



## Program Planning Guide

Current and past Program Planning Guides are available on the UofL website at [www.uleth.ca/ross/ppgs/ppg.html](http://www.uleth.ca/ross/ppgs/ppg.html)

Calendar Year: 2013/2014

Faculty: Arts & Science/Education

### Department of Chemistry and Biochemistry

#### About the Chemistry Major

The Department of Chemistry and Biochemistry ([www.uleth.ca/fas/chm](http://www.uleth.ca/fas/chm)) offers students the opportunity to obtain a Bachelor of Science (B.Sc.) degree with a major in Chemistry. This is a broadly based program that exposes students to the important subdivisions of organic, inorganic, analytical and physical chemistry along with an optional exposure to biochemistry.

#### Research Opportunities

The Faculty members in the Department of Chemistry and Biochemistry are involved in research in the areas of organic, inorganic, theoretical, and physical chemistry as well as biochemistry. Students have two avenues by which they can become involved in this research.

#### Independent Study Opportunities

The first is the Independent Study course option in which a student receives course credit for carrying out a research project under the supervision of a Faculty member. Although the research project can take many forms, in the Department of Chemistry and Biochemistry it generally involves a small experimental project that is related to a Faculty member's own research. The Independent Study is completed with a report.

#### Research Assistant Opportunities

The second avenue for research involvement is as a research assistant to a Faculty member, primarily during the summer. Research assistantships provide a modest salary and may be funded from a variety of sources including the Natural Sciences and Engineering Research Council of Canada (NSERC). The assistantships are generally open to students in a Chemistry or Biochemistry program who have completed at least one year of study and are awarded primarily on the basis of academic merit. One of the major factors considered during award competitions is a student's proven ability to handle a full load of academic courses. Therefore, students interested in research assistantships or future professional or graduate school training are strongly advised to take a full course load whenever possible. In many instances a student's contribution to a Faculty member's research program leads to inclusion of the student as a co-author when the results are published in a research journal.

#### The Combined Degrees Major in Chemistry

It is important to recognize that the 10 Chemistry courses that are listed on page 3 of this guide are only the minimum number of Chemistry courses required for a Combined Degrees major in Chemistry from the University of Lethbridge. For the purpose of teaching Chemistry in high school, the Combined Degrees major is adequate; however, for graduate studies in Chemistry, for example, this major is inadequate to meet the entrance standards of most graduate schools. Thus, should you change your career goals you should be aware that it might be necessary to take an increased number of Chemistry courses. If you decide that you want to major in Chemistry then you should discuss the matter with a Faculty member from the Department of Chemistry and Biochemistry who can advise you how best to structure your program to meet your particular needs.

#### Course Sequencing and Prerequisites for the Chemistry Major

Chemistry courses are organized in sequences and must be taken in the proper order. In addition, several of the 3000-level courses are offered only in alternate years. As a result, careful planning of the program for the major in Chemistry is required in order to be in position to take courses when they are offered. Consequently, students who intend to pursue a degree program with a major in Chemistry are advised to seek help in planning their programs from the Departmental Advisor or from any Faculty member in the Chemistry and Biochemistry Department in an early stage of their studies.

#### Where to Go for More Information

Because students have individual needs and circumstances, every Chemistry student is strongly encouraged to obtain further advice from the Department. Arrangements for obtaining such advice may be made through the Department Secretary. Students are also welcome to directly approach the Department Chair or any other Chemistry and Biochemistry Faculty member.

#### Co-operative Education in the Sciences

A Co-op option, requiring three work terms, is available. Students interested in the Co-operative Education/Internship program should contact the Coordinator of Co-operative Education in the Career Resources Centre (AH154 | phone: 403-382-7154) for further information.

## Faculty of Education

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### Choosing an Education Major

The Faculty of Education offers 11 different majors that correspond to teaching subjects in Alberta schools (see p. 161 in the 2013/2014 University of Lethbridge Calendar for a listing). In highly competitive teaching majors, the GPA for admission may be above the minimum requirements.

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### Choosing Courses Outside the Major

Students sometimes find that their initial objective to teach only at the elementary level or only at the secondary school level is later modified—or even completely changed. Students are therefore encouraged to select courses that will prepare them for teaching in a variety of situations. Moreover, students should select courses that not only provide breadth and richness for the classroom but also provide the basis for the development of a teaching minor or specialization.

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### Choosing an Education Minor

The Faculty of Education offers 18 minors (see p. 166 in the 2013/2014 University of Lethbridge Calendar for a listing). A minor consists of five non-Education courses (excluding those used in the major) and one curriculum and instruction Education course (to be completed after admission to the Faculty of Education). Students may use the same courses to fulfill the minor and the General Liberal Education Requirement (GLER).

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### Choosing an Education Specialization

The Faculty of Education offers two specializations:

- Special/Inclusive Education
- Technology in Education

The specializations consist of four courses and corresponding Professional Semester III focus.

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### Advantages of Completing a Minor and/or Specialization

Completing a minor and/or a specialization allows students to develop expertise in a second area of teaching and be more versatile and marketable as a graduating teacher. For more information, see the 2013/2014 University of Lethbridge Calendar, Part 8 - Education, Sections 7. Education Minors (p. 166) and 8. Education Specializations (p. 170).

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### Where to Get Help

Students may contact an Academic Advisor in Student Program Services in the Faculty of Education (email: [edu.sps@uleth.ca](mailto:edu.sps@uleth.ca) | phone: 403-329-2254) or in the Faculty of Arts and Science (email: [artsci.advising@uleth.ca](mailto:artsci.advising@uleth.ca) | phone: 403-329-5106).

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### Program Requirements

The B.Sc./B.Ed. combined degrees program with a major in Chemistry/Science Education requires a minimum of 50 courses, including 30 in Arts and Science and 20 in Education. A minimum of 15 courses (10 courses in Chemistry or Biochemistry and five cognates) is required in the Chemistry major. A maximum of 17 courses in Chemistry is allowed.

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### Transfer Credit

Remember that you may use both University of Lethbridge credit and credit transferred from another college or university to meet degree and major requirements. Transfer credit may be either specified or unspecified. Specified credit is indicated on your transcript by the subject name and the specific number of the course, e.g., Chemistry 1000, 2410, etc. Unspecified credit (1XXX, 2XXX, etc.) is indicated by the subject name and level of the course in parentheses, e.g., Chemistry (1000 level), Chemistry (2000 level), etc.

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### Unspecified Course Credit

Unspecified course credit means that the University of Lethbridge does not offer the same course you transferred in, but we recognize it and treat it as a regular course. An unspecified course would count as one of your maximum of 17 from one discipline, but it could not meet a specific course requirement. For example, if Chemistry 2740 is required in your program, you could not use Chemistry (2000 level) to fulfill that requirement. Students with unspecified transfer credit need to consult an Academic Advisor to establish how the transfer credit fits in the degree program. This should be done as soon as possible after transfer credit is awarded.

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**Program Worksheet**

Name : \_\_\_\_\_ ID : \_\_\_\_\_

**List A - Required Chemistry Courses**

The following six Chemistry courses must be taken:

- \_\_\_\_\_ 1. Chemistry 1000 - General Chemistry I
- \_\_\_\_\_ 2. Chemistry 2000 - General Chemistry II
- \_\_\_\_\_ 3. Chemistry 2410 - Analytical Chemistry I
- \_\_\_\_\_ 4. Chemistry 2500 - Organic Chemistry I
- \_\_\_\_\_ 5. Chemistry 2600 - Organic Chemistry II
- \_\_\_\_\_ 6. Chemistry 2740 - Physical Chemistry

**List B - Elective Chemistry or Biochemistry Courses**

- \_\_\_\_\_ 7-10. Four of:
  - \_\_\_\_\_ Biochemistry 2000 - Introductory Biochemistry
  - \_\_\_\_\_ Biochemistry 3100 - Proteins, Enzymes and Nucleic Acids
  - \_\_\_\_\_ Biochemistry 3300 - Bioenergetics and Metabolism
  - \_\_\_\_\_ Chemistry 3250 - Contemporary Chemistry
  - \_\_\_\_\_ Chemistry 3410 - Analytical Chemistry II
  - \_\_\_\_\_ Chemistry 3730 - Advanced Physical Chemistry
  - \_\_\_\_\_ Chemistry 3830 - Inorganic Chemistry I
  - \_\_\_\_\_ Chemistry 3840 - Inorganic Chemistry II

**List C - Required Cognates**

The following five courses must be taken:

- \_\_\_\_\_ 11. Mathematics 1410 - Elementary Linear Algebra
- \_\_\_\_\_ 12. Mathematics 1560 - Calculus I
- \_\_\_\_\_ 13. Mathematics 2560 - Calculus II
- \_\_\_\_\_ 14. One of:
  - \_\_\_\_\_ Physics 1000 - Introduction to Physics I (recommended)
  - \_\_\_\_\_ Physics 1050 - Introduction to Biophysics
  - \_\_\_\_\_ \*Engineering 2060 - Engineering Mechanics
- \_\_\_\_\_ 15. Physics 2000 - Introduction to Physics II

*\*Has prerequisite (Engineering 2000) that is not part of this major.*

Biology 1010 - Cellular Basis of Life is highly recommended for all students in the B.Sc./B.Ed. program whose major is Chemistry.

The major in Chemistry for the Combined Degrees program is not accredited by the Canadian Society for Chemistry nor is it normally sufficient, in the absence of further study in the field, for pursuing graduate studies in Chemistry at a Canadian university.

## Sample Sequencing Plan

Shown below is a sample sequence of courses for your degree. If you follow this plan, you should be able to graduate in five years, provided you complete five courses per semester. This is just one example of how you could complete your major and degree requirements; you may find that a different sequence works as well as this one.

<p><b>Year 1, Fall</b> Chemistry 1000 Mathematics 1410 Mathematics 1560 Physics 1000 GLER course</p> <p><b>Year 2, Fall</b> Biology 1010 (<i>recommended</i>) Chemistry 2410 Chemistry 2500 Education 2500<sup>1</sup> GLER course</p> <p><b>Year 3, Fall</b> Professional Semester I</p> <p><b>Year 4, Fall</b> Chemistry or Biochemistry list course Chemistry or Biochemistry list course Elective 3000/4000 level Elective 3000/4000 level Elective 3000/4000 level</p> <p><b>Year 5, Fall</b> Professional Semester III</p>	<p><b>Year 1, Spring</b> Chemistry 2000 Mathematics 2560 Physics 2000 GLER course GLER course</p> <p><b>Year 2, Spring</b> Chemistry 2600 Chemistry 2740 GLER course GLER course GLER course</p> <p><b>Year 3, Spring</b> Chemistry or Biochemistry list course Chemistry or Biochemistry list course GLER course 3000/4000 level Elective 3000/4000 level Elective 3000/4000 level</p> <p><b>Year 4, Spring</b> Professional Semester II</p> <p><b>Year 5, Spring</b> Education Foundation course Education elective Education elective Education elective Elective 3000/4000 level</p>
<p><b>Elementary Education and Special/Inclusive Education students will reverse the Fall and Spring semesters in Year 5 and complete PS III in the Spring.</b></p>	

<sup>1</sup> Education 2500 may also be taken in Spring or Summer semester.

**Note:** Students are strongly advised to consult with the Department of Chemistry and Biochemistry regarding the sequence of the above courses.

### Terms Used

**GLER course:** A course that could count toward the General Liberal Education Requirement. You may use courses in your major towards this 12-course requirement. See the 2013/2014 University of Lethbridge Calendar, Part 4 - Academic Regulations (p. 88) for complete information.

The Faculty of Arts and Science offers Liberal Education 1000 and 2000, specifically designed to introduce first-year students to the wide scope of human knowledge and teach essential university success skills, critical thinking, and integrative thinking (see the 2013/2014 University of Lethbridge Calendar, Part 14 - Courses, p. 307). LBED 1000 and 2000 may be used toward satisfying the GLER.

**Elective:** A course that you may choose freely from all those available and applicable to your program. Use courses inside or outside your major, bearing in mind any restrictions that may apply (e.g., a maximum of 17 courses from any one discipline).

