ENGINEERING MATHEMATICS

(Concurrent Degree)

The Bachelor of Science Engineering in Engineering Mathematics program at UM-Dearborn provides students an opportunity to expand their knowledge in the field of applied mathematics, which is essential in modern engineering. By combining the tools and techniques learned in the engineering mathematics program with those learned in their engineering disciplines, students become more proficient in the application of mathematical reasoning to formulate and solve a wide range of contemporary engineering problems. The combined mathematics and engineering education gained though the program enables the graduates to successfully pursue professional careers in industry, research and development, and elsewhere.

The Engineering Mathematics degree is a concurrent Bachelor of Science in Engineering (B.S.E.) degree in Engineering Mathematics (EMATH) that can be pursued by undergraduate students majoring in Bioengineering, Computer Engineering, Electrical Engineering, Industrial and Systems Engineering, Manufacturing Engineering, Mechanical Engineering, or Robotics Engineering. This makes it possible for a student majoring in one of the engineering disciplines to earn two degrees at the same time: a Bachelor of Science Engineering degree in their principal engineering major and a concurrent Bachelor of Science Engineering degree in Engineering Mathematics. *Both degrees must be earned at the same time.*

Educational Objectives

The coursework in the concurrent Bachelor of Science Engineering in Engineering Mathematics prepares graduates to:

1. Be able to develop innovative mathematical solutions to complex engineering problems.
2. Engage in continuous learning to advance their professional careers.

Student Outcomes

1. The ability to apply mathematical tools to model and solve engineering/applied mathematics problems
2. The ability to use techniques and modern mathematical tools to solve engineering/applied mathematics problems.
3. The ability to communicate mathematical ideas.

Major Requirements

The Engineering Mathematics degree requires a minimum of 15 credit hours of course work in advanced mathematics beyond the 16 credits of mathematics already required in the degree program of the student's principal engineering major.

Code	Title	Credit Hours
MATH 462	Mathematical Modeling	3
Choose 3 course from one of the following two areas		**9**
Area 1 Numerical and Statistical Analysis		
MATH 420/ ECE 555	Stochastic Processes [1]	
MATH 425	Mathematical Statistics	
MATH 472	Introduction to Numerical Analysis	
MATH 473	Matrix Computation	
Area 2: Modern and Classical Applied Mathematics		
MATH 404	Dynamical Systems	
MATH 454	Fourier Series and Boundary Value Problems	
MATH 455	Func of a Complex Var with App	
MATH 458	Introduction to Wavelets	
MATH 516	Finite Element Methods for Differential Equations [1]	
Mathematics Elective		**3**
Take one additional course from Area (1) or Area (2), OR one of the following courses:		
ECE 3100	Data Science I	
CIS 3200	Data Science II	
ECE 567	Nonlinear Control Systems [1]	
IMSE 505	Optimization [1]	
IMSE 511	Design and Analysis of Exp [1]	
MATH 523	Applied Linear Algebra [1]	
MATH 514	Finite Difference Methods for Differential Equations [1]	
ME 518	Advanced Engineering Analysis [1]	
ME 519	Basic Comp Methods in Eng [1]	

[1] Permission of graduate instructor required. Graduate tuition assessment applies.

Learning Goals

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2. Engage in continuous learning to advance their professional careers.