ME 123 Introduction to Mechanical Design
3 credits
Introduction to engineering design process and analysis techniques including problem solving skills, development of software learning skills, graphical analysis, data analysis, and documentation skills. Three lec and one open 2-hr lab a wk. (Fall only)
Coreq: MATH 170.

ME 201 (s) Engineering Team Projects
2-3 credits, max arranged
Joint-listed with ME 401.
Students will be introduced to a systems approach to designing, building and delivering an interdisciplinary engineering project, with an emphasis on learning how to realize a project in an organized team environment. Projects are chosen at the discretion of the department. Additional project duties/assignments required for 400-level credit.
Prereq for ME 401: ME Certification and Permission.

ME 204 (s) Special Topics
Credit arranged.

ME 223 Mechanical Design Analysis
3 credits
Use of design and problem solving methodology to model requirements, conduct project learning, develop concepts, and realize prototypes. Projects feature elements of electromechanical design, rapid prototyping, and experimentation.
Prereq: ME 123
Coreq: MATH 175.

ME 299 (s) Directed Study
Credit arranged.

ME 301 Computer Aided Design Methods
3 credits
Engineering drawing literacy, pre-CAD planning, part modeling, assembly modeling, drawing package formulation, culminating team project involving virtual dissection and reassembly of a complex machine.
Prereq: ME 223.
Coreq: ME 301 and Certification

ME 307 Group Mentoring I
1 credits
Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.

ME 308 Group Mentoring II
1 credit
Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.

ME 307 Group Mentoring I
1 credits
Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.

ME 308 Group Mentoring II
1 credit
Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.

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Prereq: Permission.

ME 308 Group Mentoring II
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Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.

ME 307 Group Mentoring I
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Prereq: Permission.

ME 308 Group Mentoring II
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Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.

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Prereq: Permission.

ME 308 Group Mentoring II
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Prereq: Permission.

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Prereq: Permission.

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Prereq: Permission.

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Prereq: Permission.

ME 308 Group Mentoring II
1 credit
Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.

ME 307 Group Mentoring I
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Prereq: Permission.

ME 308 Group Mentoring II
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Prereq: Permission.

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Prereq: Permission.

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Prereq: Permission.

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Prereq: Permission.

ME 308 Group Mentoring II
1 credit
Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Students must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.
ME 399 (s) Engr Coop Internship II
Credit arranged
Supervised internship in professional engineering settings, integrating academic study with work experience; requires written report to be evaluated by a designated faculty member; details of coop to be arranged with ME Department before start of coop; cannot be counted as a technical elective. Graded P/F.
Prereq: Permission.

ME 401 (s) Engineering Team Projects
2-3 credits, max arranged
Joint-listed with ME 201.
Students will be introduced to a systems approach to designing, building and delivering an interdisciplinary engineering project, with an emphasis on learning how to realize a project in an organized team environment. Projects are chosen at the discretion of the department. Additional project duties/assignments required for 400-level credit.
Prereq for ME 401: ME Certification and Permission.

ME 403 (s) Workshop
Credit arranged.

ME 404 (s) Special Topics
Credit arranged.

ME 407 Group Mentoring III
1 credit
Mentoring of student groups in engineering classes where a process education environment is used; students taking this course will improve their engineering skill in the area they are mentoring as well as improving their team, communication, and leadership skills. Student must attend all classes or labs where group activities in the process education environment are done (a minimum of 2 mentoring sessions per week).
Prereq: Permission.

ME 410 Principles of Lean Manufacturing
3 credit
Principles of lean manufacturing are introduced that provide a systematic process for identifying and eliminating non-value activities (waste) in production processes. Students learn these principles through a series of workshops, lectures, and hands-on simulations of lean principles. Three hours of lec and six hours of outside work per week.
Prereq: Senior standing in an engineering discipline or Permission.

ME 411 HVAC Systems
3 credits
Joint-listed with ME 514.
Application of thermodynamics, heat transfer, and fluid flow to understanding the psychrometric performance of systems and equipment; evaluating the performance characteristics, advantages, and disadvantages of the various types of HVAC systems including large tonnage refrigeration/chiller equipment, cooling coils, cooling towers, ducts, fans, and heat pump systems; economics of system and equipment selection. Cooperative: open to WSU degree seeking students.
Prereq: ME 345.

ME 416 FE Exam Review
1 credit
Review of 10 essential topics on the Mechanical Engineering Fundamentals of Engineering exam, including preparation in each topic area based on online review sessions and solving sample problems. Graded P/F
Prereq: Senior Standing

ME 417 Turbomachinery
3 credits
Joint-listed with ME 517
Introduction to the basic principles of modern turbomachinery. Emphasis is placed on steam, gas (combustion), wind and hydraulic turbines. Applications of the principles of fluid mechanics, thermodynamics and aerodynamics to the design and analysis of turbines and compressors are incorporated. Additional technical research report and presentation reqd for grad cr. Cooperative: open to WSU degree-seeking students (ME 517 only). Recommended Preparation: ENGR 320, ENGR 335.

ME 420 Fluid Dynamics
3 credits
Joint-listed with ME 520.
Credit not granted for both ME 420 and ME 520. A second fluid dynamics course featuring vector calculus and integral and differential forms of the conservation laws. Topics include fluid properties, fluid statistics, inviscid flow; conservation of mass, momentum, and energy; and turbulence. Other topics may be covered. Additional projects/assignments reqd for grad cr.
Prereq: ENGR 335, MATH 310, or Permission.

ME 421 (s) Advanced Computer Aided Design
3 credits
Use of solid modeling software for advanced component design, creation of complex multi-component assemblies, animation studies, and rendering. Course concludes with one month-long final project.
Prereq: ME 301
Coreq: ME 341.

ME 422 Applied Thermodynamics
3 credits
Advanced topics in applied thermodynamics including availability (exergy) analysis of systems, advanced power and refrigeration cycles, combustion, and thermodynamic properties of real fluids.
Prereq: ME 345.
ME 423 Human Factors and Ergonomics in Product Design
3 credits
Joint-listed with ME 523
Introduction to and application of Human Factors & Ergonomics Engineering principles in product design. Engineers design systems (e.g., work environments or products) where the human is an integral component. Human Factors & Ergonomics Engineering puts emphasis on how products should be designed so that they are safe, comfortable, and efficient for the human user. This course will focus on how body characteristics, physical and cognitive abilities, and the environment affect how products should be designed to accommodate the intended user(s). Additional projects/assignments are required for graduate credit.
Prereq: Senior standing in the College of Engineering; or Permission.

ME 424 Mechanical Systems Design I
3 credits
Gen Ed: Senior Experience
Study of production realization including project planning, concept design, detail design, and manufacturing processes with multiple realistic constraints. Concepts learned are applied to a two-semester, capstone design project. The project is continued in ME 426. (Fall only)
Prereq: ME 301, ME 313, ME 325, ME 330, ME 345, and Certification.

ME 425 Machine Component Design II
3 credits
A continuation of the analytical study of concepts in ME 325 Machine Component Design, by studying how these components are used in applications. In this context, material selection, machinability and strengthening is addressed. Special emphasis is placed on discussions of case studies and detailed design projects involving machine component elements. Significant use of solid modeling and use of equation solvers.
Prereq: ME 325.

ME 426 Mechanical Systems Design II
3 credits
Gen Ed: Senior Experience
Continuation of each two-semester, capstone design project that was started in ME 424. (Spring only)
Prereq: ME 424.

ME 430 Senior Lab
3 credits
Detailed lab investigation of engineering problem; statistical design of experiments; application of engineering principles to analyze experimental data; technical report writing; oral communication skills. One lec and four hrs of lab a wk.
Prereq: ME 313 and ME 330.

ME 433 Combustion Engine Systems
3 credits
Theory and characteristics of combustion engines; combustion process analysis; fuels, exhaust emissions and controls; system analysis and modeling.
Coreq: ME 345 or Permission.

ME 435 Thermal Energy Systems Design
3 credits
Application of fluid mechanics, thermodynamics and heat transfer in the design of thermal energy systems; topics include thermal energy system component analysis and selection, component and system simulation, dynamic response of thermal systems, and system optimization.
Prereq: ME 345.

ME 436 Sustainable Energy Sources and Systems
3 credits
An introduction to renewable energy conversion. Topics include: solar thermal, solar photovoltaic, and wind energy. Cooperative: open to WSU degree seeking students.
Prereq: ME 345.

ME 438 Sustainability and Green Design
3 credits
Joint-listed with ME 538.
Prereq: MATH 310.

ME 443 (s) Analysis of Thermal Energy Systems
3 credits, max arranged
Joint-listed with ME 543.
Analysis of thermal energy systems; topics vary depending on instructor and may include one or more of the following thermal systems: solar energy, refrigeration, vapor power generation, gas power generation, geothermal energy, wind energy, fuel cells, nuclear energy, thermoelectric systems, and thermonic systems. Additional assignments and a technical research report required for graduate credit.
Prereq: ENGR 335 and ME 345; permission required to repeat course for credit.

ME 444 Air Conditioning Engineering
3 credits
Requirements for air conditioned spaces for human comfort; thermodynamic properties of air-water vapor mixtures; heating and cooling loads; design of systems for heating, cooling, and ventilation. Cooperative: open to WSU degree-seeking students.
Prereq: ME 345.

ME 450 Computational Fluid Dynamics
3 credits
Joint-listed ME 550.
Governing equations of fluid flow; fundamentals of turbulence modeling; accuracy and stability of discretization schemes; verification and validation; boundary and initial conditions; grid generation; CFD post-processing. Application of CFD software (ANSYS FLUENT) through five hands-on CFD Labs including internal viscous pipe flows, external flows over a 2D airfoil and a circular cylinder, and flows in a 2D driven cavity. Additional projects/assignments required for graduate credits. Cooperative: open to WSU degree seeking students.
Prereq: ENGR 335 and MATH 330.

ME 451 Experimental Methods in Fluid Dynamics
3 credits
Joint-listed with ME 551.
The objective of this course is to develop the knowledge and skills to be able to design and perform fluid dynamics experiments (and experiments in related areas) and to interpret and report the results. Learn the words, the concepts, and experimental skills in areas including dimensional analysis and scaling of experiments, flow visualization, velocity and flow rate measurements, turbulence measurements, and sediment sizing and transport measurements. Additional projects/assignments reqd for grad cr. One 1-1/2 hr lec and one 3-hr lab a wk. Recommended Preparation: ENGL 317 and ENGR 335.
ME 452 TechVentures: High Technology Entrepreneurship
3 credits
Joint-listed with ME 552.
TechVentures teaches students how to startup a technology company. Topics are (a) self-management, (b) product design, (c) marketing, (d) finance, and (e) organizational design. This project-based course is open to all majors. One extra project is required for graduate credit.
Prereq: Junior Standing and Permission.

ME 458 Finite Element Applications in Engineering
3 credits
Joint-listed with ME 558.
The finite element method is an essential tool for the design and research activities performed in engineering companies and academic institutions. The goal of this course is to introduce students to the use of the finite element method by focusing on a range of engineering applications and employing an interactive commercial finite element code. Students will learn how to solve various problems from several mechanical engineering areas including solid mechanics, heat transfer and fluid mechanics. When available, analytical solutions will be compared with the finite element solutions for validation purposes. Cooperative: open to WSU degree seeking students (ME 558 only).
Prereq: ME 322 (or ENGR 320) and ENGR 350
Coreq: ME 341 or instructor permission.

ME 461 Fatigue and Fracture Mechanics
3 credits
Fracture mechanics approach to structural integrity, fracture control, transition temperature, microstructural and environmental effects, fatigue and failure analysis.
Prereq: MSE 201 and ENGR 350.

ME 464 Robotics: Kinematics, Dynamics, and Control
3 credits
Joint-listed with ME 564
Mathematical analysis applied to spatial robotics including: Rigid body motion using screw theory, forward and inverse kinematics, analyses of forces and velocities using the manipulator Jacobian, serial and parallel chains, robot dynamics and simulation, nonlinear control and adaptive control, and Lyapunov stability theory. Additional projects/assignments required for graduate credit. Recommended Preparation: CS 120.
Prereq: MATH 310, MATH 330, and ME 313 or Equivalent, ME 330.

ME 472 Mechanical Vibrations
3 credits
Free and forced vibration of single and multiple degree of freedom systems; response of mechanical systems to inputs of varying complexity, ranging from single frequency to pseudo-random; applications to mechanical design and vibration control. Cooperative: open to WSU degree-seeking students.
Prereq: ENGR 220, MATH 310, and ME 313; or graduate standing.

ME 481 Control Systems
3 credits
Cross-listed with ECE 470.
Analysis and design of feedback control systems using frequency and time domain methods, and computer-aided design tools. Cooperative: open to WSU degree-seeking students.
Prereq: MATH 330
Prereq for Electrical Engineering and Computer Engineering majors: ECE 350
Prereq for Mechanical Engineering majors: ME 313.

ME 490 Solid Modeling, Simulation and Manufacturing Capstone
3 credits
Use of solid modeling software focused on preparation for certification examinations, introduction to multi-physics numerical simulation, and computer aided manufacturing (CAM). A major final project is required. (Fall only)
Prereq: Permission.

ME 499 (s) Directed Study
Credit arranged
Selected topics. Detailed report reqd.
Prereq: Senior standing and Permission.

ME 501 (s) Seminar
Credit arranged.

ME 502 (s) Directed Study
Credit arranged
Supervised study, including critical reading of current literature.
Prereq: Permission.

ME 503 (s) Workshop
Credit arranged.

ME 504 (s) Special Topics
Credit arranged.

ME 505 (s) Professional Development
Credit arranged.

ME 513 Engineering Acoustics
3 credits
Joint-listed with ME 413. Cross-listed with ECE 579.
Fundamentals of acoustics including wave theory; transmission through layers, generation and reception; low frequency models; application to sound measurement, transducers, loudspeaker cabinet design, and nondestructive testing; acoustic design project reqd. Additional projects/assignments reqd for grad cr. ME 513 is a cooperative course available to WSU degree-seeking students.
Prereq: ENGR 240 or ECE 212, and MATH 310, or ME 313.

ME 514 HVAC Systems
3 credits
Joint-listed with ME 414.
Application of thermodynamics, heat transfer, and fluid flow to understanding the psychrometric performance of systems and equipment; evaluating the performance characteristics, advantages, and disadvantages of the various types of HVAC systems including large tonnage refrigeration/chiller equipment, cooling coils, cooling towers, ducts, fans, and heat pump systems; economics of system and equipment selection. Cooperative: open to WSU degree seeking students.
Prereq: ME 345.

ME 515 Transport Phenomena
ME 515 Transport Phenomena (3 cr) WSU Ch E 510
Same as ChE 515. Advanced treatment of momentum, energy, and mass transport processes; solution techniques.
Prereq: B.S.Ch.E. and Equivalent of ChE 340, 341 or Permission.
ME 517 Turbomachinery
3 credits
Joint-listed with ME 417
Introduction to the basic principles of modern turbomachinery. Emphasis is placed on steam, gas (combustion), wind and hydraulic turbines. Applications of the principles of fluid mechanics, thermodynamics and aerodynamics to the design and analysis of turbines and compressors are incorporated. Additional technical research report and presentation reqd for grad cr. Cooperative: open to WSU degree-seeking students (ME 517 only). Recommended Preparation: ENGR 320, ENGR 335.

ME 519 Fluid Transients
3 credits
Cross-listed with CE 519.
Development of concepts and modeling techniques for unsteady flow of liquid and gas in piping systems; extensive computer programming used to develop tools for analysis, design, and control of transients. (Alt/yr)
Prereq: MATH 310 and ENGR 335. A minimum grade of 'C' or better is required for all pre/coreqs.

ME 520 Fluid Dynamics
3 credits
Joint-listed with ME 420. Cross-listed with CE 520.
Credit not granted for both ME 420 and ME 520. A second fluid dynamics course featuring vector calculus and integral and differential forms of the conservation laws. Topics include fluid properties, fluid statistics, inviscid flow; conservation of mass, momentum, and energy; and turbulence. Other topics may be covered. Additional projects/assignments reqd for grad cr.
Prereq: ENGR 335, MATH 310, or Permission.

ME 521 Design Synthesis with Solid Modeling
3 credits
Use of solid modeling in the design synthesis process that focuses on optimized designs, reverse engineering to understand design intent, and aesthetics. Course concludes with one month-long final project.
Prereq: Graduate Standing or ME 421.

ME 523 Human Factors and Ergonomics in Product Design
3 credits
Joint-listed with ME 423
Introduction to and application of Human Factors & Ergonomics Engineering principles in product design. Engineers design systems (e.g., work environments or products) where the human is an integral component. Human Factors & Ergonomics Engineering puts emphasis on how products should be designed so that they are safe, comfortable, and efficient for the human user. This course will focus on how body characteristics, physical and cognitive abilities, and the environment affect how products should be designed to accommodate the intended user(s). Additional projects/assignments are required for graduate credit.
Prereq: Senior standing in the College of Engineering; or Permission.

ME 525 Advanced Heat Transfer
3 credits
Study of major chemical and physical principles affecting properties of solid state engineering materials. Topics include bonding, carrier statistics, band-gap engineering, optical and transport properties, novel materials systems, characterization, magnetism, and comprehensive introduction to physics of solid state devices. Cooperative: open to WSU degree-seeking students.
Prereq: Permission.

ME 529 Combustion and Air Pollution
3 credits
Formation of pollutants during combustion processes and their subsequent transformations in the atmosphere; emphasis on the effects of design and operating parameters of combustion devices on the nature and composition of exhaust gases, improvements, post-combustion treatment of effluent gases, atmospheric chemistry, transport of pollutants, smog formation, acid rain, ozone formation and destruction.
Prereq: ENGR 320 and ENGR 335, ME 345 or Permission.

ME 538 Sustainability and Green Design
3 credits
Joint-listed with ME 438.
Prereq: MATH 310.

ME 539 Advanced Mechanics of Materials
3 credits
Cross-listed with CE 510 and MSE 539.
Limitations of results of elementary mechanics of materials, complex situations of loading and structural geometry, applications to design of machines and structure, introduction to elasticity. Cooperative: open to WSU degree-seeking students.
Prereq: ME 341 or CE 342.

ME 540 Continuum Mechanics
3 credits
Stress and deformation of continua using tensor analysis; relationship between stress, strain, and strain rates in fluids and solids; applications. Cooperative: open to WSU degree seeking students.
Prereq: Permission.

ME 541 Mechanical Engineering Analysis
3 credits
Mathematical modeling and solutions to mechanical engineering problems; analytical solutions to linear heat and mass diffusion, waves and vibrations; introduction to approximate techniques. Cooperative: open to WSU degree-seeking students.
Prereq: MATH 330 and MATH 310 or Equivalent.

ME 543 (s) Analysis of Thermal Energy Systems
3 credits, max arranged
Joint-listed with ME 443.
Analysis of thermal energy systems; topics vary depending on instructor and may include one or more of the following thermal systems: solar energy, refrigeration, vapor power generation, gas power generation, geothermal energy, wind energy, fuel cells, nuclear energy, thermoelectric systems, and thermionic systems. Additional assignments and a technical research report required for graduate credit.
Prereq: ENGR 335 and ME 345; permission required to repeat course for credit.

ME 544 Conduction Heat Transfer
3 credits
Formulation of steady-state and transient one- and multi-dimensional heat conduction problems; analytical solution techniques for linear problems including separation of variables, integral transforms, and Laplace transforms.
Prereq: ME 345 or equivalent, or Permission.
ME 547 Thermal Radiation Processes
3 credits
Thermal radiation; radiation interchange among surfaces; radiation in absorbing-emitting gases; combined modes of heat transfer.
Prereq: ME 345 or Permission.

ME 548 Elasticity
3 credits
Mathematical analysis of strain and stress, including vectors, tensors, and coordinate transformations; equations of elasticity; stress problems involving extension, torsion, and flexure; theories of failure.
Prereq: ME 341 or CE 342.

ME 549 Finite Element Analysis
3 credits
Cross-listed with ME 546.
Formulation of theory from basic consideration of mechanics; applications to structural engineering, solid mechanics, soil and rock mechanics; fluid flow. Cooperative: open to WSU degree seeking students.
Prereq: ME 341 or CE 342.

ME 550 Computational Fluid Dynamics
3 credits
Joint-listed ME 450.
Governing equations of fluid flow; fundamentals of turbulence modeling; accuracy and stability of discretization schemes; verification and validation; boundary and initial conditions; grid generation; CFD post-processing. Application of CFD software (ANSYS FLUENT) through five hands-on CFD Labs including internal viscous pipe flows, external flows over a 2D airfoil and a circular cylinder, and flows in a 2D driven cavity. Additional projects/assignments required for graduate credits. Cooperative: open to WSU degree seeking students.
Prereq: ENGR 335 and MATH 330.

ME 551 Experimental Methods in Fluid Dynamics
3 credits
Governing equations of fluid flow; fundamentals of turbulence modeling; accuracy and stability of discretization schemes; verification and validation; boundary and initial conditions; grid generation; CFD post-processing. Application of CFD software (ANSYS FLUENT) through five hands-on CFD Labs including internal viscous pipe flows, external flows over a 2D airfoil and a circular cylinder, and flows in a 2D driven cavity. Additional projects/assignments required for graduate credits. Cooperative: open to WSU degree seeking students.
Prereq: ENGR 335 and MATH 330.

ME 552 TechVentures: High Technology Entrepreneurship
3 credits
Joint-listed with ME 452.
TechVentures teaches students how to startup a technology company. Topics are (a) self-management, (b) product design, (c) marketing, (d) finance, and (e) organizational design. This project-based course is open to all majors. One extra project is required for graduate credit.
Prereq: Junior Standing and Permission.

ME 558 Finite Element Applications
3 credits
Joint-listed with ME 458.
The finite element method is an essential tool for the design and research activities performed in engineering companies and academic institutions. The goal of this course is to introduce students to the use of the finite element method by focusing on a range of engineering applications and employing an interactive commercial finite element code. Students will learn how to solve various problems from several mechanical engineering areas including solid mechanics, heat transfer and fluid mechanics. When available, analytical solutions will be compared with the finite element solutions for validation purposes. Cooperative: open to WSU degree seeking students (ME 558 only).
Prereq: ME 322 (or ENGR 320) and ENGR 350
Coreq: ME 341 or instructor permission.

ME 564 Robotics: Kinematics, Dynamics, and Control
3 credits
Joint-listed with ME 464
Mathematical analysis applied to spatial robotics including: Rigid body motion using screw theory; forward and inverse kinematics, analyses of forces and velocities using the manipulator Jacobian, serial and parallel chains, robot dynamics and simulation, nonlinear control and adaptive control, and Lyapunov stability theory. Additional projects/assignments required for graduate credit. Recommended Preparation: CS 120.
Prereq: MATH 310, MATH 330, and ME 313 or Equivalent, ME 330.

ME 571 Building Performance Simulation for Integrated Design
3 credits
Cross-listed with ARCH 574
This course focuses on design decisions that impact energy, thermal, visual and acoustic comfort with a strong emphasis on building simulation tools. This course provides students with the understanding of the nature of building thermal comfort, building envelope behavior, ventilation requirements, indoor air quality, passive cooling systems, energy conservation, and the importance of iterative building simulation in achieving high performance buildings.

ME 580 Linear System Theory
3 credits
Cross-listed with ECE 572
Linear spaces and linear operators; descriptions of dynamic systems; input-output descriptions; state-space concepts; canonical forms; controllability and observability; minimal realizations; application to control and general systems analysis; pole assignment; observers. Cooperative: open to WSU degree-seeking students.
Prereq: ECE 470 or Equivalent.

ME 598 (s) Internship
Credits arranged.

ME 599 (s) Research
Credit arranged
Research not directly related to a thesis or dissertation.
Prereq: Permission.

ME 600 Doctoral Research and Dissertations
Credit arranged.