

APPLIED MATHEMATICS MAJOR: SOLID MECHANICS AND VIBRATIONS OPTION (B.S.)

<https://ceps.unh.edu/mathematics-statistics/program/bs/applied-mathematics-solid-mechanics-vibrations-option>

Description

This degree program prepares students for employment and/or graduate study in a variety of fields and research specializations in which mathematics plays a critical role in the solution of important scientific and technological problems.

Graduation Requirements

In all courses used to satisfy the requirements for its major programs, the Department of Mathematics and Statistics requires that a student earn a grade of C- or better and have an overall grade-point average of at least 2.00 in these courses.

Requirements

Major Requirements

| Code | Title | Credits |
|--|---|--------------|
| MATH 425 | Calculus I | 4 |
| MATH 426 | Calculus II | 4 |
| MATH 445 | Mathematics and Applications with MATLAB | 4 |
| or IAM 550 | Introduction to Engineering Computing | |
| MATH 527 | Differential Equations with Linear Algebra ¹ | 4 |
| MATH 528 | Multidimensional Calculus ¹ | 4 |
| MATH 531 | Mathematical Proof | 4 |
| MATH 644 | Statistics for Engineers and Scientists ² | 4 |
| MATH 645 | Linear Algebra for Applications ¹ | 4 |
| MATH 753 | Introduction to Numerical Methods I | 4 |
| PHYS 407 | General Physics I | 4 |
| Capstone: Select one of the following | | |
| MATH 797 | Senior Seminar | 4 |
| MATH 798 | Senior Project | 4 |
| MATH 799 | Senior Thesis | 2 or 4 |
| Total Credits | | 50-52 |

¹ MATH 525 Linearity I *may be substituted for* MATH 645.
MATH 525 & MATH 526, Linearity, *may be substituted for* MATH 527, MATH 528, and MATH 645.

² Applied Mathematics: Economics Option students take MATH 539 Introduction to Statistical Analysis.

Solid Mechanics and Vibrations Option Requirements

| Code | Title | Credits |
|------------|--------------------------------------|---------|
| PHYS 408 | General Physics II | 4 |
| MATH 647 | Complex Analysis for Applications | 4 |
| MATH 745 | Foundations of Applied Mathematics I | 4 |
| ME 525 | Statics | 3 |
| or CEE 500 | Statics for Civil Engineers | |

| | | |
|--|-----------------------------------|-----------|
| ME 526 | Mechanics of Materials | 3 |
| or CEE 501 | Strength of Materials | |
| ME 561 | Introduction to Materials Science | 4 |
| ME 627 | Dynamics | 3 |
| Select TWO of the following courses | | |
| ME #724 | Vibration Theory and Applications | |
| ME 727 | Advanced Mechanics of Solids | |
| ME 730 | Mechanical Behavior of Materials | |
| One 700-level elective, selected in consultation with the academic advisor | | |
| Total Credits | | 33 |

Degree Plan

| Course | Title | Credits |
|--------------------|--|-----------|
| First Year | | |
| Fall | | |
| MATH 425 | Calculus I | 4 |
| Inquiry Course | | 4 |
| Discovery Course | | 4 |
| Discovery Course | | 4 |
| MATH 400 | Freshman Seminar | 1 |
| Credits | | 17 |
| Spring | | |
| MATH 426 | Calculus II | 4 |
| MATH 445 | Mathematics and Applications with MATLAB | 4 |
| PHYS 407 | General Physics I | 4 |
| ENGL 401 | First-Year Writing | 4 |
| Credits | | 16 |
| Second Year | | |
| Fall | | |
| MATH 528 | Multidimensional Calculus | 4 |
| MATH 539 | Introduction to Statistical Analysis | 4 |
| PHYS 408 | General Physics II | 4 |
| ME 525 | Statics | 4 |
| Credits | | 16 |
| Spring | | |
| MATH 527 | Differential Equations with Linear Algebra | 4 |
| MATH 531 | Mathematical Proof | 4 |
| MATH 645 | Linear Algebra for Applications | 4 |
| ME 526 | Mechanics of Materials | 3 |
| Credits | | 15 |
| Third Year | | |
| Fall | | |
| MATH 647 | Complex Analysis for Applications | 4 |
| MATH 745 | Foundations of Applied Mathematics I | 4 |
| ME 627 | Dynamics | 3 |
| Discovery Course | | 4 |
| Credits | | 15 |
| Spring | | |
| ME 561 | Introduction to Materials Science | 4 |
| ME #724 | Vibration Theory and Applications | 4 |
| Discovery Course | | 4 |

| | |
|--|------------|
| Discovery Course | 4 |
| Credits | 16 |
| Fourth Year | |
| Fall | |
| MATH 753 Introduction to Numerical Methods I | 4 |
| 700-level ME Elective Course | 4 |
| Discovery Course | 4 |
| Elective Course | 4 |
| Elective Course | 2 |
| Credits | 18 |
| Spring | |
| Capstone: | 4 |
| MATH 797 Senior Seminar or MATH 798 or Senior Project or MATH 799 or Senior Thesis | |
| Elective Course | 4 |
| Elective Course | 4 |
| Elective Course | 4 |
| Credits | 16 |
| Total Credits | 129 |

Student Learning Outcomes

- Students recognize common mathematical notations and operations used in mathematics, science and engineering.
- Students can recognize and classify a variety of mathematical models including differential equations, linear and nonlinear systems of algebraic equations, and common probability distributions.
- Students have developed a working knowledge (including notation, terminology, foundational principles of the discipline, and standard mathematical models within the discipline) in at least one discipline outside of mathematics.
- Students are able to extract useful knowledge, both quantitative and qualitative, from mathematical models and can apply that knowledge to the relevant discipline.