
    - community service activities
- Description of the resources available to the program (labs, student spaces, computing facilities, library resources, equipment, and other categories as appropriate).
- Information about collaborative arrangements (with other academic units or institutions) when applicable.
- The findings of representative surveys (conducted by the Office of Institutional Research) of current students' and recent graduates' perceptions of the program's effectiveness in preparing them for careers and graduate studies.
- The results of surveys/consultations with representatives of industry, professions or practical training programs, as appropriate.
- Details of the unit's operating and capital budgets for the previous five years.
- Assessment of program strengths and weaknesses and level of success in meeting its stated objectives (with a description of the criteria, performance indicators, and evaluative tools employed by the program as a basis for its self-study), including:
  - consistency of the program with the university's mission and strategic plan and the standards, goals and learning objectives for the degree;
  - appropriateness and effectiveness of the admission requirements;
  - appropriateness of the program's structure, curriculum, delivery modes and evaluation methods to satisfy the learning objectives;
  - appropriateness and effectiveness of the utilization of resources, especially human resources; and,
  - evidence of quality of faculty, students and overall program success.

A preliminary response by the academic unit to the program's strengths and weaknesses identified through the self-study.



NUMBER 189  
 APPROVAL DATE 01-2009  
 LAST AMENDMENT  
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 NEXT REVIEW DATE 01-2013

## ACADEMIC PROGRAM AND UNIT REVIEWS

|                                       |                                                                                                                                                                                                                                                                         |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Approval Authority</b>             | <a href="#">PresidentSenate</a>                                                                                                                                                                                                                                         |
| <b>Responsible Executive</b>          | Provost and Vice-President, Academic                                                                                                                                                                                                                                    |
| <b>Related Policies / Legislation</b> | Board policy direction University Educational Directions and Planning (BPD-202)<br><i>University Act</i> , s 35.2 (6) (f)<br><a href="#">Undergraduate Course and Program Approval policy (21)</a><br><a href="#">Graduate Course and Program Approval policy (209)</a> |

### PURPOSE

This policy is to ensure accountability of academic programs and programming by:

- providing regular and systematic reviews of the objectives and delivery of programs and programming at UFV;
- fostering ongoing improvement of their quality;
- enhancing their contribution to the university's **strategic goals, vision, mission, and values;**
- **, and alignment** aligning with Institutional Learning Outcomes;
- achieving and maintaining high standards of educational practices;
- achieving and maintaining high professional standards, as recognized by the disciplinary and/or accrediting bodies; and
- ensuring an adequate and effective utilization of resources.

### SCOPE

This policy applies to all programs and programming at UFV, and to academic units that are responsible for, or contribute to, their delivery.

### DEFINITIONS

In this policy, the following definitions apply:

Academic unit: An administrative grouping that delivers or contributes to the delivery of programs and programming, such as a Faculty, department, or school or centre.

Institutional Learning Outcomes (ILOs): Set of abilities, skills or competencies that each UFV graduate possessescan demonstrate.

Program: For the purposes of this policy, a program is defined as a setA collection of courses and associated requirements offered as a credential or an option within a credential. This includes, but is not limited to, a certificate, diploma, minor, extended minor, major, honours, degree, specialization, option, or concentration. approved by Senate to constitute all or part of the requirements for an undergraduate or a graduate degree or certificate or diploma offered by UFV.

Programming: a set of related measures, events, activities, service courses or programs in support of a particular institutional priority or attainment of competencies (numerical, communications) across programs.

Academic unit: An academic unit is an administrative grouping of faculty and staff and the organizational structure that delivers programs, such as a faculty, department, or school.

Program goals: Program goals state for students, instructors and program/course evaluators of what the program expects to achieve.

Learning objectives: Learning objectives are a statement of what the student should learn or accomplish at the end of the program or course.

Learning outcomes: Learning outcomes demonstrate what the student actually learns or achieves.

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## **POLICY**

An academic program and unit reviews is the administrative process that provides a systematic quantitative and qualitative review of the objectives and delivery of programs and programming.

All academic programs and programming will normally undergo a review every seven to eight years, or at any time if it is requested by the Dean or Provost and Vice-President, Academic.

Academic program reviews shall be carried out under the general supervision of the Dean responsible for the program or unit and the Provost and Vice-President, Academic.

At the discretion of the Provost and Vice-President, Academic, the accreditation of professional school(s) or program(s) may serve as a component of an academic program review.

The results of an academic program review are communicated to the university at large, through the Senate, its committees, and the Board of Governors, as relevant to these committees' respective responsibilities.

All academic programs and units will normally undergo a review every five years, although a review may be undertaken at any time if it is requested by the Dean or Provost and Vice-President, Academic.

The process involves the review of two components: the academic program to be reviewed and the unit in which the program is based. Many factors contribute to the academic quality of the program. The administrative setting, the research and scholarly activities of the faculty members, the material resources and physical infrastructure, and the governance mechanisms all affect the quality of academic programs and the educational experiences of students. Reviews are intended to ensure and improve quality of both the programs and the unit and to foster a culture of continuous improvement throughout the institution.

For those programs which are subject to external accreditation reviews, those reviews will normally be considered as fulfilling the requirements of the present policy, unless a additional review is considered necessary by the Dean responsible for the program or the Provost and Vice President, Academic.

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#### **REGULATIONS**

The review of programs or programming will include the relevant academic units that are responsible for, or contribute to, their delivery.

The main elements of the review process are:

- 1 A scope letter;
- 2 A self-assessment of the program or programming by the unit(s) delivering the program;
- 3 A site visit and assessment report by the review committee;
- 4 A report and action plan prepared by the unit(s) and the Dean in response to the review within three months of receipt of the review report; and
- 5 A progress report on the action plan submitted by the Dean to the Provost within 12-18 months of the review.

Certificates and diplomas that do not ladder into another credential will normally undergo a review every seven years or at any time if it is requested by the Dean or Provost and Vice-President, Academic. Such certificates and diplomas may be clustered for the purpose of review.

The order in which programs and programming are reviewed will be determined by the Provost and Vice-President, Academic in consultation with the Deans of the respective Faculties/College, and will form part of an institutional multi-year program review plan. Under exceptional circumstances, a Dean may request a review of a particular program or programming.

The Provost and Vice-President, Academic, in consultation with the Academic Planning and Priorities Committee, will authorize Procedures under this policy. These may include detailed criteria for the review that are within the scope of this policy.

#### **The Purpose of Program Reviews**

Program reviews are designed to:

1. Determine the coherence of the program standards, design, and goals and review the alignment of the program's standards, educational goals and learning objectives with the general goals of the institution, as well as external standards, as they apply.
2. Determine whether the program has been designed, structured and delivered so as to ensure that students have achieved their learning outcomes.
3. Determine the appropriateness of the admission requirements and practices of the method of delivery for achieving the learning outcomes.
4. Determine the appropriateness of the specific curricular and pedagogical policies and practices of the program in relation to the learning outcomes.

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5. Determine the appropriateness of the methods used for the assessment and evaluation of student progress.
  6. Determine that the number and expertise of the faculty and staff are sufficient to enable students' success.
  7. Evaluate the administrative policies and practices of the unit delivering the program, and its efficient and effective utilization of human/physical/financial resources and, where necessary, to suggest improvements for effectiveness and efficiency.
  8. Suggest solutions to existing or anticipated problems and offer advice on how the program may be enhanced and its delivery be improved.

### **The Focus of Program and Unit Reviews**

The goals of a program and unit review will form the basis for defining the focus and scope of each review. The curricular content of a program, its admission requirements, its mode of delivery, and the basis of evaluation of student performance are all related to the overall quality of any academic program, as is the commitment of the necessary human and other resources for achieving the program goals and helping students achieve success.

Program reviews will focus on:

1. Indicators that provide evidence of quality of faculty, students and learning outcomes in terms of accepted standards for academic, professional and/or occupational programs:
  - Degree level standards;
  - Credential recognition;
  - Curriculum/program content;
  - Design and structure of the program;
  - Learning objectives and learning outcomes;
  - Pedagogic methodologies/program delivery;
  - Student admission, transfer and residency criteria;
  - Complement of faculty members;
  - Program resources;
  - Program advisory mechanisms;
  - Originality, particularly in relationship to academic programs offered by other post-secondary institutions in British Columbia;
  - Research opportunities for students;
  - Research productivity of faculty members;
  - Quality of research supervision (particularly for graduate programs);
  - Quality of supervision of field or clinical practica (where applicable);
  - International learning opportunities for students;
  - Relationship to university's strategic directions and stated mission in teaching, learning and research;
  - Alignment with faculty, school, and/or departmental priorities and stated goals in teaching, research, and community service;
  - Alignment with existing academic strengths.
2. Program Administration:
  - Administrative structure and support;
  - Technical support;
  - For graduate programs, research infrastructure;

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- ~~Library and related support;~~
  - ~~Teaching and learning assessment;~~
  - ~~Utilization of resources, especially human resource.~~

3. ~~Alignment with the needs of the community and/or industry:~~

- ~~Labour market demand;~~
- ~~Post graduation experience/employment of students.~~

4. ~~Enrolment, retention and student success:~~

- ~~Enrolments in the program (effectiveness of existing strategies for student recruitment and projected; student numbers for the coming five years); trends over time;~~
- ~~FTE generated and other sources of program funding; trends over time;~~
- ~~Program completion and graduation rates;~~
- ~~Student demand: current and projected;~~
- ~~Potential of the program to attract new students (market);~~
- ~~Strategies for student retention and projected rates of retention and degree completion;~~
- ~~Availability of financial assistance and awards to students;~~
- ~~Specialized access programs, and associated costs, if required;~~
- ~~Access to academic advising.~~

**The Review Process**

The goal is that reviews should be open, objective, critical, and constructive. The process for reviewing each program (or set of programs) shall consist of the following main elements:

- 1 ~~The preparation of a self-assessment report by the academic unit delivering the program to be reviewed;~~
- 2 ~~The selection of a review committee, in consultation with the Dean of Provost and Vice-President, Academic as appropriate. Normally, the committee would consist of one internal member, two external members, of which one external member is appointed chair;~~
- 3 ~~A site visit by the review committee;~~
- 4 ~~The preparation of a review report by the review committee;~~
- 5 ~~An opportunity for the unit delivering the program and the Dean to respond to the review report;~~
- 6 ~~A review of the response prepared by the academic unit and the Dean by the Provost and Vice-President, Academic; and,~~
- 7 ~~An action plan for addressing the conclusions and recommendations of the review report and response.~~

The review process will be supported by the Office of Institutional Research. A budget for academic reviews will reside in the Office of the Provost and Vice-President, Academic and funds will be transferred to respective Deans to cover the costs of the reviews. Normally, the review process is coordinated by the Office of the Dean in consultation with the unit under review. The order in which programs are reviewed will be determined by the Provost and Vice-President, Academic in consultation with the Deans of the respective Faculties and Faculty Councils, and will form part of an institutional multi-year program review plan. Under exceptional circumstances, a Dean may request a review of a particular program and/or academic unit.

Program reviews are conducted by a review committee and guided by a self-study conducted by the academic unit responsible for a program or set of programs. Additional information may be requested

by the committee before or during the site visit by the review committee. A self-study report is an opportunity for the unit to engage in self-reflection and an analysis of the strength and weaknesses of all aspects of a program or set of programs. Review committees are appointed by the Provost and Vice-President, Academic upon the recommendation of the Dean responsible for the program or unit under review. The review committee normally will consist of two reviewers external to UFV, and a third who is a UFV faculty member from outside the Faculty of the program under review. This faculty member should be someone familiar with the operation of the program under review and shall participate fully in the review. The chair of the review committee normally will be selected from the two external members.

The self-study will be developed in cooperation with the Office of Institutional Research.

The purpose of the external review is to:

- Provide an opportunity for the members of a unit to reflect on the quality and possibilities of their programs;
- Provide an external perspective on the program in terms of its comparability with similar programs elsewhere, its stature on a provincial and national scale, and its success in terms of its stated objectives;
- Make constructive recommendations and suggest actions that will improve the program.

#### **Stages in the Review Process**

- 1—An overall multi-year institutional plan for program reviews is developed by the Provost and Vice-President, Academic, in consultation with Deans and Faculty Councils, and is submitted and approved by the Senate.
- 2—The Provost and Vice-President, Academic, in consultation with the Deans of the respective Faculties, confirms annually the programs to be reviewed in the following year. The Dean then informs the academic unit(s) responsible for the program(s) to be reviewed.
- 3—An orientation session is organized for those responsible for self-studies in academic units and programs designated to conduct reviews in the subsequent academic year. This session will include an examination of the process, the required contents of the self-study document and the nature of the data to be provided by the Office of Institutional Research.
- 4—The academic unit establishes a committee to prepare its self-study of its program. This committee may also, where appropriate, seek the advice of others such as representatives of industry, professions and practical training programs.
- 5—The academic unit shall develop a list of at least four potential external and two potential internal reviewers. The Dean, in consultation with the Provost and Vice-President, Academic, shall appoint the review committee, taking into consideration the recommendations from the department.
- 6—Selection of an external review committee and the Chair by the Dean, in consultation with the Provost and Vice-President, Academic.
- 7—The Office of Institutional Research provides academic units with survey outcomes and enrolment data and other relevant information.
- 8—The academic unit conducts the self-study.
- 9—The academic unit submits the self-study to the Dean, who either accepts or returns it to the unit for further revisions.
- 10—The self-study report is reviewed and assessed by the external review committee.
- 11—The academic unit submits additional documentation if requested by the external committee.
- 12—Site visit.
- 13—The external review committee submits its confidential report to the Dean (within a set period of time after the site visit).
- 14—The Dean forwards the reviewers' report to the unit.



- 15 The academic unit develops its response, within a set period of time, after receiving the reviewers' report, and submits it to the Dean.
- 16 After consultation with the Provost and Vice-President, Academic and the academic unit, the Dean submits to the Senate: a) the self-study; b) the reviewers' report; c) the academic unit's response, and d) his/her executive summary (commenting on the outcomes, findings and conclusions of the review and providing recommendations arising from the review—including an "action plan" for implementing the recommendations emerging from the review).
- 17 When some of the recommendations arising from the review go beyond the purview of the Dean, the Provost and Vice-President, Academic provides a response to Senate.
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The self-study conducted by the academic unit provides an opportunity to assess every dimension of the program's academic quality. The background and history of the program and the academic unit responsible for the program shall be summarized as a context for the delivery of the program.

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- A statement of the goals and learning objectives of the program, changes in these since the last review or since the program was initially approved, and their consistency with the mandate and academic priorities of the university.
- The past, present and projected student enrolment in the program, including majors and number of full-time equivalents (FTEs).
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  - admission requirements and qualifications of incoming students;
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- The program, including:
  - the curriculum as presented in the calendar, incorporating course titles and hours;
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  - the identification of any courses that are not offered on a regularly accessible basis.
- A summary of how each course contributes to achieving the goals and learning objectives of the program. This may include:
  - subject matter, methods of delivery, especially approaches to pedagogy;
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- The structure, content, and objectives/focus of the program relative to its comparators in universities inside and outside of British Columbia (with an explanation of the rationale for the choice of comparators).
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  - Full-time and part-time instructional resources;
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- 
- A summary of faculty in the program indicating:
    - \* name
    - \* highest earned degree and year
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  - Description of the resources available to the program (labs, student spaces, computing facilities, library resources, equipment, and other categories as appropriate).
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  - The findings of representative surveys (conducted by the Office of Institutional Research) of current students' and recent graduates' perceptions of the program's effectiveness in preparing them for careers and graduate studies.
  - The results of surveys/consultations with representatives of industry, professions or practical training programs, as appropriate.
  - Details of the unit's operating and capital budgets for the previous five years.
  - Assessment of program strengths and weaknesses and level of success in meeting its stated objectives (with a description of the criteria, performance indicators, and evaluative tools employed by the program as a basis for its self-study), including:
    - \* consistency of the program with the university's mission and strategic plan and the standards, goals and learning objectives for the degree;
    - \* appropriateness and effectiveness of the admission requirements;
    - \* appropriateness of the program's structure, curriculum, delivery modes and evaluation methods to satisfy the learning objectives;
    - \* appropriateness and effectiveness of the utilization of resources, especially human resources; and,
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A preliminary response by the academic unit to the program's strengths and weaknesses identified through the self-study.

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## APPENDICES

N/A



NUMBER 189

APPROVAL DATE 01-2009

LAST AMENDMENT

LAST REVIEWED

NEXT REVIEW DATE 01-2013

**ACADEMIC PROGRAM AND UNIT REVIEWS**

|                                       |                                                                                                                                                                                                                                         |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Approval Authority</b>             | Senate                                                                                                                                                                                                                                  |
| <b>Responsible Executive</b>          | Provost and Vice-President, Academic                                                                                                                                                                                                    |
| <b>Related Policies / Legislation</b> | Board policy direction University Educational Directions and Planning (BPD-202)<br><i>University Act</i> , s 35.2 (6) (f)<br>Undergraduate Course and Program Approval policy (21)<br>Graduate Course and Program Approval policy (209) |

**PURPOSE**

This policy is to ensure accountability of academic programs and programming by:

- providing regular and systematic reviews of the objectives and delivery of programs and programming at UFV;
- fostering ongoing improvement of their quality;
- enhancing their contribution to the university's strategic goals, vision, mission, and values;
- aligning with Institutional Learning Outcomes;
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- ensuring an adequate and effective utilization of resources.

**SCOPE**

This policy applies to all programs and programming at UFV, and to academic units that are responsible for, or contribute to, their delivery.

**DEFINITIONS**

In this policy, the following definitions apply:

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## **POLICY**

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At the discretion of the Provost and Vice-President, Academic, the accreditation of professional school(s) or program(s) may serve as a component of an academic program review.

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## **REGULATIONS**

The review of programs or programming will include the relevant academic units that are responsible for, or contribute to, their delivery.

The main elements of the review process are:

- 1 A scope letter;
- 2 A self-assessment of the program or programming by the unit(s) delivering the program;
- 3 A site visit and assessment report by the review committee;
- 4 A report and action plan prepared by the unit(s) and the Dean in response to the review within three months of receipt of the review report; and
- 5 A progress report on the action plan submitted by the Dean to the Provost within 12-18 months of the review.

Certificates and diplomas that do not ladder into another credential will normally undergo a review every seven years or at any time if it is requested by the Dean or Provost and Vice-President, Academic. Such certificates and diplomas may be clustered for the purpose of review.

The order in which programs and programming are reviewed will be determined by the Provost and Vice-President, Academic in consultation with the Deans of the respective Faculties/College, and will

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form part of an institutional multi-year program review plan. Under exceptional circumstances, a Dean may request a review of a particular program or programming.

The Provost and Vice-President, Academic, in consultation with the Academic Planning and Priorities Committee, will authorize Procedures under this policy. These may include detailed criteria for the review that are within the scope of this policy.

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**APPENDICES**

N/A

# MEMO



**To:** Amanda Grimson, for submission to UEC

**From:** Sheryl MacMath, Department Head, Teacher Education Department (TED)

**Date:** November 24, 2015

**RE:** **Updated Calendar Copy for Teacher Education**

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The Bachelor of Education program proposal has gone through the UEC Screening Committee, Campus Wide Consultation, and was approved by UEC on **January 30, 2015**. The UFV Senate subsequently approved the degree on **March 13, 2015**. The approval of the Bachelor of Education degree included several revisions to the calendar copy, which the department hoped to implement in the 2016 intake. One of the revisions is a readjustment in the sequence of courses and starting the program in September instead of July. Although the BEd has been approved by UFV, we are still awaiting approval by the Ministry of Advanced Education and the Degree Quality Assessment Board (DQAB). It is uncertain at this time when we will receive approval.

In moving forward, our department wishes to implement the new start date, the adjustment in course sequence, and other revisions to the calendar copy.

Based on discussions with Darren Francis, Rod McLeod, and the approval of our Dean, Dr. Tracy Ryder Glass, this is considered an administrative change. We have been told that we can re-submit the already approved calendar copy of the BEd as an information item to UEC, but keep the program name "Teacher Education Program" (TEP). This would enable us to publish the updated information in the academic calendar for the spring of 2016.

Please find attached the calendar copy for the 2016 Teacher Education Programs (elementary/middle and secondary) as an information item.

If you have any questions, please do not hesitate to contact me.

**Calendar Copy****Teacher Education Program**

The Teacher Education Department offers a Teacher Education Program (TEP) for prospective teacher candidates, who have already completed a four-year degree and who intend to become pre-service teachers through the **elementary/middle school** (Kindergarten to grade 7) or the **secondary school** (grade 8 to grade 12) **option**. Within the secondary option, specializations are available through a Math/Science stream and a Humanities stream.

The Teacher Education Program (TEP) has 55-credits and the course work spans three semesters. It can only be taken on a full-time basis. Courses and practica emphasize the integration of knowledge, practice, and program components that are specifically designed to meet the TEP values and goals and the curricular requirements of the Ministry of Education. The TEP is intended to help prospective teachers attain the professional standards established by the Ministry of Education through the B.C. Teacher Regulation Branch (TRB); see [bcteacherregulation.ca](http://bcteacherregulation.ca) for more information. Upon successful completion of the TEP, teacher candidates will be recommended to the Ministry of Education for professional certification through the TRB and will receive a TEP certificate from UFV.

**Entrance requirements and eligibility (ELEMENTARY OPTION)**

The TEP Elementary Option is designed to prepare teacher candidates to qualify for a professional teaching certificate issued by the TRB. Some of the following admission requirements reflect policies or standards of the TRB.

**Academic Entrance requirements**

- Completion of a four-year bachelor degree from a recognized institution, to include 12 credits of 300 or 400 level courses in teachable subject areas (see Note)
- 3 credits of English composition
- 3 credits of English literature
- 3 credits of Canadian history
- 3 credits of Canadian geography
- 4 credits of an approved laboratory science course
- MATH 105 (4 credits)
- EDUC 200 (3 credits)
- EDUC 300 (4 credits)

Note: All applicants must meet the course requirements of the TRB to qualify for professional certification. The required Bachelor's degree needs to include a minimum of 120 credits. Twelve credits of third and fourth year courses have to be from teachable subject areas: English, math, science, physical education, social studies (any combination of anthropology, geography, history, political science, or sociology), French, visual arts, and theatre.

All courses mentioned above, except EDUC 300, must be completed one full semester prior to beginning the TEP.

**Other requirements (TEP – elementary option)**

**a) Interview** All applicants who meet the minimum requirements will be interviewed to assess their readiness and their dispositions for the teaching profession. Interview dates will be made available by invitation and are normally scheduled for March. Candidates unable to attend the interview must consult the Education Advisor.

**b) Program Preparation:** Candidates are required to have work experience with children/adolescents in a variety of settings. While all experience with children/adolescents is valuable, classroom volunteer work is strongly recommended. Candidates are encouraged to highlight additional certificates, talents, and skills. In addition, we recommend that elementary education applicants take courses in First Nations Studies or Indigenous People's Knowledge to further enhance their preparation. It is also recommended that applicants have preparation in numeracy (e.g. Math 205), modern languages, fine and performing arts courses, and/or kinesiology courses.

**c) Reference letters:** At least two, but no more than three, confidential letters of reference from professionals are required to support the application. Forms with guiding questions can be found on the TEP website

**d) Grade Point Average:** UFV will calculate grade point average (GPA) on the most recent two years (approximately 60 semester hours) of undergraduate coursework (this may include post-degree coursework). Applicants with a GPA below a 2.8 on the 4.33 scale in this calculation will not be considered.

**Entrance requirements and eligibility (SECONDARY OPTION)**

The TEP Secondary Option is designed to prepare candidates to qualify for a professional teaching certificate issued by the TRB. The TEP (secondary option) includes two streams: Math/Sciences and Humanities. Within these streams are four teachable subject areas: Mathematics and Science (Math/Sciences stream) and Social Studies and English (Humanities stream). The following admission requirements reflect the policies and standards of the TRB.

There are three ways in which an applicant can be eligible for the TEP (secondary):

1. A Bachelor's degree with a major in one of the four teachable subject areas (e.g. a major in Biology would make an applicant eligible for the math/sciences stream).
2. A Bachelor's degree with two minors, with both minors from the four teachable subject areas (e.g. a minor in Mathematics and a minor in Chemistry would make an applicant eligible for the math/sciences stream).
3. A Bachelor's degree with a minimum of one minor in one of the four teachable subject areas (with a preference for a second minor in a subject area widely taught in B.C. schools).



**Academic entrance requirements for all secondary streams:**

- Completion of a four-year bachelor degree from a recognized institution, to include at least one teachable area consisting of a major or a minor in one of English, Social Studies, Mathematics, or Sciences
- 3 credits in English composition
- 3 credits in English literature
- 3 credits of Educational Psychology (EDUC 200)
- 4 credits of Best Practices of Teaching and Learning (EDUC 300)

Note: The English requirements and EDUC 200 must be completed by December 31st prior to applying to the TEP.

**Course Requirements for major/minor distinctions:****The teachable major:**

A teachable major is comprised of 42 credits of general and specific course work in any one of the following core B.C. secondary school subjects: Mathematics, Sciences, English, or Social Studies. At least 30 of the 42 credits must be at the 300- or 400-level.

**The teachable minor:**

A teachable minor consists of a minimum of 12-15 credits at the lower-level and at least 18 credits at the 300- and/or 400-level in any one of English, Social Studies, Mathematics, or Sciences.

**2) Specific course requirements for admission to the TEP (Secondary option):****1. Math/Sciences stream****a) Science teacher applicants**

To be accepted as a science teacher candidate for biology, chemistry, physics, or physical geography in the Math/Sciences stream, applicants must meet the following course requirements in order to be prepared for both the science and math methods courses:

- MATH 111, and one of MATH 112 or Math 118, or equivalent.
- A minimum of 18 credits of 100/200-level course work in one of the following designated content areas: Chemistry, Physics, Biology, or Physical Geography/Geology.
- 30 credits of 300/400-level course work in the designated major subject area (or 18 credits for the minor).

Note: Applicants for the Physical Geography content area must hold a B.Sc. in Physical Geography.

Note: Science teacher applicants will also be completing the mathematics methods courses within the Math/Sciences stream.

**b) Mathematics teacher applicants:**

To be accepted as a mathematics teacher candidate in the Math/Sciences stream, applicants must meet the following course requirements in order to be prepared for both science and math methods courses:

- MATH 111, and one of MATH 112 or Math 118, or equivalent
- 12 additional credits in 100/200-level mathematics, (including one course in statistics)
- 8 credits from the completion of CHEM 113 and 114, **or** PHYS111 and 112, **or** BIO 111 and 112
- 30 credits in 300/400-level mathematics courses (a minimum of 18 credits is required for the minor). Please note that the upper level courses should be math courses and not statistics.

Note: Math teacher applicants will also be completing the science methods courses within the Math/Sciences stream.

**2. Humanities Stream (English/Social Studies)**

**a) Social Studies teacher applicants**

To be accepted as a Social Studies teacher candidate, applicants must meet the following course requirements:

**For Geography candidates:**

- 12 credits in geography at any university level
- 12 credits in history, which must include 3 credits in pre-Confederation Canadian history, 3 credits in post-Confederation Canadian history, 3 credits in European history, and 3 credits in Asian, African, or Latin American history
- 30 credits in 300/400 level geography courses (a minimum of 18 credits is required for the minor)

It is recommended that candidates have six credits in a social science other than history or geography, such as sociology, anthropology, or First Nations studies.

**For History candidates:**

- 12 credits in history, which must include 3 credits of pre-Confederation Canadian history, 3 credits of post-Confederation Canadian history, 3 credits of European history, and 3 credits of Asian, African, or Latin American history
- 6 credits in geography (3 credits must be in Canadian geography)

- 30 credits in 300/400 level history courses (a minimum of 18 credits is required for the minor)

It is recommended that candidates have six credits in a social science other than history or geography, such as sociology, anthropology, First Nations studies, or political science.

Note: Social Studies teacher applicants will also be completing the English methods courses within the Humanities stream.

#### **b) English teacher applicants**

To be accepted as an English teacher candidate, applicants must meet the following course requirements:

- 12 credits in 100/200 level English
- 30 credits in 300/400 level English (a minimum of 18 credits is required for the minor)
- 3 credits in Canadian history and 3 credits in either European , Asian, or LA history
- 3 credits in Geography

Note: English teacher applicants will also be completing the Social Studies methods courses within the Humanities stream. English teacher applicants are encouraged to include English literature courses in their preparation.

#### **Other requirements (TEP – secondary option)**

**a) Interview** All applicants who meet the minimum requirements will be interviewed to assess their readiness and their dispositions for the teaching profession. Interview dates will be made available by invitation and are normally scheduled for March. Students unable to attend the interview must consult the Education Advisor.

**b) Program Preparation:** Candidates are required to have work experience with children/adolescents in a variety of settings. While all experience with children/adolescents is valuable, classroom volunteer work is strongly recommended. Candidates are encouraged to highlight additional certificates, talents and skills. For those candidates applying with only one teachable minor in one of the four subject areas, preference will be given to candidates who have a second minor in another subject area widely taught in B.C. schools. In addition to the courses required to apply for each stream, applicants are encouraged to take additional courses to enhance their preparedness for today's classrooms. Candidates are encouraged to pursue course work in the following areas:

*Mathematics/Sciences applicants:* 6 credits in computer science or 6 credits in another science subject than the teachable major/minor

*Humanities applicants:* 6 credits in a social science other than history or geography, such as

First Nations studies, Indigenous People's Knowledge, anthropology, sociology, or political science.

**c) Reference letters:** At least two, but no more than three, confidential letters of reference from professionals are required to support the application. Forms with guiding questions can be found on the TEP website

**d) Grade Point Average:** UFV will calculate grade point average (GPA) on the most recent two years (approximately 60 semester hours) of undergraduate coursework (this may include post-degree coursework). Applicants with a GPA below a 2.8 on the 4.33 scale in this calculation will not be considered.

Note: All documentation submitted as part of a candidate's application is confidential and will be treated as such by UFV.

All candidates must meet the B.C. Teacher Regulation Branch acceptable degree policy, restricting the academic preparation acceptable for qualifying teachers. It is strongly recommended that prospective candidates attend the TEP Seminars which are regularly offered by the department. For more information please see [ufv.ca/tep](http://ufv.ca/tep).

### **Criminal Record Check**

Under the Criminal Records Review Act, candidates in a professional post-secondary program with a practicum component involving work with children and/or vulnerable adults must undergo a criminal records check. This is a requirement before candidates can participate in any practicum placements. Persons convicted of a criminal offense and given an absolute or conditional discharge are advised to contact the Registrar of the Teachers Regulation Branch for clarification of their status before undertaking a teacher education program. The criminal records check will be administered through the Education Department and the British Columbia Ministry of Public Safety and Solicitor General.

### **Recognition of previously completed education courses (Transfer)**

TEP is a full-time cohort program in which all candidates take all courses together on the same schedule. To ensure that candidates' progress through the program at the same pace and to ensure that candidates receive consistent exposure to all aspects of the TEP curriculum, we limit transfer credit from other institutions or from other programs at UFV toward credit in the TEP program.

The following criteria are used to determine the applicability of transfer credit or other UFV credits to the TEP requirements or TEP admission requirements:

- Relevance of the course, as determined by the Teacher Education Department.
- Suitability of the course to the program, as determined by Teacher Education Department.
- The date the course was taken. Generally, courses taken more than 10 years ago will

- not be considered applicable to TEP entrance requirements or program requirements.
- The content of the course. If a course has been taken within the past 10 years, but there has been significant change to the course content, the course may not be considered applicable to TEP entrance requirements or program requirements.

Once transfer credit has been evaluated, through the process administered by the UFV Office of the Registrar, applicants should contact the Teacher Education Department to determine whether courses assigned UFV transfer credit may be used toward the TEP admission requirements. When transfer credit to the TEP is not appropriate, unassigned transfer credit may be given towards electives for other UFV programs. Candidates should consult with the Education Advisor.

### **How to apply**

Applicants must submit completed applications, including documentation, by January 31 to be considered for the September admission of the same year. Applicants are eligible to apply while completing a Bachelor's degree acceptable to the TRB, provided all prerequisite courses (except EDUC 300) are completed in the Fall semester prior to starting the TEP. Candidates accepted into the TEP program must complete their degree and course requirements by the end of the winter semester of the same year. Applications received after January 31 may be considered, but only if space is available.

Admission to the TEP will be on a competitive basis. Meeting the minimal requirements does not guarantee admission.

Candidates can obtain the TEP application forms online through the Office of the Registrar, or the TEP website ([www.ufv.ca/tep](http://www.ufv.ca/tep)).

### **Additional documents required for a complete application:**

1. Official transcripts (or interim transcripts) from all post-secondary institutions attended, showing grade/course achievement. To be considered official, transcripts must be sent directly to UFV from the originating institution; see the [Transfer Credit](#) section of the calendar for details. To meet application deadlines, order your transcripts early.
2. Reference letters, a brief résumé: Use the forms that are available on the TEP program website: [www.ufv.ca/teachereducation](http://www.ufv.ca/teachereducation). Please note that the interview will be completed on-campus by invitation (see directions and details in the application package).

The résumé must accompany the application. The date for the interview will be made available by invitation.

All references must be submitted on the Referee Report form provided with the application package, with a separate completed form for each reference. An additional letter can be attached to the referee form, however, this must be written on

school/company letterhead, must be original, and must be signed by the referee. One reference must come from an off-campus educator who has observed the candidate interacting with children/adolescents in an educational setting.

All references must be mailed directly by the referee in a sealed envelope to the UFV Office of the Registrar:

Office of the Registrar  
attn: TEP Program Admissions  
University of the Fraser Valley  
33844 King Rd. Abbotsford, B.C. V2S 7M8

### **Basis for admission decision**

1. An admissions committee, comprised of four to five faculty members will consider each candidate's application.
2. Each applicant must meet all academic requirements. In addition, teacher candidates are evaluated based on the four additional admission criteria as outlined under "Other requirements". Applicants with the highest overall score will be given admission to the TEP. A waitlist will also be generated for each intake.
3. Conditional acceptance may be offered, if candidates are still completing their Bachelor's degree and/or EDUC 300 prior to beginning the TEP in September. Proof of completion of ALL entrance requirements is due by mid-May.

Admission to the TEP will be on a competitive basis. Meeting minimum requirements does not guarantee admission.

### **Fees and additional costs**

See the [Fees and Other Costs](#) section. Books and additional supplies cost approximately \$100 per course. Candidates must have reliable modes of transportation for travel to practica sites. The criminal record check will be \$28. Upon successful completion of the TEP, candidate teachers can expect to pay a fee to the B.C. Teacher Regulation Branch to have documents reviewed for certification purposes.

### **TEP Program outline (Elementary Option)**

This is the suggested order and sequence of courses taken by all candidates within the cohort model.

### **Semester I (September to December)**

| <b>Course</b> | <b>Title</b>                   | <b>Credits</b> |
|---------------|--------------------------------|----------------|
| EDUC 410      | Schooling in a Diverse Society | 3              |

|           |                                                    |      |
|-----------|----------------------------------------------------|------|
| EDUC 420  | Designs for Learning Elementary Language Arts      | 3    |
| EDUC 422  | Designs for Learning Elementary Fine Arts          | 1    |
| EDUC 424  | Designs for Learning Elementary Mathematics        | 3    |
| EDUC 425  | Designs for Learning Elementary Physical Education | 1    |
| EDUC 444  | Classroom Management Strategies                    | 1    |
| EDUC 445  | Planning and Assessment                            | 2    |
| EDUC 490  | School Experience (Practicum 1)                    | 6    |
| EDUC 495A | Applications of Reflective Practice I              | 0.5  |
| Total     |                                                    | 20.5 |

**Semester II (January to April)**

| <b>Course</b> | <b>Title</b>                                           | <b>Credits</b> |
|---------------|--------------------------------------------------------|----------------|
| EDUC 412      | Introduction to Development and Special Learning Needs | 3              |
| EDUC 421      | Designs for Learning Elementary Social Studies         | 2              |
| EDUC 423      | Designs for Learning Elementary Science                | 2              |
| EDUC 446      | Information Technology in Teaching                     | 1              |
| EDUC 448      | Conflict Resolution in Schools                         | 1              |
| EDUC 452      | Unit Planning, Assessment, Evaluating and Reporting    | 2              |
| EDUC 453      | Literacy Across the Curriculum                         | 1              |
| EDUC 454      | Mental Health and Special Learning Needs in Schools    | 1              |
| EDUC 492      | Integration of Knowledge and Practice (Practicum 2)    | 12             |
| EDUC 495B     | Applications of Reflective Practice II                 | 0.5            |
| Total         |                                                        | 25.5           |

**Semester III (May and June)**

| <b>Course</b>         | <b>Title</b>                                   | <b>Credits</b> |
|-----------------------|------------------------------------------------|----------------|
| EDUC 442              | Introduction to Classroom Research             | 1              |
| EDUC 447              | Indigenous Youth and Schooling                 | 3              |
| EDUC 460              | Governance and Reform in Public Education      | 2              |
| EDUC 450              | Second Language Learning in Classroom Practice | 2              |
| EDUC 495C             | Applications of Reflective Practice III        | 1              |
| Total                 |                                                | 9              |
| Total program credits |                                                | 55             |

**TEP Program outline (Secondary Option)**

This is the suggested order and sequence of courses taken by all candidates within the cohort model.

**Humanities Stream****Semester I (September to December)**

| <b>Course</b> | <b>Title</b>                                 | <b>Credits</b> |
|---------------|----------------------------------------------|----------------|
| EDUC 410      | Schooling in a Diverse Society               | 3              |
| EDUC 413      | Adolescent Development and Special Education | 3              |
| EDUC 431      | Designs for Learning General Language Arts   | 3              |
| EDUC 432      | Designs for Learning General Social Studies  | 3              |
| EDUC 440      | Professional Communications                  | 1              |
| EDUC 444      | Classroom Management Strategies              | 1              |
| EDUC 445      | Planning and Assessment                      | 2              |
| EDUC 490      | School Experience (Practicum 1)              | 6              |
| EDUC 495A     | Applications of Reflective Practice          | 0.5            |
| Total         |                                              | 22.5           |

**Semester II (January to April)**

| <b>Course</b> | <b>Title</b>                                         | <b>Credits</b> |
|---------------|------------------------------------------------------|----------------|
| EDUC 434A     | Designs for Learning Secondary History/Geography     | 1.5            |
| EDUC 434B     | Designs for Learning Secondary Language Arts         | 1.5            |
| EDUC 441      | Designs for Learning Online Instruction              | 1              |
| EDUC 446      | Information Technology in Teaching                   | 1              |
| EDUC 448      | Conflict Resolution in Schools                       | 1              |
| EDUC 452      | Unit Planning, Assessment, Evaluating, and Reporting | 2              |
| EDUC 454      | Mental Health/Special Learning Needs                 | 1              |
| EDUC 492      | Integration of Knowledge and Practice                | 12             |
| EDUC 495B     | Applications of Reflective Practice                  | 0.5            |
| Total         |                                                      | 21.5           |



**Semester III (May to June)**

| <b>Course</b>         | <b>Title</b>                                   | <b>Credits</b> |
|-----------------------|------------------------------------------------|----------------|
| EDUC 442              | Introduction to Classroom Research             | 1              |
| EDUC 447              | Indigenous Youth and Schooling                 | 3              |
| EDUC 450              | Second Language Learning in Classroom Practice | 2              |
| EDUC 460              | Governance and Reform in Public Education      | 2              |
| EDUC 495C             | Applications of Reflective Practice III        | 1              |
| EDUC 498              | Special Topics in K-12 Education               | 2              |
| Total                 |                                                | 11             |
| Total program credits |                                                | 55             |

**Math/Sciences Stream****Semester I (September to December)**

| <b>Course</b> | <b>Title</b>                                 | <b>Credits</b> |
|---------------|----------------------------------------------|----------------|
| EDUC 410      | Schooling in a Diverse Society               | 3              |
| EDUC 413      | Adolescent Development and Special Education | 3              |
| EDUC 435      | Designs for Learning Secondary Math          | 3              |
| EDUC 436      | Designs for Learning Secondary Science       | 3              |
| EDUC 440      | Professional Communications                  | 1              |
| EDUC 444      | Classroom Management Strategies              | 1              |
| EDUC 445      | Planning and Assessment                      | 2              |
| EDUC 490      | School Experience (Practicum 1)              | 6              |
| EDUC 495A     | Applications of Reflective Practice I        | 0.5            |
| Total         |                                              | 22.5           |

**Semester II (January to April)**

| <b>Course</b> | <b>Title</b>                                         | <b>Credits</b> |
|---------------|------------------------------------------------------|----------------|
| EDUC 437A     | Designs for Learning Secondary Biology/Earth Science | 1.5            |
| EDUC 437B     | Designs for Learning Secondary Chemistry/Physics     | 1.5            |
| EDUC 441      | Designs for Learning Online Instruction              | 1              |
| EDUC 446      | Information Technology in Teaching                   | 1              |
| EDUC 448      | Conflict Resolution in Schools                       | 1              |
| EDUC 452      | Unit Planning, Assessment, Evaluating and Reporting  | 2              |
| EDUC 454      | Mental Health and Special Learning Needs in Schools  | 1              |

|           |                                        |      |
|-----------|----------------------------------------|------|
| EDUC 492  | Integration of Knowledge and Practice  | 12   |
| EDUC 495B | Applications of Reflective Practice II | 0.5  |
| Total     |                                        | 21.5 |

**Semester III (May and June)**

| <b>Course</b> | <b>Title</b>                                   | <b>Credits</b> |
|---------------|------------------------------------------------|----------------|
| EDUC 442      | Introduction to Classroom Research             | 1              |
| EDUC 447      | Indigenous Youth and Schooling                 | 3              |
| EDUC 450      | Second Language Learning in Classroom Practice | 2              |
| EDUC 460      | Governance and Reform in Public Education      | 2              |
| EDUC 495C     | Applications of Reflective Practice III        | 1              |
| EDUC 498      | Special Topics in K-12 Education               | 2              |
| Total         |                                                | 11             |

Total program credits 55

**Program Regulations****Continuance in the program**

Teacher candidates must demonstrate a satisfactory level of understanding in all foundation courses, designs for learning courses, and short courses in order to receive credit. Courses are evaluated on a credit/no credit basis. Please note that details of how a teacher candidate is evaluated in a course is specified in each course outline. Teacher candidates must receive credit in the school experience and practica in order to complete the program. Moreover, teacher candidates are expected to be guided by ethically responsible professional conduct that includes behaviour consistent with the established [Standards for the Education, Competence and Professional Conduct of Educators](#), as outlined through the Ministry of Education's Teacher Regulation Branch.

**Interruption of the TEP due to extenuating circumstances**

Candidates may apply for permission to interrupt the TEP due to extenuating circumstances such as medical, personal, or financial difficulties. There is an interrupt form which must be completed by the candidate and reviewed by the program coordinator. A recommendation is then made to the department head. Conditions for the candidate's re-admission into the TEP are specified at this time. Candidates who interrupt the TEP will be considered withdrawn from the program. They must apply for re-entry into the program by the specified deadlines within two years of the interruption. **Interruption is not an option once performance issues have been identified.**

**Withdrawal from the TEP****Academic warning**

Candidates must achieve credit in all courses to maintain standing in the program. Academic warning in the TEP program is provided in the form of a Notice of Potential Withdrawal Contract. Candidates who do not achieve credit in a course will be withdrawn from the program. Please see the section on course withdrawal below.

**Course withdrawal**

Candidates who withdraw from any of the TEP courses will be considered withdrawn from the program. See [Re-application, or re-entry](#) below for information on completing the program.

The withdrawal of a candidate from the TEP may be a difficult experience for all concerned. It is important that all affected parties have a thorough understanding of the withdrawal process in order to lessen discomfort and ensure transparency of the process.

**Withdrawal procedures****Voluntary withdrawal by the candidate**

If a candidate acknowledges his/her inability to meet the goals of the TEP he/she may withdraw from the program. The candidate is required to inform their Faculty Mentor, Teacher Mentor, and the Registrar's office of his/her intention to withdraw. The candidate is required to fill out the withdrawal form and to meet with the program coordinator. In a candidate-initiated withdrawal, a variety of conditions for re-entry may be identified on the withdrawal form. These conditions will reflect the candidate's performance and the circumstances surrounding the candidate-initiated withdrawal.

**Withdrawal initiated by TEP**

If in the professional judgment of the Faculty Mentor, Teacher Mentor, or program coordinator, a candidate has not adequately demonstrated competency in meeting the goals of the TEP program, certain procedures are initiated in the following sequence:

**The Contract/Notice of Potential Withdrawal**

As problems in the candidate's work are identified and persist, the Faculty Mentor may put the candidate on contract. This contract is developed in consultation with the candidate, Faculty Mentor, Teacher Mentor, and Program Coordinator, so that the requirements of the contract are clear.

This contract identifies the candidate's performance weaknesses and specifies the conditions the candidate must meet in order to demonstrate improvement. A deadline will be set to determine whether the conditions have been met. (The candidate will have a minimum of five working days to meet the terms of the contract.) When the candidate has demonstrated

that he/she has met the conditions by the deadline, he/she must demonstrate that the improvements are sustained during the remainder of the practicum. Failure to meet or sustain the conditions of the contract will result in immediate withdrawal.

**Withdrawal**

At the time of a candidate's withdrawal, a withdrawal form is completed and signed by the candidate, the Faculty Mentor, the Teacher Mentor, and the Program Coordinator. The withdrawal form lists the reasons for the withdrawal and specifies the conditions that the candidate must meet before he/she can apply for re-entry and re-admission. These conditions for re-entry should identify the candidate's performance issues clearly, and should allow for the presentation of observable data at the time of re-entry, both in an interview and in the candidate's portfolio.

Note: Teacher candidates who withdraw or who are withdrawn from a course in the first semester must re-apply to the TEP. Teacher candidates who withdraw from any of the TEP courses will be withdrawn from the program. (See Re-entry and Re-admission to the TEP for information on subsequent attempts to complete the program.)

**Immediate withdrawals**

For situations that are considered very serious, a teacher candidate may be immediately removed from the classroom. Examples include instances when physical, emotional, intellectual, and social safety of children may be at risk or when the principal at the sponsoring school refuses to allow the candidate to continue. In this case, the Program Coordinator will remove the candidate from the program immediately without following the usual steps in the withdrawal process. The process is outlined in the TEP Handbook.

**Re-application, or re-entry**

There are two ways to re-join the TEP. The specific options available relate to the length of time spent in the degree before withdrawing or being required to withdraw: re-application, or re-entry.

**Re-application to the TEP**

Candidates who withdraw or are withdrawn from any first semester course (incl. EDUC 490), are required to re-apply for admission to the TEP. Admission is competitive and the candidate must be successful in the application to be re-admitted. A previous admission does not provide any guarantee for re-admission; the application is subject to the same criteria for admission as are those from all other candidates.

**Re-entry to the TEP**

Candidates who withdraw or are withdrawn from second semester courses (incl. EDUC 492), or from any third semester courses, may apply for re-entry to the TEP. They must show

evidence of meeting the terms of the withdrawal contract. An interview with the admissions committee may be required.

Teacher candidates who do not meet the objectives of EDUC 492 may be put on a contract. If the teacher candidate withdraws or is withdrawn from EDUC 492, s/he can apply for re-entry into the program. There are specific written requirements for re-entry as stated on the withdrawal form, which can be obtained from the Program Coordinator.

A teacher candidate who re-enters the TEP is required to repeat the semester in which the withdrawal occurred. Teacher candidates who have withdrawn from EDUC 492 must be successful in their application to be re-admitted within 2 years after interrupting or withdrawing from the TEP. Deadline for re-entry is October 15 and part of the application to re-enter is a submission of supporting data which demonstrates that all re-entry conditions have been met.

Only teacher candidates who withdraw from EDUC 492 and apply by the deadline will be considered for re-entry into the TEP.

**Requirements for Re-Entry to the TEP may include one or more of the following:**

- a) The teacher candidate may need to show documentation of new observation and/or volunteer experience working in educational/instructional contexts.
- b) The teacher candidate may need to show completion of required coursework.
- c) The teacher candidate may be required to complete specific tasks involving reading, writing, reflection, planning, and/or instruction.
- d) The teacher candidate must apply for re-entry within two years of interrupting or withdrawing from the TEP and must demonstrate that professional/personal development relevant to the circumstances of withdrawal has been undertaken.
- e) The teacher candidate may be required to have an interview with the Admissions Committee.

A teacher candidate who re-enters the TEP is required to repeat the semester in which the withdrawal occurred. Candidates who withdraw or are withdrawn from the program for the second time will not be considered for re-entry to the program.

Note: Although every effort is made to accommodate candidates who wish to re-enter the program in the semester of their choice, this cannot be guaranteed. Factors such as space availability for re-admitted candidates, as well as the total number of applicants in any given semester, inevitably influence the possibility of re-admission, even for candidates who are otherwise qualified.

**Residency**

This is a full-time program in which all candidates take all of the courses. Thus, transfer of

courses from other institutions or earlier studies will not be considered.

**Auditing courses**

Candidates will not be permitted to audit courses.

**Graduation**

Upon successful completion of all program requirements, candidates are recommended to the Ministry of Education through the B.C. Teacher Regulation Branch for professional certification. In addition, TEP graduates will receive a completion certificate from UFV.

**Course listings**

For complete details on courses see the [course descriptions](#) section.