

## 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 409  |            | <b>Number of Credits:</b> 6 <a href="#">Course credit policy (105)</a>   |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Course Full Title:</b> Undergraduate Research in Chemistry<br><b>Course Short Title:</b> Undergraduate Research in Chem<br><i>(Transcripts only display 30 characters. Departments may recommend a short title if one is needed. If left blank, one will be assigned.)</i>  |            |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Faculty:</b> Faculty of Science   |            | <b>Department (or program if no department):</b> Chemistry   |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Calendar Description:</b><br>Students pursuing a major in chemistry will complete a research project designed in consultation with a supervisor.<br><br>Note: This course is intended to be completed during the fourth year of study, and can be completed in either one or two semesters.   |            |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Prerequisites (or NONE):</b>  |            | B or better in three 300-level chemistry courses and permission of the department head.  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Corequisites (if applicable, or NONE):</b>  |            | NONE   |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Pre/corequisites (if applicable, or NONE):</b>  |            | NONE   |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Antirequisite Courses</b> <i>(Cannot be taken for additional credit.)</i><br>Former course code/number:<br>Cross-listed with:<br>Dual-listed with:<br>Equivalent course(s):<br><i>(If offered in the previous five years, antirequisite course(s) will be included in the calendar description as a note that students with credit for the antirequisite course(s) cannot take this course for further credit.)</i>   |            | <b>Special Topics</b><br>This course is offered with different topics:<br><input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <i>(Double-click on box to select it as checked.)</i><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>(The specific topic will be recorded when offered.)</i> |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Typical Structure of Instructional Hours</b> <table border="1"> <tr><td>Lecture/seminar hours</td><td></td></tr> <tr><td>Tutorials/workshops</td><td></td></tr> <tr><td>Supervised laboratory hours</td><td></td></tr> <tr><td>Experiential (field experience, practicum, internship, etc.)</td><td></td></tr> <tr><td>Supervised online activities</td><td></td></tr> <tr><td>Other contact hours: Self-directed learning</td><td>180</td></tr> <tr><td><b>Total hours</b></td><td><b>180</b></td></tr> </table> |            | Lecture/seminar hours  |  | Tutorials/workshops |  | Supervised laboratory hours |  | Experiential (field experience, practicum, internship, etc.) |  | Supervised online activities |  | Other contact hours: Self-directed learning | 180 | <b>Total hours</b> | <b>180</b> | <b>Transfer Credit</b><br>Transfer credit already exists: <i>(See <a href="#">bctransferguide.ca</a>.)</i><br><input checked="" type="checkbox"/> No <input type="checkbox"/> Yes<br><br>Submit outline for (re)articulation:<br><input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <i>(If yes, fill in transfer credit form.)</i> |  |
| Lecture/seminar hours  |            |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| Tutorials/workshops  |            |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| Supervised laboratory hours  |            |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| Experiential (field experience, practicum, internship, etc.)   |            |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| Supervised online activities   |            |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| Other contact hours: Self-directed learning  | 180        |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Total hours</b>   | <b>180</b> |  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
|  |            | <b>Grading System</b><br><input checked="" type="checkbox"/> Letter Grades <input type="checkbox"/> Credit/No Credit   |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
|  |            | <b>Expected Frequency of Course Offerings:</b><br>Every semester <i>(Every semester, Fall only, annually, every other Fall, etc.)</i>  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Department / Program Head or Director:</b> Dr. Cory Beshara   |            | <b>Date approved:</b> May 18, 2018   |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Faculty Council approval</b>  |            | <b>Date approved:</b> September 7, 2018  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Dean/Associate VP:</b> Dr. Lucy Lee   |            | <b>Date approved:</b> September 7, 2018  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Campus-Wide Consultation (CWC)</b>  |            | <b>Date of posting:</b> n/a  |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |
| <b>Undergraduate Education Committee (UEC) approval</b>  |            | <b>Date of meeting:</b> October 26, 2018   |  |                     |  |                             |  |  |  |                              |  |   |     |                    |            |   |  |

Labs to be scheduled independent of lecture hours: ☒ No ☐ Yes

**Learning Outcomes:**

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

- Carry out a literature search on their chosen research topic.
- Formulate a written research proposal in which the rationale for their choice of research topic is presented.
- Perform the necessary experimental work and/or use the relevant computer software in order to complete the project in a timely, safe, and effective manner.
- Handle all necessary equipment and chemicals in a safe and effective manner.
- Master any specific techniques required to complete the chosen project.
- Produce a written report on their research, written in a clear and scholarly way, and in the style of a major scientific journal.
- Present the results of their research by means of a seminar or other form of presentation approved by the supervisor and department head.

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

☐ Yes      ☒ No, PLAR cannot be awarded for this course because there is no way to standardize the content of the course.

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

Student directed learning. The student will work closely with a faculty member who has expertise in the selected research area.

**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.*)

Students will be expected to access the chemical literature using online and/or traditional methods.

| Author (surname, initials) | Title (article, book, journal, etc.) | Current ed.              | Publisher | Year |
|----------------------------|--------------------------------------|--------------------------|-----------|------|
| 1. Various                 | All relevant chemical journals       | <input type="checkbox"/> | various   |      |
| 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.*)

All necessary laboratory materials and/or computing facilities will be provided.

**Typical Evaluation Methods and Weighting**

|                  |      |                  |     |                     |     |            |      |
|------------------|------|------------------|-----|---------------------|-----|------------|------|
| Final Report:    | 30 % | Assignments:     | %   | Field experience:   | %   | Portfolio: | %    |
| Midterm exam(s): | %    | Project:         | %   | Practicum:          | %   | Reports:   | 15%  |
| Quizzes/tests:   | %    | Student Proposal | 10% | Oral presentations: | 45% | Total:     | 100% |

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

Course content varies by research project. The requirements of the individual project will be devised in consultation with the student's supervisor.