



## Courses

## Mechanical and Aerospace Engineering Departmental Courses

Code	Title	Credits
BME 5580	Introduction to Microfluidics and BioMEMS	3
EAS 5242	Mechanics of Composite Materials	3
EAS 5938	Special Topics in Aerospace Engineering	1-4
EAS 6138	Gasdynamics	3
EAS 6242	Advanced Structural Composites	3
EAS 6413C	Spacecraft Attitude Estimation and Control	3
EAS 6415	Guidance and Control of Aerospace Vehicles	3
EAS 6905	Aerospace Research	1-6
EAS 6910	Supervised Research	1-5
EAS 6939	Special Topics in Aerospace Engineering	1-6
EAS 6940	Supervised Teaching	1-3
EAS 6971	Research for Master's Thesis	1-15
EAS 7979	Advanced Research	1-12
EAS 7980	Research for Doctoral Dissertation	1-15
EGM 5111L	Experimental Stress Analysis	3
EGM 5121C	Data Measurement and Analysis	3
EGM 5423	High Strain Rate Behavior of Materials	3
EGM 5533	Applied Elasticity and Advanced Mechanics of Solids	3
EGM 5584	Biomechanics of Soft Tissue	3
EGM 5586	Modeling and Control of Biomolecular Machines	3
EGM 5816	Intermediate Fluid Dynamics	3
EGM 6321	Principles of Engineering Analysis I	3
EGM 6322	Principles of Engineering Analysis II	3
EGM 6341	Numerical Methods of Engineering Analysis I	3
EGM 6342	Fundamentals of Computational Fluid Dynamics	3
EGM 6352	Advanced Finite Element Methods	3
EGM 6365	Structural Optimization	3
EGM 6570	Principles of Fracture Mechanics	3
EGM 6611	Continuum Mechanics	3
EGM 6671	Inelastic Materials	3
EGM 6812	Fluid Mechanics I	3
EGM 6813	Fluid Mechanics II	3
EGM 6855	Bio-Fluid Mechanics and Bio-Heat Transfer	3
EGM 6905	Individual Study	1-6
EGM 6934	Special Topics in Engineering Mechanics	1-6
EGM 6936	Graduate Seminar	1
EGM 7819	Computational Fluid Dynamics	3
EGM 7845	Turbulent Fluid Flow	3
EGM 7979	Advanced Research	1-12
EGM 7980	Research for Doctoral Dissertation	1-15
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6640	Entrepreneurship for Engineers	3
EGN 6913	Engineering Graduate Research	0-3
EGN 6950	Engineering Capstone	3
EML 5045	Computational Methods for Design and Manufacturing	3
EML 5104	Classical and Statistical Thermodynamics	3
EML 5131	Combustion	3
EML 5215	Analytical Dynamics I	3
EML 5223	Structural Dynamics	3
EML 5224	Acoustics	3
EML 5233	Failure of Materials in Mechanical Design	3

EML 5311	Control System Theory	3
EML 5318	Computer Control of Machines and Processes	3
EML 5465	Energy Management for Mechanical Engineers	3
EML 5515	Gas Turbines and Jet Engines	3
EML 5516	Design of Thermal Systems	3
EML 5526	Finite Element Analysis and Application	3
EML 5598	Orthopedic Biomechanics	3
EML 5605	Advanced Refrigeration	3
EML 5714	Introduction to Compressible Flow	3
EML 6048	Machine Learning and System Control	3
EML 6154	Conduction Heat Transfer	3
EML 6155	Convective Heat Transfer I	3
EML 6156	Multiphase Convection Heat Transfer	3
EML 6157	Radiation Heat Transfer	3
EML 6267	Advanced Manufacturing Processes and Analysis	3
EML 6281	Geometry of Mechanisms and Robots I	3
EML 6282	Geometry of Mechanisms and Robots II	3
EML 6323	Nontraditional Manufacturing	3
EML 6324	Fundamentals of Production Engineering	3
EML 6350	Introduction to Nonlinear Control	3
EML 6351	Nonlinear Control II: Adaptive Control	3
EML 6352	Optimal Estimation and Kalman Filtering	3
EML 6364	Optimal Control	3
EML 6386	Computational Nanomechanics and Nanomaterials	3
EML 6417	Solar Energy Utilization	3
EML 6451	Energy Conversion	3
EML 6466	Industrial Energy Management	3
EML 6573	Nonlinear Programming	3
EML 6577	Verification, Validation, and Uncertainty Quantification	3
EML 6606	Advanced Air Conditioning	3
EML 6905	Individual Projects in Mechanical Engineering	1-3
EML 6934	Special Topics in Mechanical Engineering	1-4
EML 6940	Supervised Teaching	1-3
EML 6971	Research for Master's Thesis	1-15
EML 7979	Advanced Research	1-12
EML 7980	Research for Doctoral Dissertation	1-15

## College of Engineering Courses

Code	Title	Credits
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6913	Engineering Graduate Research	0-3
EGN 6933	Special Topics	1-3

EGN 6937	Engineering Fellowship Preparation	0-1
EGS 6012	Research Methods in Engineering Education	3
EGS 6020	Research Design in Engineering Education	3
EGS 6039	Engineering Leadership	3
EGS 6050	Foundations in Engineering Education	3
EGS 6051	Instructional Design in Engineering Education	3
EGS 6054	Cognition, Learning, and Pedagogy in Engineering Education	3
EGS 6056	Learning and Teaching in Engineering	1
EGS 6085	Advanced Engineering Educational Technology	3
EGS 6101	Divergent Thinking	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
EGS 6930	Engineering Education Seminar	1
EGS 6940	Preparation for Engineering Education Practicum	1
EGS 6949	Research to Practice Experience in Engineering Education	1-3
EGS 6971	Research for Master's Thesis	1-12
EGS 7979	Advanced Research	1-12
EGS 7980	Research for Doctoral Dissertation	1-12
ESI 6900	Principles of Engineering Practice	1-4

### Student Learning Outcomes

## Aerospace Engineering (PHD)

### SLO 1 Knowledge

Ability to identify, formulate, and solve engineering problems. Ability to critically read and integrate engineering research literature.

### SLO 2 Skills

Ability to use applied mathematical and/or modern experimental techniques. Ability to use modern engineering tools for practice at an advanced level.

### SLO 3 Professional Behavior

Ability to communicate effectively.

## Aerospace Engineering (MS)

### SLO 1 Knowledge

Ability to identify, formulate, and solve engineering problems.

### SLO 2 Skills

Ability to use applied mathematical techniques. Ability to use modern engineering tools for practice at an advanced level.