



## 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: 2011/2012

Faculty: Arts & Science

### About the Multidisciplinary Major in Environmental Science

The multidisciplinary major in Environmental Science is offered primarily by the Departments of Biological Sciences and Geography. It provides science-based academic training which is complemented by one semester of technology training at Lethbridge College in the student's third year of studies. Together, the Lethbridge College and University of Lethbridge experiences provide a distinctive program which is ideal with respect to preparation for a career in Environmental Science.

### Where to Go for More Information

Students should contact the Arts and Science Student Program Services Office (SU060 | phone: 403-329-5106) for further information.

### Co-operative Education

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.

### High School Courses

Several university-level science courses have high school-level courses as recommended background or prerequisites. Students are advised to complete recommended background courses before registering in the university-level course; students must have successfully completed prerequisites before they may register in the university-level course. Students pursuing an Environmental Science major should note the following recommended/required high school courses.

<i>UofL Science course</i>		<i>High School course</i>
Biology	1010	Biology 30 and Chemistry 30**
	1020	<i>Recommended: Biology 30</i>
	2000	Mathematics 30-1 or Pure Mathematics 30* (and Biology 1010 and Biology 1020)
	2200	Mathematics 30-1 or Pure Mathematics 30* (and Biology 1010 and Biology 1020)
Chemistry	1000	Chemistry 30** and Mathematics 30-1 or Pure Mathematics 30*
		<i>Recommended: Mathematics 31 and Physics 30</i>
Computer Science	1620	Mathematics 30-1 or Pure Mathematics 30*
Mathematics	1410	Mathematics 30-1 or Pure Mathematics 30*
	1560	Mathematics 30-1 or Pure Mathematics 30*
		<i>Recommended: Mathematics 31 and a blended grade of at least 75% in Mathematics 30-1 or Pure Mathematics 30*</i>
Physics	1000	Physics 30, and Mathematics 30-1 or Pure Mathematics 30*
	1050	Mathematics 30-1 or Pure Mathematics 30*
		<i>Recommended: One course in the physical sciences at the 20 level or above</i>
Statistics	1770	Mathematics 30-1, Mathematics 30-2, or Pure Mathematics 30*

\* Instead of Mathematics 30-1, Mathematics 30-2, or Pure Mathematics 30, students may use UofL's Mathematics 0500, or both Applied Mathematics 30 and a minimum grade of 75% in Athabasca University's Mathematics 101.

\*\* Instead of Chemistry 30, students may use UofL's Chemistry 0500.

### Program Requirements

The B.Sc. degree with a multidisciplinary major in Environmental Science requires 40 semester courses, including 25 courses in the major and a Technical Studies Semester (equivalent to five university courses or 15.0 credit hours) in an Environmental Science program at Lethbridge College.

### 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., Biology 1010, Chemistry 2500. Unspecified credit (1XXX, 2XXX, etc.) is indicated by the subject name and level of the course in parentheses, e.g., Biology (1000 level), Chemistry (2000 level), etc.

# Environmental Science Bachelor of Science

**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 20 from one department, but it could not meet a specific course requirement. For example, if Biology 2000 is required in your program, you could not use Biology (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.

**Physics Elective**

Students should consider including an introductory Physics course (Physics 1050 - Introduction to Biophysics is recommended) as an elective in their degree program. Many other courses offered by the Faculty of Arts and Science complement an Environmental Science focus. Consult the Coordinator of Environmental Science for more information.

**Program Worksheet**

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

**Required courses:**

- \_\_\_\_\_ 1. Biology 1010 - Cellular Basis of Life
- \_\_\_\_\_ 2. Biology 1020 - Diversity of Life
- \_\_\_\_\_ 3. Biology 2000 - Principles of Genetics
- \_\_\_\_\_ 4. Biology 2200 - Principles of Ecology
- \_\_\_\_\_ 5. Biology 3300 - Evolution
- \_\_\_\_\_ 6. Environmental Science 2000 - Fundamentals of Environmental Science
- \_\_\_\_\_ 7. Environmental Science 4000 - Selected Studies in Environmental Science II (Series)
- \_\_\_\_\_ 8. Geography 1000 - Introduction to Physical Geography
- \_\_\_\_\_ 9. Geography 2030 - Geomorphology
- \_\_\_\_\_ 10. Geography 2300 - Weather and Climate
- \_\_\_\_\_ 11. Geography 2700 - Geographical Data and Analysis
- \_\_\_\_\_ 12. Geography 2735 - Introduction to Geographical Information Science
- \_\_\_\_\_ 13-15. THREE of:
  - \_\_\_\_\_ Geography 2090 - Biogeography
  - \_\_\_\_\_ Geography 3035 - Fluvial Geomorphology
  - \_\_\_\_\_ Geography 3060 - Glaciology and Glacial Geomorphology
  - \_\_\_\_\_ Geography 3080 - Soils
  - \_\_\_\_\_ Geography 3300 - Microclimatology
  - \_\_\_\_\_ Geography 3400 - Hydrology I
  - \_\_\_\_\_ Geography 3720 - Remote Sensing
  - \_\_\_\_\_ \*Geography 3740 - Geographical Information Systems
  - \_\_\_\_\_ \*\*Geography 3780 - Field School
  - \_\_\_\_\_ Geography 4400 - Hydrology II
  - \_\_\_\_\_ Geography 4415 - Integrated Watershed Management
  - \_\_\_\_\_ Geography 4730 - Spatial Statistics
  - \_\_\_\_\_ Geography 4750 - Glacial Processes, Measurements, and Models
  - \_\_\_\_\_ Geology 2060 - Physical Geology
- \_\_\_\_\_ 16-18. Three courses from Biology List 2 (Organismal Biology) and List 3 (Ecology and Evolutionary Biology) of which two must be lab-based (see the 2011/2012 Calendar, Part 7, Section 21.h., p. 120, for Biology lists). Some special topics may also qualify (with permission of the Coordinator of Environmental Science).
  - 1. \_\_\_\_\_
  - 2. \_\_\_\_\_
  - 3. \_\_\_\_\_
- \_\_\_\_\_ 19. Chemistry 1000 - General Chemistry I
- \_\_\_\_\_ 20. Chemistry 2000 - General Chemistry II

- \_\_\_ 21. ONE of:
  - \_\_\_ Chemistry 2410 - Analytical Chemistry I
  - \_\_\_ Chemistry 2500 - Organic Chemistry I
- \_\_\_ 22-23. TWO of:
  - \_\_\_ Mathematics 1410 - Elementary Linear Algebra
  - \_\_\_ Mathematics 1560 - Calculus I
  - \_\_\_ Statistics 1770 - Introduction to Probability and Statistics
- \_\_\_ 24. ONE of:
  - \_\_\_ Biology 3630 - Field Biology
  - \_\_\_ Geography 3710 - Field Techniques in the Earth Sciences
  - \_\_\_ Geography 3792 - Field Excursion in Physical Geography (Series)
  - \_\_\_ \* An approved field course
- \_\_\_ 25. \*\* One Independent Study or Applied Study at the 3000/4000 level in Environmental Science

*\* Must be approved by the Coordinator of Environmental Science. An approved external field course offered by a Field Station may be counted among the final 10 courses taken for credit toward the B.Sc. degree.*

*\*\* Must be approved by the Coordinator of Environmental Science.*

**Note:** *Students may not receive credit for courses taken at the University of Lethbridge for which close equivalents have been taken at Lethbridge College, and vice versa. Students must ensure that their course selection has been approved by the Coordinator of Environmental Science.*

**Technical Studies Semester**

Students are required to complete a semester of study at Lethbridge College, consisting of five courses from the College's Environmental Science program. The Technical Studies Semester counts as the equivalent of 15.0 credit hours at the University of Lethbridge (three unspecified 2000-level and two unspecified 3000-level Environmental Science courses). The Technical Studies Semester should be taken after at least 20 university courses have been completed and prior to registration in the final 10 courses for the degree. Students must have the college course selection approved by the Coordinator of Environmental Science. Further details are available from the Coordinator.

**Optional Concentration**

**Concentration: Geographical Information Science**

Environmental Science majors in the B.Sc. degree program may declare a Concentration in Geographical Information Science.

**Required courses:**

- \_\_\_ 1. ONE of:
  - \_\_\_ \*Geography 3700 - Cartography
  - \_\_\_ \*Geography 3720 - Remote Sensing
- \_\_\_ 2-4. THREE of:
  - \_\_\_ Geography 4400 - Hydrology II OR Geography 4415 - Integrated Watershed Management OR Geography 4750 - Glacial Processes, Measurements, and Models
  - \_\_\_ Geography 4700 - Advanced Computer Mapping
  - \_\_\_ Geography 4710 - Remote Sensing Field Techniques
  - \_\_\_ Geography 4725 - Advanced Remote Sensing
  - \_\_\_ Geography 4740 - Advanced Geographical Information Systems
  - \_\_\_ Geography 4751 - Seminar in Spatial Modelling
  - \_\_\_ Geography 4752 - Seminar in Geographical Information Systems
  - \_\_\_ Geography 4753 - Seminar in Remote Sensing
- \_\_\_ 5. **Required cognate:**
  - \_\_\_ Computer Science 1620 - Fundamentals of Programming I

*\* Students require only one of Geography 3700 and 3720 for the Concentration. However, given the prerequisites for the 4000-level requirements, students should consider taking both.*

**Note:** *Students may not double count courses required for the Concentration in Geographical Information Science in fulfilling requirements for the Multidisciplinary Major in Environmental Science.*

For students who complete all the requirements, the Concentration in Geographical Information Science will be acknowledged on the official transcript.

## 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 four 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>                      Biology 1020                      Chemistry 1000                      Geography 1000                      Mathematics 1410 or                      Mathematics 1560                      GLER course</p> <p><b>Year 2, Fall</b>                      Biology 2200                      Chemistry 2410 or                      Chemistry 2500                      Geography 2030                      Geography 2300                      GLER course</p> <p><b>Year 3, Fall</b>                      Biology List 2 or List 3 course (lab-based)                      Geography or Geology list course                      An approved field course                      GLER course                      GLER course</p> <p><b>Year 4, Fall</b>                      Biology List 2 or List 3 course (lab-based)                      Environmental Science 4000<sup>2</sup>                      Geography or Geology list course                      GLER course (List II)                      Elective</p>	<p><b>Year 1, Spring</b>                      Biology 1010                      Chemistry 2000                      Environmental Science 2000                      Geography 2735                      Mathematics or Statistics</p> <p><b>Year 2, Spring</b>                      Biology 2000                      Geography 2700                      Geography or Geology list course                      GLER course                      GLER course</p> <p><b>Year 3, Spring</b>                      Technical Studies Semester<sup>1</sup>(15.0 credit hours)                      Students will receive credit for the following (upon successful completion and receipt of transcript):</p> <ul style="list-style-type: none"> <li>• 2 Environmental Science 3000-level courses</li> <li>• 3 Environmental Science 2000-level courses</li> </ul> <p><b>Year 4, Spring</b>                      Biology 3300                      Biology List 2 or List 3 course                      Independent Study or Applied Study 3000/4000 level                      GLER course                      Elective</p>
--	--

<sup>1</sup> If the Technical Studies Semester is undertaken in Fall, Year Three, students should follow the Fall, Year Three sequence in Spring, Year Three.

<sup>2</sup> Semester of offering may vary.

**Note:** Students must complete Biology 1010, Biology 1020, Biology 2000, Biology 2200, Chemistry 1000, and Chemistry 2000 by the end of Year Two to be eligible to undertake the required Technical Studies Semester in Year Three. Since spaces are limited, students lacking this necessary background may be deemed ineligible for the assigned Technical Studies Semester and required to change to another major.

### 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 2011/2012 University of Lethbridge Calendar, Part 4 - Academic Regulations (p. 85) 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 2011/2012 University of Lethbridge Calendar, Part 14 - Courses, p. 306). 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 20 courses from any one department).

