## MS in Mechanical Engineering Plan of Study

### Mathematics Courses

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<th>Term</th>
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### Concentration Courses

- Dynamics and Control
- Solid Mechanics and Materials Science
- Machine Learning
- Thermal Science and Fluid Mechanics
- Metrology and Manufacturing
- Interdisciplinary Biomedical Engineering
- Motorsports Engineering

Select a concentration:

### Elective Courses

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### Thesis Option

Select two mathematics courses from those listed (6 credit hours).

### Non-Thesis/Project Option

Select three elective courses. (9 credit hours)

### Select one of the following capstone completion options:

#### Thesis Option — 6 credit hours

- Master’s Thesis Research
- Term | Hours
- MEGR 7991 | 3
- MEGR 7991 | 3

#### Non-Thesis/Project Option — 3 credit hours

- Capstone Course
- Term | Hours
- | 3

### TOTAL DEGREE HOURS 30

### Degree Milestones for Thesis Option

- Thesis Committee Appointment
- Thesis Proposal Defense
- Final Thesis Defense
- Thesis Submission
- Graduation Application

### Graduate Faculty Advisor Approval

The faculty advisor for all Non-Thesis/Project option students is the Graduate Programs Director.

| Faculty Advisor Name | Signature | Date |

INSTRUCTIONS: Submit this completed form via email to megrad@uncc.edu.
Mathematics Courses
Select two of the following:
- MEGR 7172: Computational Methods in Engineering (3)
- MEGR 7174: Engineering Analysis I (3)
- MEGR 7175: Engineering Analysis II (3)
- MATH 6171: Advanced Applied Mathematics I (3)
- MATH 6172: Advanced Applied Mathematics II (3)

Concentration Courses
Declare a concentration and take 12 credit hours of courses listed in that concentration:

Dynamics and Control Concentration
- MEGR 7130: Introduction to Control Systems (3)
- MEGR 7145: Advanced Topics in Dynamics (3)
- MEGR 7221: Vibration of Discrete and Continuous Systems (3)
- MEGR 7222: Mechatronics (3)
- MEGR 7223: Mathematical Concepts for Dynamics and Control (3)
- MEGR 7224: Analytical Mechanics (3)

Machine Learning in Mechanical Engineering
- MEGR 7090: Special Topics in Mechanical Engineering (3)
- MEGR 7090: Special Topics in Mechanical Engineering (3)
- EMGT 6113: Cluster Analysis and Applications (3)
- EMGT 6912: Computational Intelligence (3)
- EMGT 6952: Engineering Systems Optimization (3)
- ITCS 5111: Introduction to Natural Language Processing (3)
- ITCS 6156: Machine Learning (3)

Metrology and Manufacturing Concentration
- MEGR 6181: Engineering Metrology (3)
- MEGR 7182: Machine Tool Metrology (3)
- MEGR 7191: Introduction to Optical Fabrication and Testing (3)
- MEGR 7283: Advanced Coordinate Metrology (3)
- MEGR 7284: Advanced Surface Metrology (3)
- MEGR 7480: Advanced Manufacturing Processes and Equipment (3)

Motorsports Engineering Concentration
- MEGR 7131: Automotive Power Plants (3)
- MEGR 7132: Advanced Automotive Power Plants (3)
- MEGR 7133: Applied Vehicle Aerodynamics (3)
- MEGR 7134: Advanced Road Vehicle Dynamics (3)
- MEGR 7135: Advanced Tire Mechanics (3)

Solid Mechanics and Materials Science Concentration
- MEGR 6141: Theory of Elasticity I (3)
- MEGR 6166: Mechanical Behavior of Materials I (3)
- MEGR 7108: Finite Element Analysis and Applications (3)
- MEGR 7163: Materials Characterization and Analysis (3)
- MEGR 7172: Computational Methods in Engineering (3)
- MEGR 7173: Engineering Design Optimization (3)

Thermal Science and Fluid Mechanics Concentration
- MEGR 7113: Dynamics and Thermodynamics of Compressible Flow (3)
- MEGR 7114: Advanced Fluid Mechanics (3)
- MEGR 7117: Statistical Thermodynamics (3)
- MEGR 7213: Introduction to Computational Fluid Dynamics (3)
- MEGR 7214: Turbulent Shear Flows (3)
- MEGR 7215: Turbulence Modeling and Simulations (3)

Interdisciplinary Biomedical Engineering Concentration
- MEGR 7119: Thermal Applications in Biomedical Engineering (3)
- MEGR 7151: Orthopedic Biomechanics (3)
- MEGR 7152: Mechanics of the Human Locomotor System (3)

Dual Concentration
Students may request to complete two concentrations. However, an additional 12 credit hours are required with no course double-counting toward two concentrations.

Elective Courses
Thesis Option: 6 credit hours
Non-Thesis/Project Option: 9 credit hours
Select two or three of the following; additional concentration courses may be taken as electives. No more than 6 credit hours may be taken from outside MEES. No more than 6 credit hours may be in Individual Study.
- MEGR 6090: Special Topics (3)
- MEGR 7090: Special Topics (3)
- MEGR 7129: Structural Dynamics of Production Machinery (3)
- MEGR 7169: Introduction to Transmission Electron Microscopy (3)
- MEGR 7183: Design of Precision Machines and Instruments I (3)
- MEGR 7185: Gear Manufacturing and Metrology (3)
- MEGR 7090: Flexures (3)
- MEGR 7090: Tribology (3)
- ECGR 6115: Optimal Control Theory I (3)
- EMGT 6924: Lean Six Sigma Practice and Management (3)
- ENER 6120: Energy Generation and Conversion (3)
- NANO 8102: Nanoscale Phenomena (3)
- NANO 8104: Fabrication of Nanomaterials (3)
- NANO 8301: Nanomedicine (3)
- NANO 8351: Nanoscale Materials for Energy Applications (3)
- NANO 8354: Solar Applications of Nanomaterials (3)
- OPTI 5371: Waves and Optics (3)

Capstone Course
A capstone course has a class project component. No capstone course can be double-counted to also satisfy a Concentration or Elective Course requirement. With prior approval from the Graduate Program Director, an offering of MEGR 7892 that includes a project may be approved to count as the required capstone course. Select one of the following:
- MEGR 7108: Finite Element Analysis and Applications (3)
- MEGR 7172: Computational Methods in Engineering (3)
- MEGR 7173: Engineering Design Optimization (3)
- MEGR 7186: Data Analysis and Uncertainty (3)
- MEGR 7213: Introduction to Computational Fluid Dynamics (3)
- MEGR 7214: Turbulent Shear Flows (3)
- MEGR 7215: Turbulence Modeling and Simulations (3)
- MEGR 7222: Mechatronics (3)
- MEGR 7284: Advanced Surface Metrology (3)

Refer to the Course Delivery Schedule on the MEES website for additional options and details. The course schedule in Banner is the most up-to-date resource for course options and information.