University of Lethbridge

Name: _____ **ID:** _____

Program Planning Guide

Current and past Program Planning Guides are available on the UofL website at www.uleth.ca/ross/ppgs/ppg.html

Calendar Year: 2010/2011

Faculty: Arts & Science

Bachelor of Science

Environmental 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 (B610 | 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.

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

** Instead of 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.

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:** _____

_____ 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

** Students interested in completing the Concentration in GIS must complete Geography 3740*
*** Prerequisite required: Geography 1200*

_____ 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 2010/2011 Calendar, Part 7, Section 21.h., p. 123, for Biology lists). Some special topics may also qualify (with permission of the Coordinator of Environmental Science).

1. _____ 3. _____
2. _____

_____ 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.

Concentration: Geographical Information Science

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

Required courses for the Concentration in Geographical Information Science include:

_____ 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 School
- _____ 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.

Year 1, Fall	***Year 1, Spring***
Biology 1020	Biology 1010
Chemistry 1000	Chemistry 2000
Geography 1000	Environmental Science 2000
Mathematics 1410 or Mathematics 1560	Geography 2735
GLER course (List I)	Mathematics or Statistics
Year 2, Fall	***Year 2, Spring***
Biology 2200	Biology 2000
Chemistry 2410 or Chemistry 2500	Geography 2700
Geography 2030	Geography or Geology list course
Geography 2300	GLER course (List I)
GLER course (List II)	GLER course (List II)
Year 3, Fall	***Year 3, Spring***
Biology List 2 or List 3 course (lab-based)	Technical Studies Semester[1] (15.0 credit hours)
Geography or Geology list course	Students will receive credit for the following (upon successful completion and receipt of transcript):
An approved field course	• 2 Environmental Science 3000-level courses
GLER course (List I)	• 3 Environmental Science 2000-level courses
GLER course (List II)	
Year 4, Fall	***Year 4, Spring***
Biology List 2 or List 3 course (lab-based)	Biology 3300
Environmental Science 4000[2]	Biology List 2 or List 3 course
Geography or Geology list course	Independent Study or Applied Study 3000/4000 level
GLER course (List II)	GLER course (List I)
Elective	Elective

[1] *If the Technical Studies Semester is undertaken in Fall, Year Three, students should follow the Fall, Year Three sequence in Spring, Year Three.*

[2] *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 2010/2011 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 2010/2011 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).