

# MS in Mechanical Engineering Plan of Study

See reverse for course options and information.

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

Mathematics Courses	Term	Hours
		3
		3

Select a concentration:

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

Select four concentration courses from those listed (12 credit hours).

Concentration Courses	Term	Hours
		3
		3
		3
		3

Thesis Option: Select two elective courses. (6 credit hours)

Non-Thesis/Project Option: Select three elective courses. (9 credit hours)

Elective Courses	Term	Hours
		3
		3
		3

Select one of the following capstone completion options:

<input type="checkbox"/> Thesis Option—6 credit hours		
Master's Thesis Research	Term	Hours
MEGR 7991		
MEGR 7991		

<input type="checkbox"/> Non-Thesis/Project Option—3 credit hours		
Capstone Course	Term	Hours
		3

<b>TOTAL DEGREE HOURS</b>	<b>30</b>
---------------------------	-----------

## Graduate Faculty Advisor Approval

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

--	--

Faculty Advisor Name

Signature

Date

--

Student Name

--

UNCC ID

## Semester-by-Semester Plan

Semester 1:	Hours
<b>Total Hours</b>	

Semester 2:	Hours
<b>Total Hours</b>	

Semester 3:	Hours
<b>Total Hours</b>	

Semester 4:	Hours
<b>Total Hours</b>	

## Degree Milestones for Thesis Option

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

**INSTRUCTIONS:** Submit this completed form via email to [megrad@uncc.edu](mailto: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.