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<th>COURSE</th>
<th>SECTION</th>
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<tr>
<td>ENG ME 526 A1: Recent Application of Quantum DOTS</td>
<td>A1 - Tyler Barouch</td>
<td>Tuesday, Wednesday</td>
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<td>ENG ME 518 A1: Product Quality</td>
<td>A1 - William Deery</td>
<td>Tuesday, Thursday</td>
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<td>ENG ME 518 A1 - Daniel Cole</td>
<td>A1 - Michael Albro</td>
<td>Tuesday, Thursday</td>
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<tr>
<td>ENG ME 518 A1: Polymers and Soft Materials</td>
<td>A1 - Jishua Xias</td>
<td>Tuesday, Thursday</td>
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<td>ENG ME 518 A1: Engineering Device Applications: From Physics to Design</td>
<td>A1 - Daniel Cole</td>
<td>Tuesday, Thursday</td>
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<tr>
<td>ENG ME 518 A1: Product Quality</td>
<td>A1 - Allison Weber</td>
<td>Tuesday, Thursday</td>
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Thermodynamic and mechanical aspects of modern conventional energy conversion systems, including thermoelectric power plants, gas turbines and internal combustion engines, and refrigeration systems. Combined cycle and cogeneration are also considered, as well as economic and environmental aspects of energy conversion. Includes design project.

ENG ME 545 A1: Sustainable Power Systems: Planning, Operation and Markets

A1 - Michael Carmona
Tuesday, Thursday
9:00-10:45

This course focuses on the essential and challenging process of getting a design from the drawing board into the hands of a customer. Cases are drawn from a range of industries, technologies and development stages (everything from hardware startups to aircraft). It includes topics such as DFM, validation testing, cash flow modeling, as well as sourcing, setting up a factory, selecting supplier partners, distribution, and ongoing product support. There will be a full term-long project to build and prototype a small production line.

ENG ME 549 A1: Green Manufacturing

A1 - Emily Ryan
Monday, Wednesday
9:00-10:45

Provides a systems view of the manufacturing process that aims to efficiently use energy, water, and raw materials to minimize air and water pollution and generation of waste per unit of the manufactured product. Specifically, the course will discuss methods to minimize solid and liquid waste and make waste as a resource, ways to devise investment strategies for handling manufacturing wastes, innovative ways to decrease energy consumption in manufacturing, by-product sale and product recycling, and policies that encourage green manufacturing. Same as ENG ME 555. Students may not receive credit for both.

ENG ME 561 A1: Structures and Function of the Extracellular Matrix

A1 - Uday Pal
Tuesday, Thursday
9:00-10:45

This is an introductory course dealing with the detailed structure of the basic units of the extracellular matrix including collagen, elastin, microfibrils, and proteoglycans as well as the functional properties such as elasticity at different scales from molecule to fiber. The basic principles of tissue remodeling and the interaction of enzymes and tissue mechanics, basic sensing and actuation principles, packaging, and MEMS markets and applications. The course will emphasize the relationships between the fabrication and materials of micro/nanosystems. This is not because the other parts aren't important. Instead, it is because with fabrication and materials expertise there is something concrete you can do that will always help. When we speak of fundamental mechanisms of transport phenomena at the micro/nanoscale.

ENG ME 572 A1: Additive Manufacturing

A1 - Xin Zhang
Monday, Wednesday
12:20-2:05

This course is an introductory graduate course in mechanical engineering. It is aiming to introduce undergraduate students to additive manufacturing. Topics include overview of micro/nanofluids, scaling laws, intermolecular forces, lubrication theory, surface tension and Marangoni flow, chaotic mixing, and prototype a small production line.

ENG ME 575 A1: Introduction to Micro/Nanofluids

A1 - Chuanhua Duan
Tuesday, Thursday
9:00-10:45

This course will explore the world of microelectromechanical systems (MEMS) and NEMS. This requires an awareness of design, fabrication, and materials issues involved in micro/nanoelectronics. We will go over this through a combination of lectures, case studies, and individual homework assignments. The course will cover fabrication technologies, material properties, structural mechanics, basic sensing and actuation principles, packaging, and MEMS markets and applications. The course will emphasize the fabrication and materials of micro/nanosystems. This is not because the other parts aren't important. Instead, it is because with fabrication and materials expertise there is something concrete you can do that will always help. When we speak of fundamental mechanisms of transport phenomena at the micro/nanoscale.

ENG ME 577 A1: Product Realization

A1 - Staff
Tuesday, Thursday
9:00-10:45

There is a lab component to this course that will meet either on Tuesdays or Thursdays.

ENG ME 584 A1: Introuduction to Micro/Nanofluids

A1 - Emily Ryan
Monday, Wednesday
9:00-10:45

This course is an introductory graduate course in mechanical engineering. It is aiming to introduce undergraduate students to additive manufacturing. Topics include overview of micro/nanofluids, scaling laws, intermolecular forces, lubrication theory, surface tension and Marangoni flow, chaotic mixing, and prototype a small production line.

ENG ME 590 A1: Structures and Function of the Extracellular Matrix

A1 - BME Staff
Undecided

This course will prepare students in the fundamentals of the computational approach to study fluid flow problems, and will provide a deeper understanding of the physical models and governing equations of fluid dynamics. It will also present an opportunity to learn the basic skills of programming solutions to differential equations, and present an overview of essential numerical techniques. Students will develop finite difference based computer models as part of the “12 Steps” to numerically solving the Navier-Stokes equations. Consistency, stability and convergence of the numerical methods will be discussed. Extensions to turbulent flows will be considered. The students will be introduced to an open source CFD code and will explore numerical solutions to problems in fluid mechanics using the code.

ENG ME 595 A1: Additive Manufacturing

A1 - Steve Choryczak
Monday, Wednesday
12:20-2:05

This course will teach the fundamentals of additive manufacturing (AM) theory and practice. AM is being used in industry to accelerate product development and replace more traditional low-volume and high-volume manufacturing processes. Topics will cover the technologies, methods and applications of a range of additive methods including FDM (Fused Deposition Modeling), SLA (Sterolithographic) and SLS (Selective Laser Sintering). Methods for designing for additive will be covered, and implications of additive manufacturing in the complete product life cycle. We will use the equipment in EPIC to demonstrate and practice the design and production of additive parts.

ENG ME 596 A1: Introduction to Micro/Nanofluids

A1 - Sheryl Grace
Monday, Wednesday
9:00-10:45

This course will prepare students in the fundamentals of the computational approach to study fluid flow problems, and will provide a deeper understanding of the physical models and governing equations of fluid dynamics. It will also present an opportunity to learn the basic skills of programming solutions to differential equations, and present an overview of essential numerical techniques. Students will develop finite difference based computer models as part of the “12 Steps” to numerically solving the Navier-Stokes equations. Consistency, stability and convergence of the numerical methods will be discussed. Extensions to turbulent flows will be considered. The students will be introduced to an open source CFD code and will explore numerical solutions to problems in fluid mechanics using the code.

ENG ME 597 A1: Additive Manufacturing

A1 - BME Staff
Undecided

This course will teach the fundamentals of additive manufacturing (AM) theory and practice. AM is being used in industry to accelerate product development and replace more traditional low-volume and high-volume manufacturing processes. Topics will cover the technologies, methods and applications of a range of additive methods including FDM (Fused Deposition Modeling), SLA (Sterolithographic) and SLS (Selective Laser Sintering). Methods for designing for additive will be covered, and implications of additive manufacturing in the complete product life cycle. We will use the equipment in EPIC to demonstrate and practice the design and production of additive parts.

ENG ME 598 A1: Additive Manufacturing

A1 - BME Staff
Undecided

This course will teach the fundamentals of additive manufacturing (AM) theory and practice. AM is being used in industry to accelerate product development and replace more traditional low-volume and high-volume manufacturing processes. Topics will cover the technologies, methods and applications of a range of additive methods including FDM (Fused Deposition Modeling), SLA (Sterolithographic) and SLS (Selective Laser Sintering). Methods for designing for additive will be covered, and implications of additive manufacturing in the complete product life cycle. We will use the equipment in EPIC to demonstrate and practice the design and production of additive parts.

ENG ME 599 A1: Structures and Function of the Extracellular Matrix

A1 - BME Staff
Undecided

This course will prepare students in the fundamentals of the computational approach to study fluid flow problems, and will provide a deeper understanding of the physical models and governing equations of fluid dynamics. It will also present an opportunity to learn the basic skills of programming solutions to differential equations, and present an overview of essential numerical techniques. Students will develop finite difference based computer models as part of the “12 Steps” to numerically solving the Navier-Stokes equations. Consistency, stability and convergence of the numerical methods will be discussed. Extensions to turbulent flows will be considered. The students will be introduced to an open source CFD code and will explore numerical solutions to problems in fluid mechanics using the code.
ENG ME 366 A1: Advanced Engineering Mathematics
AA - Ritesh Baruch
Monday, Wednesday
6:00-6:15

Introduces students of engineering to various mathematical techniques which are necessary in order to solve practical problems. Topics covered include a review of calculus methods, elements of probability and statistics, linear algebra, transforms methods, difference and differential equations, numerical techniques, and mathematical techniques in optimization theory. Sample and case studies focus on applications to several engineering disciplines. The intended audience for this course is advanced seniors and entering ME engineering students who desire strengthening of their fundamental mathematical skills in preparation for advanced studies and research.

ENG ME 568 A1: Soft Robotics Technologies
AA - Shikha Bussa
Monday, Wednesday
12:30-2:30

This course will be composed of lectures, tutorials, and group work. We will study the design, mechanics, materials, manufacturing, and control of robotic and associated technologies for medical applications. We will cover theory, on medical robotics and case studies, including examples from medical companies and research groups. This class is aimed at graduate students in engineering; no medical background is required. We will study and explore design principles of different robotic components and systems for medical robotics. We will cover in-depth especially the nano-scale actuators, sensors, and body construction methods.

ENG ME 570 A1: Nonmanufacturing and Hierarchical Materials
AA - Keith Brown
Monday, Wednesday
12:00-2:00

Nonmetallic materials are often considered to having unique properties that exceed their bulk counterparts. However, leveraging such nonmetallic materials as components in bulk materials is challenging as it requires (1) making enough material to be relevant on bulk scales and (2) incorporating nonmetallics at a bulk scale in an manner so as to maximize their effect. The structural ordering of these nonmetallics can range from disordered, as in the case of nanocomposites, to highly ordered, as generally the case in metamaterials. This course is designed to communicate the role of the nonmetallics, and opportunities of constructing hierarchical materials with nonmetallic constituents. Same as ENG MS 576. Students may not receive credits for both.

ENG ME 571 A1: Medical Robotics
AA - Nia Perkins
Monday, Wednesday
2:00-2:15

This course will introduce students to the field of soft robotics and more generally non-conventional actuation (e.g. shape memory alloys, soft elastic actuators, electroactive polymers, etc.) and sensing technologies (soft and flexible technologies required as sensors, cognitive, and so on). They will learn the fluidic principles that drive them and how they can be designed, manufactured, and integrated into functional soft robotic systems.

AA - Hsiu-Wen
Tuesday, Thursday
11:00-11:15

Introduction to the theory and design methods of non-linear control systems. Application to robotics, vibration and noise control, fault control, manufacturing processes, and biomechanical systems. Mathematical methods based on the theory of differentiable manifolds; non-linear control techniques include feedback linearization, back-stepping, forwarding, and sliding mode control. Additional course topics will include controllability and observability, Lyapunov stability and its applications, Lyapunov, input-output stability, zero dynamics, center manifold theory, perturbation theory, and averaging.

ENG ME 740 A1: Vision, Robotics, and Planning
AA - John Balloul
Tuesday, Thursday
10:00-10:45

Methodologies required for constructing and operating intelligent mechatronics. Comprehensive introduction to robot kinematics for motion planning; dynamics and control of mechanical systems, and for understanding the control of forces and torques at the end effector. Discussion of robot vision and sensing and advanced topics in robot mechanics, including elastic effects and kinematic redundancy. Meets with ENG ME 724. Students may not receive credit for both.

ENG ME 762 A1: Nonlinear Systems and Control
AA - Hsiu-Wen
Tuesday, Thursday
11:00-11:15

Provides the theory and engineering skills needed to solve challenges in the biomaterials and tissue engineering area, concentrating on cell-biomaterial interactions, soft tissue mechanics and specific research topics. Students will write a thesis grant proposal on a specific research topic. Note that the laboratory portion is not offered in ENG ME 727. Same as ENG ME 727/ENG ME 727. Students may not receive credit for both.

ENG ME 770 A1: Advanced Optimization Theory and Methods
AA - Alexander D'Isidoro
Thursday
1:00-2:15

Provides the theory and engineering skills needed to solve challenges in the biomaterials and tissue engineering area, concentrating on cell-biomaterial interactions, soft tissue mechanics and specific research topics. Students will write a thesis grant proposal on a specific research topic. Note that the laboratory portion is not offered in ENG ME 727. Same as ENG ME 727/ENG ME 727. Students may not receive credit for both.

ECE home department

AA - John Balloul
Tuesday, Thursday
10:00-10:45

Methodologies required for constructing and operating intelligent mechatronics. Comprehensive introduction to robot kinematics for motion planning; dynamics and control of mechanical systems, and for understanding the control of forces and torques at the end effector. Discussion of robot vision and sensing and advanced topics in robot mechanics, including elastic effects and kinematic redundancy. Meets with ENG ME 724. Students may not receive credit for both.

ENG ME 740 A1: Vision, Robotics, and Planning
AA - Hsiu-Wen
Tuesday, Thursday
11:00-11:15

Introduction to the theory and design methods of non-linear control systems. Application to robotics, vibration and noise control, fault control, manufacturing processes, and biomechanical systems. Mathematical methods based on the theory of differentiable manifolds; non-linear control techniques include feedback linearization, back-stepping, forwarding, and sliding mode control. Additional course topics will include controllability and observability, Lyapunov stability and its applications, Lyapunov, input-output stability, zero dynamics, center manifold theory, perturbation theory, and averaging.

ENG ME 762 A1: Nonlinear Systems and Control
AA - Hsiu-Wen
Tuesday, Thursday
11:00-11:15

Provides the theory and engineering skills needed to solve challenges in the biomaterials and tissue engineering area, concentrating on cell-biomaterial interactions, soft tissue mechanics and specific research topics. Students will write a thesis grant proposal on a specific research topic. Note that the laboratory portion is not offered in ENG ME 727. Same as ENG ME 727/ENG ME 727. Students may not receive credit for both.

ECE home department

AA - Alexander D'Isidoro
Thursday
1:00-2:15

Provides the theory and engineering skills needed to solve challenges in the biomaterials and tissue engineering area, concentrating on cell-biomaterial interactions, soft tissue mechanics and specific research topics. Students will write a thesis grant proposal on a specific research topic. Note that the laboratory portion is not offered in ENG ME 727. Same as ENG ME 727/ENG ME 727. Students may not receive credit for both.

ENG ME 740 A1: Vision, Robotics, and Planning
AA - Hsiu-Wen
Tuesday, Thursday
11:00-11:15

Introduction to the theory and design methods of non-linear control systems. Application to robotics, vibration and noise control, fault control, manufacturing processes, and biomechanical systems. Mathematical methods based on the theory of differentiable manifolds; non-linear control techniques include feedback linearization, back-stepping, forwarding, and sliding mode control. Additional course topics will include controllability and observability, Lyapunov stability and its applications, Lyapunov, input-output stability, zero dynamics, center manifold theory, perturbation theory, and averaging.

ENG ME 762 A1: Nonlinear Systems and Control
AA - Hsiu-Wen
Tuesday, Thursday
11:00-11:15

Provides the theory and engineering skills needed to solve challenges in the biomaterials and tissue engineering area, concentrating on cell-biomaterial interactions, soft tissue mechanics and specific research topics. Students will write a thesis grant proposal on a specific research topic. Note that the laboratory portion is not offered in ENG ME 727. Same as ENG ME 727/ENG ME 727. Students may not receive credit for both.
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<tr>
<td>ENG EC 503 A1: Introduction to Learning from Data</td>
<td>A1</td>
<td>Prakash Mohar Thursday 1:40-3:15</td>
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<tr>
<td>ENG EC 503 A1: Introduction to Learning from Data</td>
<td>A1</td>
<td>Brian Fahi Tuesday, Thursday 1:30-3:15</td>
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<td>EC 504 A1: Introduction to Embedded Systems</td>
<td>A1</td>
<td>Babak Kia Montazam Tuesday, Thursday 5:00-6:15</td>
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<td>CAS CS 585 A1: Image and Video Computing</td>
<td>A1</td>
<td>Mengrit Bette Tuesday, Thursday 5:00-6:15</td>
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<tr>
<td>ENG EK 690 A1: Career Lab: Job &amp; Internship Search for Master's Students</td>
<td>A1</td>
<td>Mary Bertrand Friday 1:25-2:15</td>
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In this course, students will learn about job search principles and actively work on their application materials and job search techniques. Priority for this class is given to students participating in a 3 credit course and those with upcoming graduation dates. Graduate student only; enrollment at the discretion of the CDO.