



DEPARTMENT OF
HIGHER EDUCATION &
WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:

07/13/2023

Institution

Webster University

Site Information

Implementation Date:

6/1/2018 12:00:00 AM

Added Site(s):

Selected Site(s):

Webster University, 470 East Lockwood, St. Louis, MO, 63119-3194

CIP Information

CIP Code:

140102

CIP Description:

A program that prepares individuals for admission or transfer to a baccalaureate-level program in any of the fields of engineering.

CIP Program Title:

Pre-Engineering

Institution Program Title:

Mathematics (Pre-Engineering)

Degree Level/Type

Degree Level:

Bachelor's Degree

Degree Type:

Bachelor of Science

Options Added:

Collaborative Program:

N

Mode of Delivery

Current Mode of Delivery

Classroom

Student Preparation

Special Admissions Procedure or Student Qualifications required:

At least 30 of the required 48 mathematics credit hours must be taken at Webster University.

Specific Population Characteristics to be served:

n/a

Faculty Characteristics



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Special Requirements for Assignment of Teaching for this Degree/Certificate:

Webster University has academic policies describing minimum faculty qualifications by discipline. These policies meet or exceed guidelines from the Higher Learning Commission.

Estimate Percentage of Credit Hours that will be assigned to full time faculty:

Webster University strives to have more than 50% of credit hours assigned to full-time faculty. Percentages can be above 75%. The percentage of credit hours assigned to full-time faculty will vary based on student enrollment in a program at any given time.

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

Faculty are expected to continually engage in appropriate professional development activities to ensure their professional qualifications are current. The University provides resources to help ensure robust student contact and engagement. The University also provides resources for faculty to innovate their teaching/learning to meet clear learning outcome objectives.

Student Enrollment Projections Year One-Five

| | | | |
|--------|--------------|--------------|---------------------------|
| Year 1 | Full Time: 5 | Part Time: 0 | |
| Year 2 | Full Time: 5 | Part Time: 0 | |
| Year 3 | Full Time: 5 | Part Time: 0 | Number of Graduates: 5 |
| Year 4 | Full Time: 5 | Part Time: 0 | |
| Year 5 | Full Time: 5 | Part Time: 0 | Number of Graduates: 5 |

Percentage Statement:

n/a

Program Accreditation

Institutional Plans for Accreditation:

Webster University will maintain its accreditation by the Higher Learning Commission. There are no plans to pursue specialized accreditation at this time for this program.

Program Structure

Total Credits:

120

Residency Requirements:

At least 30 of the required 48 mathematics credit hours must be taken at Webster University.

General Education Total Credits:

30

Major Requirements Total Credits:

48

Course(s) Added

| COURSE NUMBER | CREDITS | COURSE TITLE |
|---------------|---------|------------------------|
| MATH 3160 | 3 | Linear Algebra |
| COSC 1550 | 3 | Computer Programming I |
| MATH 3000 | 5 | Calculus III |



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| | | |
|-----------|---|--------------------------------------|
| CHEM 1100 | 3 | General Chemistry I |
| PHYS 2030 | 3 | University Physics I |
| MATH 1620 | 5 | Calculus II |
| MATH 2200 | 3 | Statistics |
| PHYS 2040 | 3 | University Physics II |
| MATH 2450 | 3 | Introduction to Abstract Mathematics |
| PHYS 2031 | 1 | University Physics I: Lab |
| CHEM 1101 | 1 | General Chemistry Lab I |
| MATH 3610 | 3 | Probability |
| MATH 1610 | 5 | Calculus I |
| MATH 3040 | 3 | Differential Equations |
| MATH 2410 | 3 | Discrete Mathematics |
| PHYS 2041 | 1 | University Physics II: Lab |

Free Elective Credits:

42

Internship or other Capstone Experience:

n/a

Assurances

I certify that the program will not unnecessarily duplicate an existing program of another Missouri institution in accordance with 6 CSR 10-4.010, subsection (9)(C) Submission of Academic Information, Data and New Programs.

I certify that the program will build upon existing programs and faculty expertise.

I certify that the institution has conducted research on the feasibility of the proposal and it is likely the program will be successful. Institutions' decision to implement a program shall be based upon demand and/or need for the program in terms of meeting present and future needs of the locale, state, and nation based upon societal needs, and/or student needs.

Contact Information

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Mathematics (Pre-Engineering) (BS)

This program is offered by the College of Science and Health/ Natural Sciences and Mathematics Department and is only available at the St. Louis main campus.

Program Description

Webster University offers a dual degree program in engineering with Washington University and Missouri University of Science and Technology. This program leads to a BS in mathematics from Webster University and a BS in engineering from Washington University or Missouri University of Science and Technology. Students in the pre-engineering program combine high-quality professional engineering education with a strong background in the humanities, mathematics and the natural and social sciences. The programs at Washington University and Missouri University of Science and Technology include biomedical engineering, computer science, computer engineering, electrical engineering, systems science and engineering, chemical engineering and mechanical engineering. The professional degrees offered in each area are accredited by the Accreditation Board for Engineering and Technology, Inc. (ABET).

Learning Outcomes

- Students will demonstrate critical thinking skills in the area of mathematics.
- Students will demonstrate the ability to solve problems related to the program content.
- Students will demonstrate in depth knowledge of calculus.
- Students will demonstrate comprehension with a variety of mathematics, chosen from applied and/or theoretical topics.
- Students will gain basic computer programming skills.

Degree Requirements

For information on the general requirements for a degree, see Baccalaureate Degree Requirements under the Academic Policies and Information section of this catalog.

- 48 required credit hours (*additional courses may be needed based on chosen engineering field*)
- Applicable University Global Citizenship Program hours, with accommodations for the mathematics BS
- Electives

Global Citizenship Program for Mathematics BS

Requirements are modified to allow one course with the MATH prefix to satisfy both a requirement of the major and also the GCP 'Quantitative Literacy' requirement.

Required Courses

At least 30 of the required 48 mathematics credit hours must be taken at Webster University.

- MATH 1610 Calculus I (5 hours)
- MATH 1620 Calculus II (5 hours)
- MATH 2450 Introduction to Abstract Mathematics (3 hours)
- MATH 3000 Calculus III (5 hours)
- MATH 2410 Discrete Mathematics (3 hours)
- MATH 3040 Differential Equations (3 hours)
- MATH 3160 Linear Algebra (3 hours)
- MATH 2200 Statistics (3 hours)
- MATH 3610 Probability (3 hours)

The following courses are required to complete the pre-engineering transfer requirements:

- CHEM 1100 General Chemistry I (3 hours)

- CHEM 1101 General Chemistry Lab I (1 hour)
- COSC 1550 Computer Programming I (3 hours)
- PHYS 2030 University Physics I (3 hours)
- PHYS 2031 University Physics I: Lab (1 hour)
- PHYS 2040 University Physics II (3 hours)
- PHYS 2041 University Physics II: Lab (1 hour)

Depending on the selected engineering major, the following electives are additionally required to support transfer to the engineering school.

For chemical engineering and biomedical engineering majors only:

- BIOL 1550 Essentials of Biology I (4 hours)
- BIOL 1551 Essentials of Biology I: Lab (1 hour)
- CHEM 1110 General Chemistry II (3 hours)
- CHEM 1111 General Chemistry II: Lab (1 hour)
- CHEM 2100 Organic Chemistry I (3 hours)
- CHEM 2101 Organic Chemistry I: Lab (1 hour)
- CHEM 2110 Organic Chemistry II (3 hours)
- CHEM 2111 Organic Chemistry II: Lab (1 hour)

In addition, there are some department-specific requirements:

Biomedical Engineering

- BIOL 1560 Essentials of Biology II (4 hours)
- BIOL 1561 Essentials of Biology II: Lab (1 hour)

Computer Science & Computer Engineering

- COSC 1560 Computer Programming II (3 hours)