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/Education

Department of Mathematics and Computer Science

What is Mathematics?

Carl F. Gauss (1777-1855) described his subject: "Mathematics is the Queen of Sciences and Arithmetic the Queen of Mathematics. She often condescends to render service to astronomy and other natural sciences, but under all circumstances the first place is her due." Gauss is rated alongside Newton and Archimedes as one of the greatest mathematicians of all time. The golden age of Mathematics is said to have begun around the end of the 18th Century and continues to this day. The development of Mathematics over the past 200 years has been phenomenal and shows no signs of decline. Now is the golden age of Mathematics.

Applied vs. Pure Mathematics

Mathematics is the study of structure and pattern. Applied mathematicians develop models of structures in the real world, and in this way Mathematics provides a language for many other physical and social sciences. In pure Mathematics the structures studied are more abstract, and the emphasis is on proof of ideas. In all areas of Mathematics, research is very active, with a rapid expansion over the last few decades.

About the Mathematics Major

The Mathematics degree program at the University of Lethbridge offers courses in the three main areas of Mathematics – algebra, analysis, and geometry – as well as Statistics. The department also offers special courses for students in other degree programs. Students will obtain a broad mathematical knowledge coupled with a sound liberal arts education. Often students will combine Mathematics with courses in Physics, Computer Science, Chemistry, Economics, Management, or other areas of interest.

The Department of Mathematics and Computer Science

The Department of Mathematics and Computer Science consists of full-time Faculty members, academic assistants, and a number of sessional instructors. We want to share our enthusiasm for the subject; we want to get you through whether you are a major or not. We are here to help you with your Mathematics.

Proficiency in English is Essential for the Mathematics Major

Mathematics is about ideas, and ideas are spelled out in words. Many students make a fundamental mistake in thinking that a mastery of English grammar is not essential for Mathematics. Unquestionably, the most important aspect of your university degree is to learn to express, in writing, your ideas so that they can be clearly understood by the intended reader.

Career Opportunities

Most Mathematics majors choose to work in education and for good reason. There appears to be a constant shortage of good Mathematics teachers. Every year the scientific disciplines require more Mathematics from their majors; the demand for mathematical knowledge is accelerating.

Graduate Studies

Members of the Department would be very happy to talk to any students hoping to do graduate studies in Mathematics. Faculty members could advise students on choosing and entering a graduate school and the numerous career possibilities using higher Mathematics. There is a Mathematics Club for students interested in more than just the course work required for a major.

Undergraduate Employment with the Department

While doing their degrees, the best students earn money and valuable experience marking first and second semester assignments, and as proctors (informed supervisors) in the computing laboratories. Some students work privately as tutors for beginning students having difficulties with the subject.

Bachelor of Science/Bachelor of Education

Mathematics/Mathematics Education

Scholarships and Awards

Students should consult the Calendar for information regarding the many awards available for continuing undergraduate students. NSERC Scholarships are available to top students going on to graduate school. Eligible students should talk to Department members regarding the best strategy for obtaining these awards. A minimum grade point average of 3.5 is a good start.

Texts

The Mathematical Association of America has published a list of 'Library Recommendations for Undergraduate Mathematics' [L. Steen, editor]. This wonderful list - 3,000 texts in 25 categories - allows a beginner to select a three-star classic on any chosen branch of Mathematics. Faculty members have their own lists of classic texts and favourite authors. Majors are strongly encouraged to talk to Department members about extracurricular reading to widen their appreciation of the subject.

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 (B610 | phone: 403-382-7154) for further information.

Faculty of Education

Choosing an Education Major

The Faculty of Education offers 11 different majors that correspond to teaching subjects in Alberta schools (see p. 163 in the 2010/2011 University of Lethbridge Calendar for a listing). In highly competitive teaching majors, the GPA for admission may be above the minimum requirements.

How to Choose a Major

Students generally begin by thinking about which subjects they enjoyed and did well at in school. Students are also encouraged to conduct additional research regarding their interests and aptitudes. Students who are uncertain about their major should try taking introductory courses in several areas.

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.

Choosing an Education Minor

The Faculty of Education offers 19 minors (see p. 167 in the 2010/2011 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. Students may use the same courses to fulfill the minor and the General Liberal Education Requirement (GLER).

Choosing an Education Specialization

The Faculty of Education offers three specializations:

- Early Childhood Education
- Special/Inclusive Education
- Technology in Education

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

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 2010/2011 University of Lethbridge Calendar, Part 8 - Education, Sections 7. Education Minors (p. 167) and 8. Education Specializations (p. 172).

Where to Get Help

You can start career research at your school counselling centre, at your local library, or on the Internet, including websites like Alberta Advanced Education and Technology (www.advancededucation.gov.ab.ca). There are also many programs and people at the University of Lethbridge to assist you with a choice of major. Career and Employment Services (CES) assists students and alumni with their career exploration needs (in particular, see "What Can I Do With a Major in...?" at www.uleth.ca/ross/ces/majors.html). Students may also contact an Academic Advisor in Student Program Services in the Faculty of Education (email: edu.sps@uleth.ca | phone: 403-329-2254) or in the Faculty of Arts and Science (email: artsci.advising@uleth.ca | phone: 403-329-5106).

Program Requirements

The B.Sc./B.Ed. combined degrees program with a major in Mathematics/Mathematics Education requires a minimum of 50 courses, including 30 in Arts and Science and 20 in Education. A minimum of 13 courses (10 courses in Mathematics plus three cognates) is required in the Mathematics major. A maximum of 17 courses in Mathematics (including Statistics) is allowed. Computer Science courses are not counted in this maximum.

Course Prerequisites

All Mathematics and Computer Science courses at the 1000 level are introductory, but they do require certain 30-level high school Mathematics courses as prerequisites. If you intend to do two or more Calculus courses at the University, you should take Pure Mathematics 30 and Mathematics 31 in high school. Specifically, the prerequisite for Computer Science 1620, Mathematics 1410 and 1560, and Statistics 1770 is one of Pure Mathematics 30, Mathematics 30, Mathematics 0500, or Applied Mathematics 30 and at least 75 percent standing in Athabasca University's Mathematics 101.

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., Mathematics 1560, Statistics 2780, etc. Unspecified credit (1XXX, 2XXX, etc.) is indicated by the subject name and level of the course in parentheses, e.g., Mathematics (1000 level), Statistics (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 17 from one department, but it could not meet a specific course requirement. For example, if Mathematics 1410 is required in your program, you could not use Mathematics (1000 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.

Program Worksheet

Name: _____ **ID:** _____

_____ 1. Mathematics 1410 - Elementary Linear Algebra

_____ 2. Mathematics 1560 - Calculus I

_____ 3. Mathematics 2000 - Mathematical Concepts

_____ 4. Mathematics 2560 - Calculus II

_____ 5. Mathematics 2570 - Calculus III

_____ 6. Mathematics 2580 - Calculus IV

_____ 7. Mathematics 3400 - Group and Ring Theory

_____ 8. Mathematics 3410 - Linear Algebra

_____ 9. Mathematics 3500 - Analysis I

_____ 10. ONE additional Mathematics or Statistics course at the 3000/4000-level (excluding Mathematics 3980/Mathematics 4980, Statistics 3980/Statistics 4980 - Applied Studies and Mathematics 3990/Mathematics 4990, Statistics 3990/Statistics 4990 - Independent Study):

_____

_____ 11-13. THREE required cognates:

- _____ 1. Computer Science 1620 - Fundamentals of Programming I
- _____ 2. Statistics 1770 - Introduction to Probability and Statistics
- _____ 3. Statistics 2780 - Statistical Inference

Note: *A 3000/4000-level Mathematics course regularly offered by the Department of Mathematics and Computer Science (excluding Mathematics 3980/Mathematics 4980 - Applied Studies or Mathematics 3990/Mathematics 4990 - Independent Study) may replace Statistics 2780 in the list above.*

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.

Year 1, Fall	***Year 1, Spring***
Mathematics 1410	Mathematics 2000
Mathematics 1560	Mathematics 2560
GLER course	GLER course
GLER course	GLER course
GLER course	GLER course
Year 2, Fall	***Year 2, Spring***
Computer Science 1620 *(required cognate)*	Mathematics 2580
Education 2500[1]	Statistics 2780 *(required cognate)*
Mathematics 2570	GLER course
Statistics 1770 *(required cognate)*	Elective 3000/4000 level
GLER course	Science elective
Year 3, Fall	***Year 3, Spring***
Professional Semester I	Mathematics 3410
	Science elective 3000/4000 level
	Science elective 3000/4000 level
	Science elective
	Science elective
Year 4, Fall	***Year 4, Spring***
Mathematics 3400	Professional Semester II
Mathematics 3500	
Science elective 3000/4000 level	
Elective 3000/4000 level	
Science elective	
Year 5, Fall	***Year 5, Spring***
Professional Semester III	Education Foundation course
	Education elective
	Education elective
	Education elective
	Mathematics or Statistics 3000/ 4000 level

Elementary Education and Special/Inclusive Education students will reverse the Fall and Spring semesters in Year 5 and complete PS III in the Spring.

[1] *Education 2500 may also be taken in Spring or Summer semester.*

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 17 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.