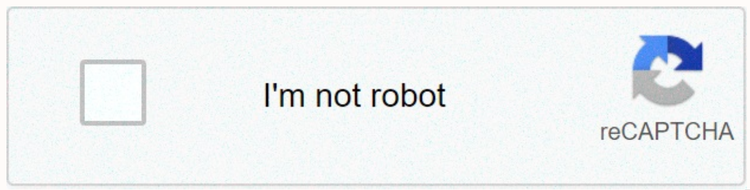

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Me 170 uiuc

ME 170 Computer Aided Design credit: 3 Hours. Geometry and topology of engineering components: the creation of engineering models and their presentation in standard 2D plan form and as 3D wire frame and shaded solids; meshed topologies for team-road production for engineering analysis and component production; ISO and ANSI standards for coordinate sizing and tossing; geometric sizing and tolerancing. Using solid modeling software to create interning models at component and assembly levels with automatic plan creation, interference control, and linked material invoice. Credits are not issued for both ME 170 and GE 101 or SE 101. ME 199 Undergraduate Open Seminar credit: 1-5 Hours. Repeatable. ME 200 Thermodynamic Credits: 3 Hours. Classical thermodynamics with the second law; system and control-volume analyses of thermodynamic processes; irreversibleness and availability; relationships for ideal gas mixtures. Prerequisite: MATHEMATICS 241. ME 270 Design for production credit: 3 Hours. Introduction to DFM methodologies and tools; selection of materials (new and traditional materials); design for primary manufacturing processes (basic cutting, casting, shaping and shaping); design with plastics (snap-fits, integral hinges, etc.); assembly design (DFA); geometric sizing and tolerance (GD&T). Exactly the same as the 270. Prerequisite: ME 170. Me and EM majors only. ME 290 Seminar credit: 0 Hours. Lectures given by faculty and invited officials on the ethics and practices of mechanical engineering/engineering mechanics, other engineering fields, economics and their relations with society. Only the fall semester was offered. Approved for S/U rating only. ME 297 Entry Independent Work credit: 1-3 Hours. Independent work and/or individual projects related to mechanical engineering. Approved for letter and S/U note. How many 6 credit hours can be repeated for a letter grade; There is no limit to S/U class mode. Prerequisite: Faculty Member's Approval. ME 330 Engineering Materials credit: 4 Hours. Structures as the basis for mechanical behavior of polymers, metals and ceramics. Manipulation of the structure by processes such as heat processing and solidization. Material failure mechanisms in service (efficient, broken, fatigue, creep, corrosion and wear) and simple design techniques to prevent these errors. Strategies for the selection of materials in design. Credits are not issued for both ME 330 and either CEE 300 or MSE 280. Prerequisite: CHEM 102 and TAM 251. ME 351 Analysis of Mfg Processes Credit: 3 Hours. Mechanistic and empirical modeling of production processes including metal cutting theory, casting analysis, forging analysis, sheet forming, plastic molding, welding and mechanics assembly analysis. In addition, applied exposure to production processes using CMM, CAD/CAM software (MasterCam), 5-axis machining (ShopBot), Tel EDM processing, statistical process control (SPC) and geometric sizing and tones (GD&T) metrology principles. Prerequisite: ME 270. ME 360 Signal Processing credit: 3.5 Hours. Basic electromenetic techniques used in modern instrumentation and control systems. Use of converters and actuators. Signal conditioning, grounding and protection. Analog and digital signal processing and feedback control methods by emphasizing frequency domain techniques. Frequency response of continuous and discerning systems. Credits are not issued for both ME 360 and ABE 425. Prerequisite: ME 340. ME 370 Mechanical Design I credit: 3 Hours. Kinematics analytical and computer-aided design, dynamic force analysis, virtual working principle, cam and gear design and balancing, including kinematics and machine dynamics, user-centered design and design thinking input. Project-based learning of multi-mechanism system design, analysis, manufacturing and evaluation. Prerequisites: ME 270, TAM 212 and TAM 251. ME 371 Mechanical Design II credits: 3 Hours. Design and analysis of machines for load handling and power transmission. Taking into account material failure modes, including efficiency, broken and fatigue. Design and selection of machine elements: gear fasteners, springs, rolling element bearings, fluid film lubricant, gears and friction drives. Prerequisite: ME 330 OR CEE 300; BEN 370. ME 401 Cooling and Cryogenic Credit: 3 or 4 Hours. The theory of operation and design of equipment for the production of low temperatures is close to absolute zero from under the environment; industrial, consumer, aerospace, medical and research applications. 3 license hours. 3 or 4 graduate hours. Prerequisite: Credit or concurrent registration in ME 320. ME 402 Thermal Systems Design credit: 3 or 4 Hours. Selection of components in fluid and energy processing systems to meet system performance requirements; computer-aided design; system simulation; optimization techniques; statistical combinations of investment economics and working conditions. 3 license hours. 3 or 4 graduate hours. Prerequisite: Credit or concurrent registration in ME 320. ME 403 No-Drink Engines credit: 3 or 4 Hours. The theory and analysis of mutual internal combustion engines; factors affecting fuels, carburetion, combustion, exhaust emissions, explosion, fuel injection and performance; laboratory work on variables affecting performance. 3 license hours. 3 or 4 graduate hours. Prerequisite: Credit or concurrent registration in ME 400 or ABE 466. ME 404 Intermediate Thermodynamics credit: 4 Hours. Classic thermodynamics, including TdS and Maxwell relations; development of thermodynamic property relationships, behavior of real gases, thermodynamics of mixtures, phase balance and balance by dysleclament and combustion reactions; the effect of molecular and atomic structure, statistical concepts and distributions, calculation of thermodynamic properties of gas phase atoms and molecules, kinetic theory of gases, vibrations in crystals and electron gas in metals; selected applications. 4 license hours. Four postgraduate hours. No credits are issued for both ME 404 and PHYS 427, CHEM 442 or any of the CHEM 444. Prerequisite: ME 200. ME 410 Intermediate Gas Dynamics credit: 3 or 4 Hours. Solution of internal compressable flow problems with both fixed and unstable, one-dimensional techniques; flows with smooth and sudden change of space, with friction, with the addition of heat, and with the addition of mass; weak and strong waves flow with multiple limited streams and shock waves. 3 license hours. 3 or 4 graduate hours. Prerequisite: ME 200; ME 310, TAM 335 or AE 311. ME 412 Digital Thermo-Liquid Mechs credits: 2 to 4 Hours. Numerical techniques for solving equations that govern conductivity and convective heat transfer in continuous and unstable fluid flows: slus difference and volume techniques, basic algorithms, and applications to real-world fluid flow and heat transfer problems. Same as CSE 412. 2 or 3 license hours. 3 or 4 graduate hours. Prerequisite: ME 310 OR TAM 335; I credit 320. ME 430 Engrg Ingredients: 3 or 4 Hours. Crystalline level material aizotropy and elasto-plastic properties; microstructural foundation for fatigue, fracture and creep in metals, polymers and ceramics; fault mechanisms and hardening in components; structure and behavior of metal-matrix composites, ceramic-matrix composites and polymer composites. 3 license hours. 3 or 4 graduate hours. Prerequisite: ME 330 OR TAM 324. ME 431 Mechanical Component Failure credit: 3 or 4 Hours. The relationship of material and mechanical concepts with the design of structures and components: elasticity, plasticity, thermal loading, creeping, fatigue, fracture and life evaluations in relation to material selection and design. 3 license hours. 3 or 4 graduate hours. Prerequisites: ME 330 and ME 371; Recommended: ME 430. ME 432 Photovoltaic credit basics: 3 or 4 Hours. In this lesson, we will develop a basic understanding of how solar cell converts light into electricity, how solar cell is produced, how solar cell performance is evaluated, and photovoltaic technologies currently available and/or under development on the market. We will evaluate and criticize potential using thermodynamics, material physics and engineering analysis, and 3 license hours of modern photovoltaic technologies, including single and multi-crystallinelikon, tandem cells, CdTe, CIGS, PVT, bulk heterojunctions (organic), Graetzel cells, nanostructure-based and third generation PV. Four postgraduate hours. Approved for letter and S/U note. Prerequisite: PHYS 212 and ME 330 or equivalent. ME 450 Modeling Materials Processing credit: 3 Hours. Production processes for metals and polymers; creation of process models based on momentum, heat and mass transfer; model simplification with forecasting and scaling; casting applications, microstructure evolution, polymer molding and extrusion and welding. 3 license hours. Three postgraduate hours. Prerequisites: ME 320 and ME 330. ME 451 Computer Aided Mfg Systems credit: 3 or 4 Hours. Application of computer technology and operations research to production systems. Direct numerical control of machine tools, adaptive control and optimization, and the use of micro-processers for integrated production systems. Applications of industrial robots. 3 license hours. 3 or 4 graduate hours. Prerequisite: ME 270. ME 453 Production De Data Science Quality Control credit: 3 or 4 Hours. Production quality management in the age of big data; philosophy of quality improvement; statistical modeling of process quality; quality-related inkings; statistical process control; control charts; machine learning and quality engineering applications; quality classification/estimation with machine learning; design and implementation of quality monitoring systems based on supervised learning; measurement system analysis (gage R&R operation); design of experiments. 3 or 4 license hours. 3 or 4 graduate hours. Prerequisite: ME 270; So 300 OR STAT 400; MATH 415. ME 465 Optics: Theory & Applications credit: 4 Hours. Introduction to basic concepts and waves in electromagnetic fields in the science of measurement and under-ground imaging. By using wave-based enders such as acoustic fields and waves, we focused on related applications, current events and technologies. 4 license hours. Four postgraduate hours. Prerequisite: PHYS 212, MATH 285 OR MATHEMATICS 286 OR MATHEMATICS 441. Limited to students with senior or master's degree or instructor permission. ME 470 Senior Design Project credits: 3 Hours. Solving a real design problem: the development, evaluation and recommendation of alternative solutions subject to realistic constraints such as economy, environment, sustainability, manufacturing, ethics, health and safety, society and politics. 3 license hours. No graduate loans. Department approval required. Prerequisite: Simultaneous registration for up to two required ME courses; completion of all required courses. This course is general For criteria: Advanced Composition ME 471 Sedied Elements Analysis credit: 3 or 4 Hours. Method of slurs and application to engineering problems: lattice and frame structures, heat transmission and linear elastic; use of application software; Overview of advanced topics such as structural dynamics, fluid flow, and nonlinear structural analysis. Same as AE 420 and CSE 451. 3 or 4 license hours. 3 or 4 graduate hours. No credits are issued for both ME 471 and CEE 470. Prerequisites: CS 101 and ME 371 or TAM 470. Alternatively, AE 370. ME 472 Tribology credit entry for AE students: 3 or 4 Hours. Friction, wear and lubria; engineering surfaces; surface features and surface topography; Hertzian contact and contact of rough surfaces; friction of surfaces in contact; wear and surface failures; border lubriasing; liquid properties; hydrodynamic lubriation; elastohydrodynamic lubriation; bearing selection; input micro-and nanotribology. 3 license hours. 3 or 4 graduate hours. ME 481 Whole Body Musculoskel Biomech credits: 3 or 4 Hours. Discovery of the human musculoskeletal system by emphasizing the level of the whole body or organism; modeling and analysis techniques to study human movement, such as hard body modeling techniques, advanced and reverse dynamics, and Lagrangian mechanics; examination of current topics such as orthopedic biomegics, prosthesis and orthosis, postural control and lokomotion; use of computer motion capture equipment and software to study, simulate and analyze human movement. Same as BIOE 481. 3 license hours. 3 or 4 graduate hours. Prerequisite: FULL 212 and FULL 251. ME 482 Muscle-Bald Tissue Mechanics credits: 3 or 4 Hours. Composition-structure-function relationships for musculoskeletal tissues, including bone, tendon, ligament, cartilage and muscle; hierarchical structure of textures from macro to nanoscales; the relationship of composition with the mechanical properties of health and diseased tissue; experimental methods used to obtain mechanical properties. Same as BIOE 482. 3 license hours. 3 or 4 graduate hours. Prerequisites: FULL 251. ME 483 Mechanobiology credits: 4 Hours. Integrate approach to mechanobiology; cell adysion mechanics; cytosykelet structure and mechanics; mechanotransduction; cell proliferation mechanics, apoptosis, cancer cells, and stem cells; aging; critical problems facing mechanological sciences. 4 license hours. Four postgraduate hours. Prerequisites: CHEM 102 and TAM 251. ME 487 MEMS-NEMS Theory & Fabrication credits: 4 Hours. Physical and chemical theory, design and applied manufacturing of micro and nano-electromeceneic systems (MEMS and NEMS); cleanroom production theory including general cleaning room safety, lithography, additive and subtractive, pouring and surface micromachining, deep reactive ion engraving (DRIE), lithographic Galvanoformung Abformung (LIGA), packaging, scaling, actuators and micro-nanofluids; Manufacture of two take-home devices, showing advanced manufacturing processing, such as piezoresistive sensors and micro-functioning logic chips. 4 license hours. Four postgraduate hours. Prerequisite: PHYS 212. ME 497 Independent Work credit: 1 to 3 Hours. Independent operation of advanced problems related to mechanical engineering. 1 to 3 license hours. No graduate loans. Since the topics have changed, a top of 6 hours can be repeated separately. Prerequisite: Faculty Member's Approval. Junior or Senior students. ME 498 Special Topics credit: 0-4 Hours. The topic proposals of new and developing fields of knowledge in mechanical engineering are aimed at strengthening the existing curriculum. See the Class Schedule or department course information for topics and prere conditions. 0 to 4 license hours. 0 to 4 graduate hours. If topics change to a top of 9 hours, they can be repeated in the same or separate terms. ME 501 Combustion Basics credit: 4 Hours. Fundamentals of kinetic theory, transport events, chemical equilibria and reaction kinetic; gas dynamics, including flames, their gross properties, structure and ossedicular and turbulent combustion; solid and liquid repellent combustion; one-dimensional explosion theory, including structure and initiative; three-dimensional and other complex burst waves; supersonic burning. Same as the AE 538. Prerequisite: AE 311 or ME 410. ME 503 IC Motorcycle design: 4 Hours. Design of internal combustion engines, including gas forces, inertia loads, bearing analysis, torsion vibration, balance, lubricating, valve and cam design, and voltage analysis of main engine components. Prerequisite: ME 403. ME 504 Multiphase Systems and Processes credit: 4 Hours. Dynamics and thermodynamics of multiphase and multi-component systems that have a special relevance to air pollution control and energy transformation; relaxation phenomenon; general movement of systems of different elemental masses; boundary layer movement with diffusion and mass transport in gravitational and electrical fields; distribution and collection of particulate matter; transport with surface reactions. Prerequisite: ME 404. ME 512 Physiochemical Hydrodynamic credit: 4 Hours. Molecular diffusion in liquids with constant or flowing fluids or interactions introduced basic concepts. Unloaded and charged solutions/distributions/suspensions of molecules, macromolecules and particles are accepted in closed and porous media flows. In particular, analysis is given importance using equations that manage concentration and speed areas, flow and flow constructive relationships, propulsion and transport characteristics, and Applications are offered in energy, environment, chemical and biological systems. Four postgraduate hours. No professional credit. Prerequisite: ME 420, ME 411, CEE 442, CEE 451, CHBE 421 or instructor approval. ME 520 Heat Transmission Credit: 4 Hours. Basics of heat transmission in isotropic and asynotropic materials; methods of solution to one, two and three dimensional constant and transily heat transmission problems; internal heat sources; periodic heat flow; problems involving phase change; approximate analytical techniques; numerical methods; review of current articles on the subject. Prerequisite: ME 420. ME 521 Convective Stack Transfer credit: 4 Hours. Basics of convective heat transfer; on sunk objects for the calculation of heat transfer within channels and laminar and turbulent flow; natural convection; film condensing and boiling; liquid metals. Prerequisite: ME 411. ME 523 Nanorealized Energy Transport credit: 4 Hours. An advanced treatment of various nanometer-scale transport events involving solids, liquids and gases, highlighting common characteristics in the transport of molecules, electrons, ions, photons and other semi-particles, is aimed at applied research in the fields of nanoscale heat transfer and nanoscale energy transformation. Topics include mass, momentum and species transport on surfaces and microconsciouss, linear response theory, free molecular flow in gases, electron and ion transport in crystals, Boltzmann equation and moments, ballistic and diffuse transport, thermoelectric energy transformation, interfacial transport, nanostructures energy transport and radiative transport in the immediate field. Approved for letter and S/U note. ME 530 Fatigue Analysis credit: 4 Hours. Methods of fatigue analysis for the design of structures and components: stress life, stress-life and crack spread approaches; multi-axis and high temperature fatigue; relationship between material properties, geometry and design methodology suitable for a wide range of mechanical engineering components. Prerequisite: ME 430. ME 531 Inelastic Design Methods credit: 4 Hours. Material deformation under combined mechanical and thermal loading; constituent equations and methods of engineering design and inelastic slurs methods; material and structural deterioration in fatigue and creep conditions. Prerequisites: ME 471 and ME 430. ME 532 Refringing Design credit: 4 Hours. Application of fracture mechanics and microstructure behavior to the selection of materials for design; practical approach to linear and non-inelastic fracture parameters for the evaluation of complex components; destructive and harmless tests for the control of the toxin in production; residue life assessment fracture (creep, fatigue, stress, corrosion); case studies; design project. Prerequisite: Physical Base for ME 430. ME 533 Plasticity credit: 4 Hours. Physical and mathematical basis for plasticity in crystal materials, with application to deformation processes. Metal forming; deformation processes in geological materials and other materials such as slippage in polymers; dependence on the ratio of plastic current with underlying physical mechanisms; disitension movement kinetic, work hardening mechanisms and crystallographic tissue; theoretical framework and allied calculation procedures to model the constituent response of materials linked to the ratio of undergoing crystallographic shift. Prerequisite: TAM 445. ME 541 Control of Machine Systems credit: 4 Hours. Modeling processing processes and machine tools. Mechanistic modeling of processing processes, tool-tool failures, characterization of processed surfaces, machine-tool system dynamics and stability, and issues in motion control. Four postgraduate hours. No professional credit. Prerequisite: ME 340 and ME 270. ME 550 Solidification Processing credit: 4 Hours. Control principles of structure, feature and shape in processes involving liquid-solid transformations; stresses, heat flow, mass transport, soluble redistribuation and nucleation and growth kinetic; the relationship between process variables and their structures and properties in the resulting material; examples are taken from existing commercial and emerging processes. Prerequisite: ME 450. ME 561 Control Credit OuterBuvek Methods: 4 Hours. Use of convex optimization in the analysis and control of dynamic systems; robust control methods and the use of semi-precise programming; linear matrix inequalities, operator theory, model reduction, H-2 and H-infinity optimal control, S-procedure and integral quatic constraints, structured singular value and mu-synthesis and Markovian jumping systems; applications in control design. Prerequisite: ECE 515. ME 562 Robust Adaptive Control credit: 4 Hours. Mathematical basis for synthesis and analysis of adaptive control systems: Lyapunov stability theory; direct and indirect model reference adaptive control methods; final methods such as L1 adaptive control, which provides adaptive control with the desired transiding and fixed stage performance characteristics. Prerequisites: ECE 486, ECE 515, ECE 528, GE 424, ME 460. ME 586 MEMS credit mechanics: 4 Hours. Mechanics and dynamics of microelectromechanical systems (MEMS); scaling laws in electrostatics, magnetics and fluids; analytical models for thin film growth and engraving; the effect of small surface tension in relations with the stability of MEMS during web manufacturing; Dimension effects on the mechanical properties of MEMS materials; Motion equations for MEMS, containing elastic and electrical fields that lead to nonlinear dynamic behaviors; Mathieu behavior and chaotic systems. Prerequisite: ME 485. ME 590 Seminar credit: 1 Hour. Presentation and discussion of important developments in mechanical engineering. Approved for S/U rating only. Repeatable. ME 597 Independent Work credit: 1 to 4 Hours. Independent operation of advanced problems related to mechanical engineering. If topics range up to a top of 12 hours, they can be repeated in the same period or at separate intervals. Prerequisite: Instructor's approval. ME 598 Special Topics credit: 1 to 4 Hours. The topic proposals of new and developing fields of knowledge in mechanical engineering are aimed at strengthening the existing curriculum. See the Class Schedule or department course information for topics and prere conditions. If subjects are variable, they can be repeated in the same or separate terms. Change.

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