NEW PROGRAM PROPOSAL FORM

Sponsoring Institution(s): University of Central Missouri
Program Title: Mathematics Major, Accelerated MS Degree
Degree/Certificate: Bachelor of Science & Master of Science
Options: N/A
Delivery Site(s): University of Central Missouri main campus in Warrensburg, MO
CIP Classification: 270199
Implementation Date: Fall 2011
Cooperative Partners: None
Expected Date of First Graduation: May 2013

CONTACT

Dr. Nicholas R. Baeth, Associate Professor of Mathematics

STUDENT ENROLLMENT PROJECTIONS

Year	1	2	3	4	5
Full Time	1	2	3	4	5
Part Time	0	0	0	0	0
Total	1	2	3	4	5

The figures in the above table indicate conservative estimates of the number of students in the new program that would not otherwise be enrolled in either of the existing BS or MS programs in mathematics.

The purpose of this program is to:

1) Retain talented undergraduate students in the BS program to the MS program

In an informal poll of approximately 100 students in four 2000 and 3000 level mathematics courses during the Fall 2010 semester, 20 students have expressed serious

interest in an accelerated program in mathematics at UCM. Of these students, we are confident that at least 10 of them would qualify for the MS program.

Several other students who have recently graduated or plan to graduate in the 2010-2011 academic year have expressed that they would have enrolled in such a program had it existed at an earlier time.

By identifying qualified and interested undergraduate students in the mathematics degree program at UCM during their second or early third year, we will be able to enroll students in the accelerated program and mentor them individually to ensure success in the completion of the accelerated program within 5 years as opposed to the traditional 4-year undergraduate and 2-year graduate program.

2) Help recruit students to the BS and MS program via a unique accelerated program in mathematics

According to the 1999 Report on Mathematics in Missouri written by the Missouri K-16 Coalition with the support of the CBHE, colleges and universities should design strategies to attract more students to mathematics, and mathematics-related disciplines.

Using the existing BS program and MS program in mathematics, we can create a new and unique program that will draw more students to mathematics at UCM without the requirement of additional resources.

Conversations with faculty and administrators at other Missouri institutions with accelerated BS/MS programs lead us to conclude that several students that currently do not consider attending UCM to pursue a degree in mathematics would consider this an option if an accelerated BS/MS program existed. In addition, several of our more talented students will remain at UCM for an additional year before pursuing employment or further graduate studies.

Through focused advertising of this unique new program that allows students to earn both a bachelor and a master degree in mathematics within 5 years, we will be able to recruit more mathematically talented students to UCM.

3) Meet local and state and national demand for mathematicians with advanced degrees

At the national level there is support and increased funding for quality programs in mathematics and UCM has been recognized as such when it was awarded a $500,000 NSF grant in 2007 to support students for AY07-08 through AY10-11 in Mathematics, Actuarial Science and Computer Science (STEM programs).

In 1996, the Missouri Coordinating Board for Higher Education awarded UCM a statewide mission in applied sciences and technology programs. Quality programs in applied sciences and technology must be undergirded by a strong mathematical foundation.

In 2003, Missouri CBHE identified Computer Science and Mathematics Education as two of the four high-demand occupational categories in the state, characterized as pivotal for the future of the state.

According to the U.S. Bureau of Labor Statistics:

- Much faster than average employment growth is expected for mathematicians.
- The number of mathematical-related jobs will increase by 22% from 2008 to 2018
- Keen competition for jobs is expected.
- A Ph.D. in mathematics usually is the minimum educational requirement for mathematicians, except in the Federal Government.

Giving our talented undergraduates a chance to prepare for future graduate study or for the workforce in a timelier manner, we address the state and national need for individuals qualified to work in mathematical-related fields.

According to the Council of Graduate Schools:

- Between fall 1999 and fall 2009, graduate applications grew at an average annual rate of 4.8%.
- Applications for admission to U.S. graduate schools increased 8.3% between fall 2008 and fall 2009.
- The average annual increases were greatest in mathematics and computer sciences, health sciences, and arts and humanities.
- Between 2003-04 and 2008-09, the average annual increases in doctoral degree production were greatest in health sciences (16.3%), mathematics and computer sciences (10.1%), and business (9.2%).

According to Missouri Hot Jobs (Missouri Economic Research and Information Center, Department of Elementary and Secondary Education, Missouri Career Center, and Missouri Connections):

- The largest increased needs for future Missouri jobs require Master's and Doctoral degrees.
- Missouri will see an increased need of 1.4% for Master's degrees between 2009 and 2011
- Missouri will see an increased need of 2.3% for Doctoral degrees between 2009 ad 2011

Several of the fastest growing occupations in Missouri (and in particular the Kansas City metropolitan area) are in mathematical-related fields such as Operations Research, Computer Software Engineering, and Post-secondary Education in the mathematical sciences.

With a continued increase in the number of students applying for and obtaining advanced degrees in mathematics, as well as continual increase in demand for advanced degrees in the mathematical sciences we need to create a competitive program that will draw more mathematically talented students to UCM.

PROGRAM STRUCTURE

A. Total credits required for graduation: 140

B. Residency requirements, if any: N/A

C. General education: Total credits: 45

D. Major requirements: Total credits: 70

Math 1151	Calculus & Analytic Geometry I	5
Math 1152	Calculus & Analytic Geometry II	5
Math 2153	Calculus & Analytic Geometry III	3
Math 2410	Discrete Mathematics	3
Math 3151	Differential Equations	3
Math 3311	Intro. Mathematical Statistics	3
Math 3710	Linear Algebra	3
Math 4150	Advanced Calculus I	3
Math 4211	Topology I	3
Math 4710	Algebraic Structures	3
Math 4711	Introduction to Modern Algebra	3
CS 1100	Computer Programming I	3
Elect from the following		3-6
Math 5150	Advanced Calculus II	3
Math 5180	Real Analysis	3
Elect from the following		3-6
Math 5711	Advanced Group and Field Theory	3
Math 5722	Advanced Ring and Module Theory	3
ELECTIVES		18-24
(This must include at least 9 hours below the 5900 level)		
Math 3221	College Geometry	3
Math 4171	Functions of a Complex Variable	3
Math 4400	Combinatorics	3
Math 4450	Intro. to Graph Theory	3
Math 4741	Intro. to the Theory of Numbers	3
Math 4910	Special Problems Mathematics	3
Math 4912	Internship in Mathematical Sciences	3-8
Math 5211	Topology II	3
Math 5900	Special Projects in Mathematics	1-3
Math 5911	Special Topics in Mathematics	1-3
Math 5920	Seminar in Mathematics	1-3
Math 6912	Readings in Mathematics	1-5
Math 6950	Thesis	6

E. Free elective credits: 25

F. Requirements for thesis, internship or other capstone experience: Each student must complete either a thesis or departmental comprehensive exam.

PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS

Institution Name: University of Central Missouri
Program Name: Mathematics Major, Accelerated MS Degree
Date: March 3, 2011

Student Preparation

Any special admissions procedures or student qualifications required for this program which exceed regular university admissions, standards, e.g., ACT score, completion of core curriculum, portfolio, personal interview, etc. Please note if no special preparation will be required.

Undergraduate mathematics students having completed at least 9 hours of mathematics courses above the 1000 level with a GPA of at least 3.0 may apply for admission to the accelerated MS program. Applications for admission will be considered in the same fashion as applications to the current MS program, except that no BS degree is required.

Characteristics of a specific population to be served, if applicable

This program will allow for the retention of talented undergraduate students in the BS program to the MS program. This program will help to prepare students for careers as mathematicians – careers that often require an advanced degree – and to prepare them for future studies and the pursuit of doctoral degrees in the mathematical sciences.

Faculty Characteristics

Faculty teaching in this program will have advanced degrees in the mathematical sciences. All courses at and above the 4000 level will be taught by faculty holding a doctorate degree in mathematics.

Estimated percentage of credit hours that will be assigned to full time faculty. Please use the term "full time faculty" (and not FTE) in your descriptions here.

Full-time faculty will teach all courses in this program.

Expectations for professional activities, special student contact, teaching/learning innovation

Faculty teaching in this program will be expected to meet the same set of criteria necessary to teach courses in the current BS and MS programs in mathematics. In particular, faculty will be expected to be professionally active in terms of publishing articles in peer reviewed journals, attending professional conferences, giving talks at meetings, and pursuing external grants. Faculty will also be required to have a high degree of interaction with students – especially those enrolled in the thesis option – and to keep up to date on pedagogical issues.

Enrollment Projections

Student FTE majoring in program by the end of five years.

15 students

Percent of full time and part time enrollment by the end of five years

90% full time, 10% part time

Student and Program Outcomes

Number of graduates per annum at three and five years after implementation.

Three years: 3, five years: 5

Special skills specific to the program.

Graduates of this program will understand how mathematical ideas interconnect and build on one another to produce a coherent whole and apply mathematics in contexts outside of mathematics. This program will help students to establish a career in the mathematical sciences and prepare for entry-level positions in business, industry, government, or education or to prepare for further graduate study in mathematics or a related field.

Proportion of students who will achieve licensing, certification, or registration.

N/A

Performance on national and/or local assessments, e.g., percent of students scoring above the 50th percentile on normed tests; percent of students achieving minimal cut-scores on criterion-referenced tests. Include expected results on assessments of general education and on exit assessments in a particular discipline as well as the name of any nationally recognized assessments used.

N/A

Placement rates in related fields, in other fields, unemployed.

95% in mathematical related fields, 5% in other fields, 0% unemployed

Transfer rates, continuous study.

5% transfer rates, 5% continuous study in graduate school

Program Accreditation

Institutional plans for accreditation, if applicable, including accrediting agency and timeline. If there are no plans to seek specialized accreditation, please provide reasons.

No accreditation body exists for this program.

Alumni and Employer Survey

Expected satisfaction rates for alumni, including timing and method of surveys

We expect a 90% satisfaction rate. Graduates of this program will be sent electronic surveys immediately following and one year after graduation in order to determine how well the program prepared them for their career or future education.

Expected satisfaction rates for employers, including timing and method of surveys

We expect a 90% satisfaction rate with employers, including educators from Ph.D. programs in which our students enroll. These individuals will be sent electronic surveys one year after our students begin employment and/or future studies in order to determine how well our program is preparing students.