



**NEW PROGRAM PROPOSAL FORM**

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**Sponsoring Institution(s):** Department of Mathematics – Lindenwood University

**Program Title:** Bachelor of Science in Mathematics with Actuarial Emphasis

**Degree/Certificate:** Bachelor of Science

**Options:** None

**Delivery Site(s):** St. Charles campus of Lindenwood University

**CIP Classification:** 27.0305

\*CIP code can be cross-referenced with programs offered in your region on MDHE's program inventory [higherred.mo.gov/ProgramInventory/search.jsp](http://higherred.mo.gov/ProgramInventory/search.jsp)

**Implementation Date:** Fall 2014

**Cooperative Partners:** none

\*If this is a collaborative program, form CL must be included with this proposal

**AUTHORIZATION:**

Jann Weitzel		7/25/2014
_____ Name/Title of Institutional Officer	_____ Signature	_____ Date

Dr. W. L. Golik, <a href="mailto:wgolik@lindenwood.edu">wgolik@lindenwood.edu</a>	636-949-4701
_____ Person to Contact for More Information	_____ Telephone



**STUDENT ENROLLMENT PROJECTIONS**

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Year	1	2	3	4	5
Full Time	4	6	8	10	10
Part Time					
Total	4	6	8	10	10

Please provide a rationale regarding how student enrollment projections were calculated:

In the 2013/2014 year we graduated 2 students in the BS in Mathematics program who took all additional courses now required for the new BS in MTH with Actuarial Emphasis program. During enrollment days many incoming freshmen often enquire about our actuarial programs. Our projections are based on this interest.

Provide a **rationale** for proposing this program, including **evidence of market demand and societal need supported by research**:

From <http://www.beanactuary.org>: No matter the source, actuary is consistently rated as one of the best jobs in America. US News and World Report, the Jobs Rated Almanac, CNN Money, and others all agree: few other occupations offer the combination of benefits that an actuarial career can offer. In almost every category, such as work environment, employment outlook, job security, growth opportunity, and salary (especially salary), a career as an actuary is hard to beat.



**PROGRAM STRUCTURE**

A. Total credits required for graduation: 128

B. Residency requirements, if any: 0

C. General education: Total credits: 30

Courses (specific courses OR distribution area and credits):

Course Number	Credits	Course Title
ENG 15000	3	Strategies for University Writing
ENG 17000	3	Research and Argumentation
COM	3	1 course in Communications
ENG & PHL/REL	9	2 courses in Literature and 1 course in Philosophy or Religion
ART	3	1 course in Fine Arts
HIS or PS	3	1 course in American History or Government
HIS10000/22100	3	World History or Global History
ANT/CJ/ECON/PSY/ SOC/SW	6	2 courses in Social Sciences – covered by major
MTH	6	2 courses in Mathematics – covered by major
BSC/ESC/CHM/PHY	10	3 Natural Science courses (1 with a lab) – partially covered by major
		<a href="http://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55">http://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55</a>

D. Major requirements: Total credits: 85

Course Number	Credits	Course Title
MTH24100	3	Statistics for Natural Science
MTH27100	5	Calculus I
MTH27200	5	Calculus II
MTH28500	3	Intro to Advanced Mathematics
MTH30300	5	Calculus III
MTH31100	3	Differential Equations
MTH31500	3	Linear Algebra
MTH32000	3	Algebraic Structures
MTH32400	3	Interest Theory
MTH34100	3	Probability and Statistics I
MTH34200	3	Probability and Statistics II
MTH37000	3	Advanced Calculus
MTH39000	3	Special Topics in Applied Mathematics
ACCT 21010	3	Principles of Financial Accounting
CSC10011/10022	3	Intro to Computer Science – JavaScript (or Python)

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CSC 14400	4	Computer Science I
CSC 24400	4	Computer Science II
ECON 23020	3	Microeconomics
ECON 23020	3	Macroeconomics
FIN 32000	3	Principles of Finance
PHY 30100	4	General Physics I
PHY 30100	4	General Physics II
MTH 3xx00	9	3 courses of MTH3xx00 electives

E. Free elective credits: 13  
(Sum of C, D, and E should equal A.)

F. Requirements for thesis, internship or other capstone experience:  
none

G. Any unique features such as interdepartmental cooperation:  
This major requires 4 courses (12 credit hours) from the School of Business.



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## PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS

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Institution Name      Department of Mathematics – Lindenwood University  
Program Name          Bachelor of Science in Mathematics with Actuarial Emphasis  
Date      7/15/2014

(Although all of the following guidelines may not be applicable to the proposed program, please carefully consider the elements in each area and respond as completely as possible in the format below. Quantification of performance goals should be included wherever possible.)

### 1. 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.  
No special preparation required
- Characteristics of a specific population to be served, if applicable.  
Students with the above average aptitude for mathematics

### 2. Faculty Characteristics

- Any special requirements (degree status, training, etc.) for assignment of teaching for this degree/certificate.  
No additional personnel required (we have 6 PhD in MTH, 2 in PHY and 2 CSC)
- 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.  
ALL courses required for the major will be taught by full time faculty.
- Expectations for professional activities, special student contact, teaching/learning innovation.  
Faculty teaching actuarial courses have passed or will soon pass the initial professional examinations offered by the Society of Actuaries <https://www.soa.org/>

### 3. Enrollment Projections

- Student FTE majoring in program by the end of five years.  
20
- Percent of full time and part time enrollment by the end of five years.  
20% (20 out of 100)

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#### 4. Student and Program Outcomes

- Number of graduates per annum at three and five years after implementation.  
6 and 10
- Special skills specific to the program.  
Students graduating with the Bachelor of Science in Mathematics with Actuarial Emphasis are expected to pass at least 1 (and preferably 2) of the professional actuarial exams administered by the Society of Actuaries <https://www.soa.org/>. The two exams are: Exam P- Probability and Exam FM – Financial Mathematics. Passing them virtually guarantees full time employment in an actuarial firm anywhere in the country. No actuarial job offers are even likely without at least one of these exams.
- Proportion of students who will achieve licensing, certification, or registration.  
Expected: 70%-100%. Students will be carefully monitored – those having problems with passing Exam P- Probability and Exam FM – Financial Mathematics will be advised to change the major.
- 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.  
Expected rates of passing the Exam P- Probability and Exam FM – Financial Mathematics: (first attempt) 50%.
- Placement rates in related fields, in other fields, unemployed.  
N/A
- Transfer rates, continuous study.  
Click here to enter text.

#### 5. Program Accreditation

- Institutional plans for accreditation, if applicable, including accrediting agency and timeline. **If there are no plans to seek specialized accreditation, please provide a rationale.**  
None. The status of the degree will be determined by the percentage of the students passing : Exam P- Probability and Exam FM – Financial Mathematics offered by the Society of Actuaries.

#### 6. Alumni and Employer Survey

- Expected satisfaction rates for alumni, *including timing and method of surveys*.  
100% for those who pass Exam P- Probability and Exam FM – Financial Mathematics.

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- Expected satisfaction rates for employers, including timing and method of surveys. 100% - based on our recent MTH graduates who passed the actuarial exams (without the benefit of this new degree) their actuarial employers are very satisfied with their performance. We invite our alumni to give talks in the department for the benefit of our current students.

## **7. Institutional Characteristics**

- Characteristics demonstrating why your institution is particularly well-equipped to support the program.

Our MTH/CSC/PHY departments provide small classes taught by full time PhD faculty. The main focus of our faculty is teaching, advising, and mentoring. The individual attention given to each student is our main priority. Our faculty have experience with Exam P- Probability and Exam FM – Financial Mathematics. They already showed that their students pass these exams. We are now formalizing this experience by proposing the new degree. The idea of the Bachelor of Science in Mathematics with Actuarial Emphasis is to combine a traditional BS in Mathematics degree with 8 additional courses specifically preparing for the Exam P- Probability and Exam FM – Financial Mathematics . Thus students may either pursue their actuarial career or a more traditional career in large corporations as computing researchers, operations research personnel, or statisticians.