

Required Courses

Students must take at least one class in EMA at the 700-level or above.

To establish sufficient depth in aerospace sciences, the courses selected must involve completion of at least two of the following five topical areas¹. You should check the future course offerings plans² when choosing, since not all courses are offered every year (and hence not all topical areas can be completed every year).

The additional courses required to meet the 30-credit minimum for completion of the degree should be selected from among the courses listed below.

¹ These tracks are internal to the program and represent different pathways a student can follow to earn this degree.

² Track names do not appear in the Graduate School admissions application, and they will not appear on the transcript.

- Engineering Physics website - Click on 'Courses' under 'Degree Information' (<https://www.engr.wisc.edu/department/engineering-physics/academics/bs-engineering-mechanics/>)

- Mechanical Engineering website - Click on 'Courses' under 'Program Details' (<https://www.engr.wisc.edu/department/mechanical-engineering/academics/bachelor-of-science-in-mechanical-engineering/>)

TOPICAL AREAS

Fluid Mechanics ¹

E M A 521 Aerodynamics ² 3 cr

Select one: 3 cr

M E 563 Intermediate Fluid Dynamics

E M A 524 Rocket Propulsion

M E 572 Intermediate Gas Dynamics

M E 775 Turbulent Heat and Momentum Transfer

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If you have already completed an equivalent course as an undergrad then you may take two courses total from the second list and meet this requirement.

Rigid Body Dynamics ¹

E M A 542 Advanced Dynamics ² 3 cr

Select one: 3 cr

E M A 523 Flight Dynamics and Control

E M A/ASTRON 550 Astrodynamics

E M A 642 Satellite Dynamics

M E 451 Kinematics and Dynamics of Machine Systems

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Structural Dynamics ¹

Select one: ² 3 cr

M E 440 Intermediate Vibrations

E M A 545 Mechanical Vibrations

E C E 717 Linear Systems

Select one: 3 cr

M E/E M A 540 Experimental Vibration and Dynamic System Analysis

E M A 610 Structural Finite Element Model Validation

E M A 747 Nonlinear and Random Mechanical Vibrations

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Aerospace Mechanics and Materials ¹

Select two courses: 6 cr

E M A 506 Advanced Mechanics of Materials I

E M A/M S & E 541 Heterogeneous and Multiphase Materials E M A/CIV

ENGR/M E 508 Composite Materials

E M A 622 Mechanics of Continua

E M A 630 Viscoelastic Solids

E M A 700 Theory of Elasticity

E M A/M E 703 Plasticity Theory and Physics

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Computation ¹

Select one: ² 3 cr

E M A 605 Introduction to Finite Elements

M E 573 Computational Fluid Dynamics

Select one: 3 cr

E M A 705 Advanced Topics in Finite Elements

M E 548 Introduction to Design Optimization

M E 748 Optimum Design of Mechanical Elements and Systems MATH/COMP SCI 714

Methods of Computational Mathematics I

E M A/COMP SCI/E C E/E P/M E 759 High Performance Computing for Applications in Engineering

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