

Calendar Year: 2004-2005 Faculty: Arts & Science

Bachelor of Science

Biological Sciences

The Department of Biological Sciences offers a major in Biological Sciences, with possible emphasis on one of several fields, including Biology, Botany, Cell Biology, Ecology, Evolutionary Biology, Molecular Biology and Zoology, and supports courses for a number of pre-professional transfer programs. The Biological Sciences and Chemistry and Biochemistry Departments offer a combined program for a major in Biochemistry. The Biological Sciences and Geography Departments jointly offer a Post-Diploma program with a major in Environmental Science and a 40-course B.Sc. with a multidisciplinary major in Environmental Science. The Departments of Biological Sciences, Chemistry and Biochemistry, and Economics jointly offer a multidisciplinary major in Agricultural Biotechnology. The Department of Biological Sciences also provides instruction leading to the B.Sc. in Agricultural Studies. Special individual programs may be developed in Psychobiology, Animal Behaviour and other related fields.

If you plan to major in Biological Sciences, come and talk about your plans with a Faculty member. You should see the Department Chair, who will assign you to a Faculty member for advising. You should consult an Arts and Science Advisor (Student Program Services Office, SU060) concerning degree requirements for courses outside Biology.

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 a Biological Sciences major should note the following recommended/required high school courses.

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; tel. 403-382-7154) for further information.

UofL course High school course

Biology	
1010	Biology 30, and Chemistry 30 or 0500
1020	Recommended: Biology 30
2000	Pure Mathematics 30 or Mathematics 30* or Mathematics 0500 (and Biology 1010)
2200	Pure Mathematics 30 or Mathematics 30* or Mathematics 0500 (and Biology 1020)
Chemistry	
1000	Chemistry 30 or 0500, and Pure Mathematics 30 or Mathematics 30* or Mathematics 0500 Recommended: Mathematics 31
2100	Chemistry 30 or 0500 Recommended: Chemistry 1000
Computer Science	
1620	Pure Mathematics 30 or Mathematics 30* or Mathematics 0500
Mathematics	
1410	Pure Mathematics 30 or Mathematics 30* or Mathematics 0500
1510	Pure Mathematics 30 or Mathematics 30* or Mathematics 0500
1560	Pure Mathematics 30 or Mathematics 30* or Mathematics 0500 Recommended: Mathematics 31 and a blended grade of at least 75% in Pure Mathematics 30 or Mathematics 30
Physics	
1000	Physics 30, and Pure Mathematics 30 or Mathematics 30* or Mathematics 0500
1050	Pure Mathematics 30 or Mathematics 30* or Mathematics 0500
Statistics	
1770	Pure Mathematics 30 or Mathematics 30* or Mathematics 0500

*Students may use both Applied Mathematics 30 and a minimum grade of 75% in Athabasca University's Mathematics 101 instead of Mathematics 30 or Pure Mathematics 30.

Program Planning Guide

University of
Lethbridge



This program guide is designed to help you plan your degree program. The information should help you keep track of your progress in your major, electives and all your degree requirements. Please remember that this is only a guide and not a graduation check. Students are responsible for the accuracy of their own programs. The guide should be used in conjunction with the University of Lethbridge Calendar, which is the final authority on all questions regarding program requirements and academic regulations.

Current and past Program Planning Guides are available on the UofL website at:
http://www.uleth.ca/reg/ro_quick_links.html

REQUIREMENTS FOR THE BIOLOGICAL SCIENCES MAJOR

The Program

The B.Sc. degree with a major in Biological Sciences requires 40 semester courses, including 18 courses in the major (12 courses in Biological Sciences plus six cognates). A maximum of 20 courses in Biological Sciences (including courses labelled Botany and Zoology prior to 1999-2000) is allowed.

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, Biology 3300, etc. Unspecified credit (1XXX, 3XXX, etc.) is indicated by the subject name and level of the course in parentheses, e.g., Biology (1000 level), Biology (3000 level), etc.

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 3300 is required in your program, you could not use Biology (3000 level) to fulfill that requirement.

How do I use the guide?

When you have met one of the requirements, place a check mark beside it. When all the requirements are checked, you should have completed the major.

- _____ 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. Biology 4500 - Seminars in Biological Sciences
- _____ 7-12. A minimum of TWO 3000- or 4000-level courses in EACH of the following subfields: Cellular and Molecular Biology, Organismal Biology, and Ecology and Evolutionary Biology. **Courses cross-listed with another School or Faculty are not eligible to be counted as required courses.**

Cellular and Molecular Biology (Biology 3000/3110/3200/4100/4110/4170/4200)*

1. _____
2. _____

**You may replace one of the Biology courses from this Cellular and Molecular Biology subfield with Biochemistry 3010 - Biochemistry I. This option is recommended for students with an Academic Objective of Dentistry, Medicine or Veterinary Medicine, or with a particular interest in Cellular and Molecular Biology.*

Organismal Biology (Biology 3310/3410/3420/3460/3520/3530/3560/4560)

1. _____
2. _____

Ecology and Evolutionary Biology (Biology 3600/3610/3620/3630/3700/4600/4770/4800)

1. _____
2. _____

_____ Of the SIX courses listed in requirements 7-12, above, at least ONE must be at the 4000 level:

Note: Applied Studies (3980-3985, 4980-4985), Special Topics courses (Biology 3850, 4850), Independent Studies (Biology 3990, 4990) and courses cross-listed with another Faculty or School cannot be used to fulfill list requirements for the major.

Required Cognates:

In addition to the 12 courses in Biology, majors must also complete SIX courses in cognate disciplines as follows:

_____ 13. Chemistry 1000 - Atoms, Molecules and Chemical Reactions

_____ 14. Chemistry 2000 - Chemical Equilibrium and Electrochemistry

_____ 15-16. ONE of the following groups

Chemistry 2100 - Elements of Organic Chemistry I
Chemistry 2200 - Elements of Organic Chemistry II

OR

Chemistry 2500 - Organic Chemistry I
Chemistry 2600 - Organic Chemistry II

_____ 17. ONE of:

_____ Physics 1000 - Introduction to Physics I

_____ Physics 1050 - Introduction to Biophysics (preferred)

_____ 18. ONE numeracy course: Statistics (Statistics 1770 - Introduction to Probability and Statistics; Psychology 2030 - Methods and Statistics**); or Sociology 2130 - Social Statistics**), Computer Science or Mathematics:

** Has prerequisite.

Recommended for students emphasizing Cellular and Molecular Biology:

Biochemistry 3010 - Biochemistry I

Biological Sciences Majors Emphasizing Cell and Molecular Biology: Students interested in cellular and molecular biology could take Biology 3000 in semester five and Biology 3110 and/or 3410 in semester six. The Chemistry 1000, 2000, 2500 and 2600 sequence is recommended. Those considering graduate school in cellular or molecular biology should also take Chemistry 2710 and 2720, and Biochemistry 3010 and 3020. Note that Mathematics 1560 is required for Chemistry 2710 and 2720.

Biological Sciences Majors Emphasizing Ecology: Since Biology 2200 is the prerequisite for many senior-level Biology courses, it should be taken in the third semester by students wishing to take these courses. This gives you two years to take the senior-level courses that are offered only every other year.

Preparation for Graduate School: The curriculum set for Biological Sciences majors provides excellent background for entrance to graduate school. You should, of course, plan your program so that in your fourth year you will be able to take senior level courses, including Independent Studies in your chosen field of specialization. You should also attempt to develop expertise in important related fields (statistics, chemistry, computing) as you proceed through the program here. If you lack basic courses in these fields you may be required to put in a make-up year before being admitted into graduate school.

Research Opportunities: Many opportunities exist for interaction with Faculty members in their research programs, through Independent Study and Summer work. The opportunity to obtain experience in Electron Microscopy through an Independent Study also exists. All such interactions provide valuable experience and insights into the various fields of biological research. You are encouraged to seek out these opportunities, especially if you are interested in pursuing graduate studies. The Department of Biological Sciences issues a brochure on Independent Studies that is available from the Department Secretary.

PRE-PROFESSIONAL PROGRAMS

Pre-professional students should try to follow the Biological Sciences sequence as closely as possible while, at the same time, fulfilling their pre-professional requirements. With the current severe competition and because many schools now accept only degree holders, you are well advised to plan on working towards a B.Sc. degree.

Note that although some courses are listed as 'required' for admission to professional schools while others are 'recommended', it is recommended that students treat all of them as required courses.

SAMPLE COURSE SEQUENCING PLAN

B.Sc. - BIOLOGICAL SCIENCES

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.

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 2004-2005 University of Lethbridge Calendar, Part 4 - Academic Regulations (pp.77-80) for complete information.

The Faculty of Arts and Science offers Liberal Education 1001 and 1002, 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 2004-2005 University of Lethbridge Calendar, Part 15 - Courses, p. 347). LBED 1001 and 1002 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).

Cognate: A course from a related discipline deemed to complement the chosen area of study and to encompass knowledge and skills essential to that area.

YEAR ONE	FALL	SPRING
	Biology 1010 or 1020* Chemistry 1000 (required cognate) Physics 1050 or 1000 (required cognate) GLER course GLER course	Biology 1010 or 1020 (if not taken in previous Fall)* Chemistry 2000 (required cognate) Numeracy course (required cognate) GLER course GLER course
YEAR TWO	FALL	SPRING
	Biology 2000* Biology 2200 Chemistry 2100 or 2500 (required cognate) GLER course GLER course	Biology 2000 (if not taken in previous Fall)* Biology 3000 level Chemistry 2200 or 2600 (required cognate) GLER course GLER course**
YEAR THREE	FALL	SPRING
	Biology 3000 level Biology 3000 level Elective Elective Elective	Biology 3300*** Biology 3000 level Elective Elective Elective
YEAR FOUR	FALL	SPRING
	Biology 3000 level Biology 4000 level Elective 3000/4000 level Elective Elective	Biology 4500 Elective 3000/4000 level Elective Elective Elective

*Students may select GLER courses in the semester when Biology 1010, 1020 or 2000 is not taken.

**Students choosing Sociology 2130 as the numeracy course may select an elective.

***The semester of offering for this course may vary.

If you have questions regarding the Biological Sciences major, please contact one of the Department Advisors.

