

0. Form NP – New Program Proposal Form

NEW PROGRAM PROPOSAL FORM

Sponsoring Institution(s): Northwest Missouri State University

Program Title: Mathematics (non-comprehensive, requires minor)

Degree/Certificate: Bachelor of Arts / Bachelor of Science

Options: _____

Delivery Site(s): Maryville Campus

CIP Classification: 270101 (Please provide a CIP code)

Implementation Date: Spring 2016

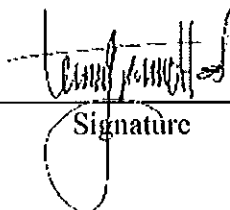
Cooperative Partners: N/A

Expected Date of First Graduation: Spring 2017

AUTHORIZATION

Timothy Mottet, Provost

Name/Title of Institutional Officer



Signature

June 1, 2015

Date

Gregory Haddock, Vice Provost

Person to Contact for More Information

(660) 562-1145

Telephone

1. Need (Form SE - Student Enrollment Projections)

Student Demand:

i. Estimated enrollment each year for the first five years for full-time and part-time students (Please complete Form SE.)

| <i>Year</i> | <i>1</i> | <i>2</i> | <i>3</i> | <i>4</i> | <i>5</i> |
|------------------|----------|-----------|-----------|-----------|-----------|
| <i>Full-time</i> | <u>5</u> | <u>10</u> | <u>10</u> | <u>10</u> | <u>10</u> |
| <i>Part-time</i> | _____ | _____ | _____ | _____ | _____ |
| <i>Total</i> | <u>5</u> | <u>10</u> | <u>10</u> | <u>10</u> | <u>10</u> |

ii. Will enrollment be capped in the future?

There are no plans to cap this program.

What method(s) or data were used to project student enrollment for this proposed program?

Existing majors that wish to have a second major or a minor can shift to this program option. Computer Science faculty believe this could be a great double major opportunity for Computer Science majors. but we have no way to document that. However, since the courses involved duplicate those in the comprehensive major, we see no cost in offering this program, and it may well increase enrollment in upper-division mathematics courses.

A. Market Demand:

. National, state, regional, or local assessment of labor need for citizens with these skills

The ACT National student database indicates that out of the 90,000 2014 high school graduates, in the 4-state region with an 18-36 ACT composite score, only 204 students indicated interest in a Mathematics Education major. Additionally, only 329 students indicated an interest in a Mathematics related major. Combined these four majors represent .6% of the students who are college bound in Northwest's recruitment region.

- Major ACT Headcount
- Mathematics Education 204
- Information Science 37
- Mathematics, General 1 94
- Applied Mathematics 98
- NRCCUA Headcount
- Mathematics & Mathematics Education 1.099

The National Research Center for College University Admissions (NRCCUA), is another national organization that gauges high school student demand for majors

1. Need (Form SE - Student Enrollment Projections)

at 4-year colleges. Out of the 2015 high school graduates who were surveyed, 1.099 of the 80.000 or 1.04% indicated an interest in one of these two areas.

This primary research shows there is little minimal demand among high school seniors for a major in Mathematics or Mathematics Education. Instead, students who are interested in the Mathematics field are selecting majors in engineering related programs.

B. Societal Need:

i. General needs which are not directly related to employment

There is considerable evidence to support the current marketability of mathematics graduates. According to the Bureau of Labor Statistics, employment of mathematics graduates is projected to grow 23 - 27 percent from 2012 to 2022, much faster than the average for all occupations. (Note: according to baseline numbers, projected growth represents 800-900 new positions.) Many employers seek individuals for internships and employment with skills obtained by mathematical training: clear and logical thinking, ability to attack a problem and find the best solution, prompt attention to daily work, ability to handle numerical data: analytical skills. Because many companies provide specific on-the-job training, a broad range of courses may be the best preparation for such occupations.

There is a nation desire to increase stem majors. In 2012, the PCAST (President's Council of Advisors on Science and Technology) report to President Obama estimated that STEM occupations will grow 1.7 times faster than non-STEM occupations, and to meet work force needs, the US will need approximately 1 million more STEM professionals to graduate in the next decade. This degree will allow students to develop their abilities (and document them with future employers) in mathematics while also pursuing other interests.

C. Methodology used to determine "B" and "C" above.

ACT database

Business professions require a strong quantitative background like that provided by an undergraduate degree in mathematics. Law schools value the analytical reasoning that is a basic part of a mathematical education. Medical schools regard mathematics as a strong major.

The following organizations have useful web sites:

1. American Mathematical Society
2. Association for Women in Mathematics
3. Mathematical Association of America
4. American Statistical Association
5. Institute of Mathematical Statistics
6. Society of Actuaries
7. Society for Industrial and Applied Mathematics

2. Duplication and Collaboration: (Form CL – Collaborative Programs)

If similar programs currently exist in Missouri, what makes the proposed program necessary and/or distinct from the others at public institutions, area vocational technical schools, and private career schools?

Note: there is already a comprehensive Bachelor of Arts and Bachelor of Science major in Mathematics. This proposal creates a non-comprehensive major that will require a minor (or a second major) to complete the degree requirements. It will not add any new courses.

Does delivery of the program involve a collaborative effort with any external institution or organization?

No (If yes, please complete Form CL.)

3. Program Structure: (Form PS - Program Structure)

PROGRAM STRUCTURE

A. Total credits required for graduation: 124

B. Residency requirements, if any: _____

C. General education: Total credits: 42

Courses (specific courses OR distribution area and credits):

6 hours of institutional requirements

24 hours required for minor

D. Major requirements: Total credits: 36

Core Requirements for Majors in Mathematics and

Mathematics Education

To achieve the common objectives, all majors in Mathematics are required to complete a common core of 16 semester hours and participate in senior assessment. The area's common core requirements are:

MATH 17-120 Calculus I (4 cr.)

MATH 17-121 Calculus II (5 cr.)

A Discrete course chosen from 3

MATH 17-215 Discrete Mathematics (3 cr.)

OR

MATH 17-216 Graph Theory (3 cr.)

MATH 17-230 Probability & Statistics (3 cr.)

MATH 17-311 Linear Algebra (3 cr.)

A Professions course chosen from 1

MATH 77-297 Professional Experience (1 cr.)

OR

MATH 17-197 Orientation to Careers in Math (1 cr.)

MATH 17-495 Seminar in Mathematics (2 cr.)

A Programming course chosen from:

CSIS 44-141 Programming I (3 cr.)

OR

CSIS 44-149 Scientific Computing (3 cr.)

MATH 17-390 Transition to Proofs (3 cr.)

3. Program Structure: (Form PS - Program Structure)

One course chosen from:

- MATH 17-415 Modern Algebra--Rings (3 cr.)
- MATH 17-416 Modern Algebra-Groups (3 cr.)
- MATH 17-421 Intro to Analysis (3 cr.)
- MATH 17-520 Applied Analysis (3 cr.)

Two electives chosen from:

- MATH 17-215 Discrete Mathematics (3 cr.)
- MATH 17-216 Graph Theory (3 cr.)
- MATH 17-321 Calculus III (3 cr.)
- MATH 17-351 College Geometry (3 cr.)
- MATH 17-361 Differential Equations (3 cr.)
- MATH 17-415 Modern Algebra-Rings (3 cr.)
- MATH 17-416 Modern Algebra-Groups (3 cr.)
- MATH 17-511 Applied Linear Algebra (3 cr.)
- MATH 17-421 Intro to Analysis (3 cr.)
- MATH 17-518 Number Theory (3 cr.)
- MATH 17-520 Applied Analysis (3 cr.)

E. Free elective credits: 16 (Sum of C, D, and E should equal A.)

F. Requirements for thesis, internship or other capstone experience:

The "Professions" course requirement in the core is the capstone course for this program.

G. Any unique features such as interdepartmental cooperation:

N/A

5. Program Characteristics and Performance Goals: (Form PG).

PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS

Institution Name: Northwest Missouri State University

Program Name: BA/BS in Mathematics (non-comprehensive, requires minor)

Date: June 1, 2015

(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.)

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.

None anticipated or required, however it is typical that students majoring in mathematics have an average to above average ACT subscore in the area.

- Characteristics of a specific population to be served, if applicable.
Current students at the university as a degree offering.

Faculty Characteristics

- Any special requirements (degree status, training, etc.) for assignment of teaching for this degree/certificate.

62.5% of the mathematics faculty are terminally degreed. Most of the non-terminally degreed instructors are teaching lower level courses, not courses for the mathematics majors in large part.

- 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.

100% full-time faculty

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

none anticipated

Enrollment Projections

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

10-15 students specifically in these noncomprehensive major options

5. Program Characteristics and Performance Goals: (Form PG).

- Percent of full time and part time enrollment by the end of five years.
anticipated 100% full-time

Student and Program Outcomes

- Number of graduates per annum at three and five years after implementation.
Anticipated 4-5 students per year specifically in the BA or BS non-comprehensive major graduating per year at both the three and five year implementation
- Special skills specific to the program.
Undergraduate major requires no specific skill set beyond acceptance to the university.
- Proportion of students who will achieve licensing, certification, or registration.
None.
- 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.
Historically over 80% of undergraduate students majoring in mathematics score above the 50th percentile on the general education assessment.
- Placement rates in related fields, in other fields, unemployed.
Expectation is that the non-comprehensive major will match the placement of the comprehensive major. 100% of the students are placed according to our completer placement report with half directly seeking employment and the other half continuing with a graduate degree.
- Transfer rates, continuous study.
Not anticipated.

6. 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.
Institution is accredited by HLC, no specialized program accreditation in this area.

Alumni and Employer Survey

- Expected satisfaction rates for alumni, including timing and method of surveys
Historic information is that satisfaction is high, anticipated to match this outcome.
- Expected satisfaction rates for employers, including timing and method of surveys
Program evaluation in five year reviews shows employers are satisfied.

5. Program Characteristics and Performance Goals: (Form PG).

7. Institutional Characteristics: Please describe succinctly why your institution is particularly well equipped or well suited to support the proposed program.

Mathematics has been a part of the institution for quite some time. There is a sizable faculty body devoted to teaching in this program.

8. Any Other Relevant Information:

Appendix A - proposed catalog copy

Appendix A: Catalog Copy of program description

| Catalog (Current) | Catalog (Proposed) |
|--|--|
| <p>Course Description</p> <p>Major Requirements</p> <p>Minor Requirements</p> <p>Total hours</p> | <p>Course Description (The highlighted portion below is the proposed catalog description from proposal 215-17-02.)</p> <p>Core Requirements for Majors in Mathematics and Mathematics Education <u>To achieve the common objectives, all majors in Mathematics are required to complete a common core of 16 semester hours and participate in senior assessment. The area's common core requirements are:</u></p> <p><u>*MATH 17-120 Calculus I</u> 4 <u>MATH 17-121 Calculus II</u> 5 <u>A Discrete course chosen from</u> 3 <u>MATH 17-215 Discrete Mathematics</u> 3 <u>OR</u> <u>MATH 17-216 Graph Theory</u> 3 <u>MATH 17-230 Probability & Statistics</u> 3 <u>MATH 17-311 Linear Algebra</u> 3 <u>A Professions course chosen from</u> 1</p> <p><u>MATH 77-297 Professional Experience</u> 1 <u>OR</u> <u>MATH 17-197 Orientation to Careers in Math</u> 1 <u>MATH 17-495 Seminar in Mathematics</u> 2</p> <p><u>Total Hours</u> 21</p> <p><u>*This course counts as a General Education course as well as a course in the major area;</u></p> <p>Major Requirements Major in Mathematics, 36 hours, B.A., B.S.—Minor required</p> <p>Core Requirements 21 A Programming course chosen from: 3 **CSIS 44-141 Programming I 3 OR **CSIS 44-149 Scientific Computing 3 MATH 17-390 Transition to Proofs 3 One course chosen from: 3 MATH 17-415 Modern Algebra --Rings 3 MATH 17-416 Modern Algebra --Groups 3 MATH 17-421 Intro to Analysis 3 MATH 17-520 Applied Analysis 3 Two electives chosen from: 6-7 MATH 17-215 Discrete Mathematics 3 MATH 17-216 Graph Theory 3 MATH 17-321 Calculus III 4 MATH 17-351 College Geometry 3 MATH 17-361 Differential Equations 3 MATH 17-415 Modern Algebra—Rings 3 MATH 17-416 Modern Algebra—Groups 3 MATH 17-511 Applied Linear Algebra 3 MATH 17-421 Intro to Analysis 3 MATH 17-518 Number Theory 3 MATH 17-520 Applied Analysis 3</p> <p>Total hours 36</p> <p>**An Institutional requirement for Information Technology is a prerequisite course.</p> <p>Minor Requirements Total hours</p> |