

TECH: Technology

Courses

TECH 1008. Basic Manufacturing Processes — 3 hrs.

Materials and properties, fundamentals of metal casting, plastics processing, metal forming, welding, assembly processes, powder metallurgy, and ceramic processing. Lecture and lab. (Fall)

TECH 1010. Fundamentals of Metal Removal — 3 hrs.

Theory of metal machining, cutting-tool technology, turning and related operations, drilling and related operations, milling, grinding and other abrasive processes, other machine tools, nontraditional machining and thermal cutting processes, metrology introduction to CNC machines-advantages applications of CNC machines, CNC parts programming for milling and turning operations along with computer simulation, CNC machine tool controller simulation, and lab activities. Introduction to sustainable machining processes. Lecture Lab. (Spring)

TECH 1011. Software for Graphic Techniques — 3 hrs.

Provides lab-based experiences for learning software skills utilizing the industry standard for graphic communications. Addresses fundamentals of the Adobe Creative Suite for print and multimedia. Provides a foundation for required courses in Graphic Technology. (Fall)

TECH 1024. Engineering Design with CAD — 3 hrs.

Fundamentals of the product design process; 3D modeling, Sketching, development of engineering drawings, geometric constructions, dimensioning, sketching, multi-view projections, section views, threaded fasteners, assembly modeling. (Fall and Spring)

TECH 1037. Introduction to Circuits — 3 hrs.

Introduction to AC circuits, in-depth DC circuits; current and voltage laws, circuit analysis including series and parallel circuits, inductance, capacitance, introductory magnetism; power calculations and electrical measurements, circuit simulation, troubleshooting techniques. (Fall)

TECH 1039. Circuits and Systems — 3 hrs.

AC circuits including j operators, phasors, transformers, reactance, capacitance, impedance, AC resonance, frequency response, passive filters, network theorems and circuit simulation. Lecture and lab. Prerequisite(s): TECH 1037. Prerequisite(s) or corequisite(s): MATH 1140. Automation Engineering Technology majors will be waived from MATH 1140. (Spring)

TECH 1055. Graphic Communications Foundations — 3 hrs.

Concepts and processes used by the communications industry to place images on surfaces including conventional offset, laser techniques, inkjet technology, screen printing and specialized contemporary technologies are presented. Topics include imaging history, finishing techniques and the opportunity to experience actual print projects within a graphics lab. Includes both lecture and lab. (Fall)

TECH 2024. Technical Drawing with GD&T — 3 hrs.

Engineering design process, geometric dimensioning and tolerancing pertaining to ANSI Y14.5M, fasteners, gears, cams, assembly modeling, coordinate measuring, and rapid prototyping. Prerequisite(s): TECH 1024. (Spring)

TECH 2036. Power Technology — 3 hrs.

Introduction to energy and mechanical power systems. Lecture and lab cover traditional and emerging electrical power technologies such as renewable energy applications. (Variable)

TECH 2051. Analog Electronics — 4 hrs.

Understanding and applications for analog electronic systems including: Semiconductor materials, P-N junction, characteristics of electronic devices: junction diodes, photodiodes, LED, Zener diodes, and their applications, BJT and FET transistors, small-signal amplifiers, oscillators, electronic circuit simulation and troubleshooting. Including amplifier and oscillator circuits using discrete electronic devices, principle of feedback, ICs - SSI, MSI and LSI, operational amplifiers, electronic circuits using OP-AMPs, measurement and simulation techniques, regulated power supplies, industrial applications of ICs, troubleshooting techniques. Lecture and lab. Prerequisite(s): TECH 1037; TECH 1039. Prerequisite(s) or corequisite(s): MATH 1140 or MATH 1150 or MATH 1420. (Fall)

TECH 2053. Digital Electronics — 4 hrs.

Understanding and utilization of Digital Electronic Systems. Number systems and codes, digital arithmetic, Boolean algebra, elementary logic gates, combinational logic circuits, sequential logic circuits, logic circuit design and industrial applications, simulation and troubleshooting. Including: arithmetic circuits, sequential logic circuit analysis and synthesis, counters and registers, shift registers, memory devices, digital and analog interfaces, ADC, DAC, and Multiplexing. Lecture and Lab. Prerequisite(s): TECH 1037; TECH 1039. Prerequisite(s) or corequisite(s): MATH 1140 or MATH 1150 or MATH 1420. (Spring)

TECH 2055. Electrical Power Systems & Machinery — 4 hrs.

Single and polyphase circuits, DC machines, AC single and polyphase synchronous and induction machines, power transformers, introduction to conventional- and renewable-based power systems. Analysis, modeling, simulation, and operation of electrical utility, commercial, and industrial power systems. Voltage-drop calculations, voltage regulation, system protection, faults, and harmonics. Power quality in industrial power systems. Lecture and Lab. Prerequisite(s): TECH 1037; TECH 1039. Prerequisite(s) or corequisite(s): MATH 1140 or MATH 1150 or MATH 1420. (Fall)

TECH 2065. Industrial Robotics — 3 hrs.

Introduction to robots in a manufacturing setting; Robot safety; Calibration of robots; tool definition; tool center point; work coordinate system; Robot programming; structured programming-routines and logic; material handling operations; and Robot simulation software. Lecture and Lab. Prerequisite(s) or corequisite(s): for Technology and Engineering Education majors: sophomore standing or consent of instructor. For all other majors: CS 1510 or CS 1160; sophomore standing. (Fall)

TECH 2070. Digital Pre-Media — 3 hrs.

Using industry standard applications and technology, this course introduces students to the essentials of preparing a file for different mediums including print, web, and electronic media. An in-depth look into electronic file development, digital prepress techniques, variable data implementation, interactive pdf creation, color management and epubublishing. Prerequisite(s): TECH 1055. (Spring)

TECH 2072. Engineering Materials — 3 hrs.

Introductory course of principles and properties of materials, including metals, composites, ceramics, glass, and polymers. Lecture and lab. Prerequisite(s): completion of UNIFI Written Communication requirement; CHEM 1020 or CHEM 1110; MATH 1420 or

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MATH 1150; PHYSICS 1511 or PHYSICS 1701; sophomore standing. (Spring)

TECH 2114. Making Cool Stuff — 3 hrs.

Application of production concepts and practices within a product development, fabrication and assembly environment. Activities relate to the development of a custom team created product that will be marketed in collaboration with the entities across campus. (Variable)

TECH 2119. Computer Applications in Technology — 3 hrs.

Study of major technology-oriented programming software including spreadsheet applications, technical report writing, database management, and presentation graphics. Applications are introduced as solutions to specific technology problems through programming exercises. (Spring)

TECH 2405. Introduction to Packaging; 3D Design and Package Prototyping — 3 hrs.

Introduces the consumer packaging industries' materials, processes, and technologies. Provides hands-on learning through the creation of 3D designs and the development of a package prototype using the AETM laboratories. (Fall)

TECH 3024/5024. Solid Modeling and Additive Manufacturing for Design — 3 hrs.

Design and development of 3D solid models, part assemblies, generation of detailed drawings, and kinematic analysis of assembly models using a parametric solid modeling software. Concepts of design for additive manufacturing (AM) introduced at the solid modeling stage for subsequent use in group projects. Students work in collaborative group projects for developing a product (parts and assembly), preparing for AM (3D printing/prototyping the product). Lecture and lab. Prerequisite(s): TECH 1024; TECH 2024; junior standing. (Fall)

TECH 3100/5100. Engineering Cost Analysis — 3 hrs.

Principles of economic factors in engineering project evaluation, planning and implementation. Engineering decision analysis, money-time relationships, measures of investment, break-even method, cost-benefit ratio, risk management. Engineering projects analyzed/justified. Prerequisite(s): junior standing. (Variable)

TECH 3102. Living in Our Techno-Social World — 3 hrs.

Exploration of the complex relationships between technology and society. Students discover how social systems affect the nature and use of technology and how the nature and use of technology affect social systems. Prerequisite(s): junior standing. (Same as CAP 3102) (Spring)

TECH 3113. Manufacturing Tooling — 3 hrs.

Principles of cutting tools, jigs, fixtures, progressive dies, and gaging; tool geometry, tool life, cost analysis, ergonomics, and safety in tooling design applications. Lecture and lab. Prerequisite(s): TECH 1008; TECH 1010; TECH 1024; MATH 1150 or MATH 1420; CHEM 1020 or CHEM 1110; PHYSICS 1511 or PHYSICS 1701; junior standing. (Spring)

TECH 3127. Applied Thermodynamics — 3 hrs.

Application of fluid flow and heat transfer concepts including conduction, convection, radiation, Bernoulli's principles, and turbulent flow. Thermodynamic principles are reviewed and applied to heat power cycle systems. Thermal and fluid computational dynamics are covered and applied to physical simulation models. Prerequisite(s): TECH 1024; MATH 1150 or MATH 1420; CHEM 1020 or CHEM 1110; PHYSICS 1511 or PHYSICS 1701; junior standing or consent of instructor. (Spring)

TECH 3129. Linear Control Systems — 3 hrs.

Learning open and closed loop control theory, applications to analogies for modeling and design procedures. Introducing sensors, actuators, PID control, analog controllers, and elementary concepts of dynamic performance and stability. Lecture and lab. Prerequisite(s): TECH 2051; PHYSICS 1511 or PHYSICS 1701; junior standing. (Fall)

TECH 3131/5131. Technical Project Management — 3 hrs.

Project management concepts, needs identification, composition and role of project teams, project communication, related project management techniques, practical implementation, and project management software. Prerequisite(s): junior standing. (Fall and Spring)

TECH 3132/5132. Metallurgy and Phase Transformation — 3 hrs.

Advanced principles of metallurgy, properties, microstructural analysis, and heat treatment of metals and alloys used in manufacturing. Transformation kinetics are included. Lecture and lab. Prerequisite(s): CHEM 1020 or CHEM 1110; PHYSICS 1511 or PHYSICS 1701; or consent of instructor; junior standing. (Variable)

TECH 3135/5135. Product Design — 3 hrs.

Applied manufacturing design process: design teams define, plan and document design project. Concept generation and evaluation, engineering and product performance specifications, costing, production process, and product support. Prerequisite(s): TECH 2024; junior standing. (Spring)

TECH 3136. Principles of Metal Casting — 3 hrs.

Intermediate course in melting practices and molding processes in metal casting. Melting practice topics for ferrous and non-ferrous metals include charge selection, process control techniques for premium quality liquid metal production, and microstructural evaluation correlated to mechanical properties. Molding process topics include expendable processes with a concentration on sand processes and investment casting; permanent mold process with a concentration die-type processes; and process control techniques for mold property characterization. Lecture and lab. Prerequisite(s): TECH 2072. (Fall)

TECH 3142. Statistical Quality Control — 3 hrs.

Application of quality control tools/techniques to manufacturing and service environments using statistics, sampling techniques, probability, and control charts. Utilization of quality control concepts and strategies such as Lean and Six Sigma. Calculations and interpretations of process controls and process capabilities for continuous improvement. Prerequisite(s): MATH 1140 or MATH 1150 or MATH 1420 or STAT 1772; junior standing or consent of instructor. (Fall and Spring)

TECH 3143. Managing Operations and Manufacturing Systems — 3 hrs.

Operations management (OM) principals for production of both goods and services through the basic functions of the management process, consisting of planning, organizing and controlling in order to make strategic decisions with the goal of improving operational efficiency. Topics include: forecasting, project management, process and location strategies, plant layout, staffing and balancing, inventory control, material requirements planning and short-term scheduling. Prerequisite(s): MATH 1140 or MATH 1150 or MATH 1420 or STAT 1772; junior standing or consent of instructor. (Fall and Spring)

TECH 3147. Computer Aided Manufacturing — 3 hrs.

Advanced programming for CNC machines, machining parameters, machining centers, turning centers, CAM application programs to create part geometry, tool paths, machining parameters, surface

modeling, multi axis machining, and post process NC code. Lecture and computer simulation lab and hands-on lab practice. Prerequisite(s): TECH 1010; TECH 1024; junior standing or consent of instructor. (Odd Springs)

TECH 3148. Machine Design — 3 hrs.

Principles of design for machine elements, failure analysis, static and dynamic loads. Machine elements include power transmission elements such as fasteners, gears, belts, chains, shafts, keys, couplings, clutches, brakes, springs, bearings. Prerequisite(s): ENGR 2080; ENGR 2180; MATH 1150 or MATH 1420; PHYSICS 1511 or PHYSICS 1701; junior standing or consent of instructor. (Fall)

TECH 3150/5150. Graphic Communications Imaging — 3 hrs.

Explorations of conventional graphic arts imaging technologies and processes including screen printing processes, dye sublimation, and other conventional imaging technologies. Emphasis on technical information and hands-on experiences. Prerequisite(s): TECH 2070; junior standing. (Spring)

TECH 3157/5157. Microcontroller Applications — 3 hrs.

Microcontroller technology applied to real-time industrial problems; survey of industrial computer hardware, networking, and software. Lecture and lab. Prerequisite(s): TECH 2051; TECH 2053; CS 1160 or consent of instructor; junior standing. (Fall)

TECH 3160/5160. Computer-Aided Instrumentation and Interfacing — 3 hrs.

Computer-aided instrumentation and interfacing; real-time industrial data acquisition hardware and software; sensors, signal conditioning; design and debugging of data acquisition systems using software tools. Lecture and lab. Prerequisite(s): TECH 1037; TECH 1039; TECH 2053; MATH 1140 or MATH 1150 or MATH 1420; junior standing. (Spring)

TECH 3164. Programmable Logic Controllers (PLCs) — 3 hrs.

Introduction to PLCs, Basic Modes of Operation Ladder Logic Diagrams, industrial applications, sequencers, bit-wise operations, arithmetic operations, and conditional branching. Lab activities and projects. Prerequisite(s): TECH 1039; sophomore standing. (Spring)

TECH 3169. Digital Imaging — 3 hrs.

Photography fundamentals for digital imaging. Emphasis on developing calibration, creating profiles for digital cameras, imaging technologies, and output devices. Lecture and hands-on capturing and manipulating digital images for cross applications and content management. Prerequisite(s): TECH 2070. (Fall)

TECH 3177. Advanced Manufacturing Processes — 3 hrs.

Engineering analysis of different shaping processes; Non-traditional machining processes, Additive manufacturing, semiconductor manufacturing, IC fabrication and packaging, microfabrication and nanofabrication technologies; Principles and concepts of green/sustainable manufacturing concepts; Fundamentals of production lines for material handling and assembly, application of robotics for manufacturing, introduction to smart manufacturing (Industry 4.0). Prerequisite(s): PHYSICS 1511 or PHYSICS 1701; MATH 1150 or MATH 1420; TECH 1008; TECH 1010; TECH 1024; TECH 2065; junior standing. (Odd Falls)

TECH 3180. Lean and Sustainable Operations — 3 hrs.

Introduction to lean systems and concepts - basic philosophy of reducing waste in areas of production, processing, inventory, transportation, waiting time and scrap generation - to reduce cost and production time and to improve quality and sustainability in the design, production and operations of goods and services.

Prerequisite(s): MATH 1150 or MATH 1420 or STAT 1772; junior standing or consent of instructor. (Spring)

TECH 3182/5182. Coordination of Techniques in Career and Technical Programs — 2 hrs.

Planning, organization, development, and teaching of cooperative or multi-occupational programs in career and technical education. Prerequisite(s): junior standing. (Variable)

TECH 3183. Fundamentals of Manufacturing Engineering — 3 hrs.

Application of technical knowledge to solve industrial problems within the functional area of manufacturing engineering. Preparation for examination through the manufacturing Engineering Certification Institute. Prerequisite(s): junior standing or consent of instructor. (Variable)

TECH 3192/5192. Non-Destructive Evaluation of Materials/ Scanning Electron Microscopy — 3 hrs.

Non-destructive evaluation of materials using such techniques as x-ray, gamma ray, liquid penetrant tests, magnetic particle, eddy currents, SEM, etc. Prerequisite(s): TECH 2072 or TECH 3132/5132; junior standing. (Variable)

TECH 3196. Industrial Safety — 3 hrs.

Examination of the directives mandated for General Industry (29 CFR Part 1910) of the Occupational Safety and Health Administration (OSHA). Emphasis on developing and implementing a comprehensive safety and health program. Introductory discussions on understanding environmental regulations are presented. Prerequisite(s): sophomore standing. (Fall and Spring)

TECH 3405. Packaging Design, Structure, and Production — 3 hrs.

Focuses on the consumer packaging industry workflow including the packaging design, structure, proofing, and production. Utilizes online lectures and project-based learning to provide a hands-on classroom and AETM lab experience. Prerequisite(s): TECH 1055; TECH 2405. (Spring)

TECH 4000/5000. Wind Energy Engineering — 3 hrs.

Fundamentals and history of wind power. Operation, control, applications, types of wind turbines. Stand alone, grid connectivity, transmission, economic and management issues regarding the adoption of wind as an energy source. Technical, political and economic implications. Prerequisite(s): junior standing. (Variable)

TECH 4093/5093. Graphic Communications Estimating and Management I — 3 hrs.

Study of traditional and modern project management workflow principles in the traditional print publishing industry and web-to-print publishing. This course also studies the development of marketing strategies for variable data printing and ancillary services. Prerequisite(s): TECH 1055; TECH 2119; junior standing. (Even Falls)

TECH 4103/5103. Electronic Communications — 3 hrs.

Basic communication concepts including propagation, modulation, demodulation, receivers, transmitters, antennas, transmission lines, digital coding, pulse modulation and other digital/data communication techniques. Introduction to fiber-optic and satellite communications. Lecture and lab. Prerequisite(s): TECH 2051; TECH 2053; MATH 1150 or MATH 1420; junior standing. (Fall)

TECH 4104/5104. Applied Digital Signal Processing — 3 hrs.

Introduction to discrete-time signals and systems, digital sampling theory, discrete Fourier transform, Z transform, and FIR/IIR

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filter design. Projects and labs based on MATLAB and DSP development kit (TMS320C5510) will be performed. Lecture and lab. Prerequisite(s): TECH 2053 or CS 1410; CS 1160 or CS 1130; junior standing. (Spring)

TECH 4110/5110. Manufacturing Process Planning — 3 hrs.

This course deals with the best practices used in industry to design and manufacture successful products. Product cycle in manufacturing, product quality, part design for producibility, part design analysis, tolerance stacking, process design and development, operation selection, manufacturing process selection, tooling selection, tolerance charting, process parameter selection, cost estimation, economics of process planning. Prerequisite(s): CHEM 1020 or CHEM 1110 ; PHYSICS 1511 or PHYSICS 1701; MATH 1150 or MATH 1420; TECH 1008; TECH 1010; TECH 2024; TECH 2065; TECH 2072; ENGLISH 3772/5772 (undergraduates) or ENGLISH 5772 (graduates); junior standing. (Fall)

TECH 4137. Tooling Practices in Metal Casting — 3 hrs.

Advanced course in the principles of foundry tooling design including selection of pattern materials, rapid prototype development techniques, gating and riser design, and basic core box production techniques. Prerequisite(s): TECH 2072; MATH 1150 or MATH 1420; CHEM 1020 or CHEM 1110; PHYSICS 1511 or PHYSICS 1701; junior standing or consent of instructor. (Spring)

TECH 4155/5155. Finite Element Analysis — 3 hrs.

Fundamental concepts of the finite element method for linear stress and deformation analysis of mechanical components. Development of truss, beam, frame, plane stress, and plane strain elements. Practical modeling techniques and use of general-purpose codes for solving practical stress analysis problems. Prerequisite(s): MATH 1150 or MATH 1420; PHYSICS 1511 or PHYSICS 1701; junior standing. (Variable)

TECH 4161. Digital Graphic Communications — 3 hrs.

Emphasis on contemporary and future issues in the graphic communications industry. Study of the creation and conversion of graphics for cross-media applications for print and the Internet. Creative problem solving and portfolio development. Prerequisite(s): TECH 2070; junior standing. (Odd Springs)

TECH 4162. Hydraulics & Pneumatics — 3 hrs.

Introduction to fluid power, safety precautions, Bernoulli's equation, basic application of hydraulics and pneumatics towards industrial automation. It includes hydraulic pumps, cylinders, valves, motors, fluid logic control and electrical devices used in fluid control. Pneumatic circuits and applications. Applications in automation. Prerequisite(s): MATH 1150 or MATH 1420; PHYSICS 1511 or PHYSICS 1701. (Fall)

TECH 4165/5165. Wireless Communication Networks — 3 hrs.

Topics include wireless transmission fundamentals, protocols and TCP/IP suites, cellular wireless networks, Mobile IP, wireless LAN technologies, IEEE 802.11 and IEEE 802.15 standards, and security issues in wireless networks. Lecture and lab. Prerequisite(s): junior standing. Prerequisite(s) or corequisite(s): TECH 4103/5103 or CS 2470. (Spring)

TECH 4167/5167. Power Electronics Applications — 3 hrs.

Theory and industrial applications of solid-state electronic devices for control and conversion of electrical power. Fundamentals of power computations. Analysis/design of power converter circuits and components: single and 3-phase rectifiers, DC-DC, AC/AC converters, and inverters. Prerequisite(s): TECH 2051; junior standing. Prerequisite(s) or corequisite(s): TECH 2055. (Spring)

TECH 4184. Digital Imaging II — 3 hrs.

Students will explore digital imaging formats in a lab-based, hands-on environment. Topics include color calibration and printing large format images, as well as workflow and production issues, color pre-press and digital formats appropriate to multiple media. Prerequisite(s): TECH 3169; junior standing. (Even Springs)

TECH 4187. Applied Industrial Supervision and Management — 3 hrs.

Application of day-to-day planning, organizing, staffing, leading, and controlling of people, goods and services. Topics include problem solving, leadership, teamwork, coaching and communication, training, safety, ethics, equal opportunity employment, stakeholder engagement, and best practices of supervision and management. Prerequisite(s): junior standing. (Fall and Spring)

TECH 4198. Independent Study.

(Variable)

TECH 4225/5225. Integrated Logistics — 3 hrs.

Analysis, design, and issues integrating logistics and supply operations for industrial operations. Includes sourcing decisions, supply systems practices, pricing and revenue management, and quality considerations. Prerequisite(s): junior standing. (Variable)

TECH 6230. Special Topics in Applied Engineering — 3 hrs.

Comprehensive investigation in applied engineering or technical management that addresses an approved current or historical topic. (Problems in applied engineering other than those for theses or in regular curricular offerings.) Culminates with a written document and presentation. May be repeated for up to six credits. Prerequisite(s): Admitted to the MS Technology Program or consent of instructor. (Variable)

TECH 6231. Thermodynamics of Material Processing — 3 hrs.

Application of thermodynamic principles and energy changes associated with processing of metals, ceramics and polymers. Concepts such as mass and energy balances, fundamental laws of thermodynamics, Gibb's free energy, and activity of binary liquid and solid solutions. Prerequisite(s): Admitted to the MS Technology Program/Metal Casting Emphasis OR Instructor Consent. (Variable)

TECH 6235. Material Transformations and Modeling — 3 hrs.

Material transformation topics such as solidification science, micro- and macro- segregation principles, fluid flow of Newtonian and non-Newtonian liquids, and advanced solid state transformations are covered and directly correlated to material modeling techniques. Prerequisite(s): Admitted to the MS Technology Program/Metal Casting Emphasis OR Instructor Consent. (Variable)

TECH 6239. Foundry Management — 3 hrs.

The graduate level course integrates concepts of foundry operations management to understand how casting design, material and energy cost analysis, process operations, and scheduling is critical in determining product costs. Using a complete departmental approach in analyzing foundry operations, each area of the casting process is analyzed to determine their management functionality, operations, and their associated cost to the final casting price. The course is designed to be a project based course, starting with a casting design and developing the initial tooling associated with the design. As part of the final cost analysis, student teams have to identify all functions and operations of each departmental areas such as raw materials for the casting process, inspection equipment, and environmental/safety regulations. Prerequisite(s): Admitted to the MS Technology Program/Metal Casting Emphasis OR Instructor Consent. (Variable)

TECH 6242. Complex Digital System Design — 3 hrs.

Complex digital systems design at the logic gate level. Basic structure, sub programs, packages and libraries of VHDL; combinational/ sequential logic design with VHDL; VHDL simulation and synthesis, FPGA implementation. Projects and labs using Xilinx Spartan-3 FPGA development kit. Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Odd Springs)

TECH 6244. Applied Embedded Systems — 3 hrs.

Design and implementation of microcontroller-based embedded computing systems to solve real-world problems. Methodologies, hardware platforms, software design and analysis, embedded OS, real-time scheduling, mixed signal processing, hardware accelerators, low power optimization. Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Even Falls)

TECH 6250. Technology of Productivity Improvement — 3 hrs.

Exploration of productivity as an operational concept; analysis of productivity in industrial settings to seek improvement through technical and managerial expertise. Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Variable)

TECH 6258. Total Quality Management — 3 hrs.

Managerial, technological, behavioral, and statistical concepts applied to total quality management. Quality management philosophies, continuous improvement, productivity, and issues affecting quality that apply to manufacturing, service, and technological organizations. Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Odd Springs)

TECH 6275. Advanced Lean and Sustainable Operations — 3 hrs.

Skills and techniques in Lean principles applied to manufacturing and service industries: Lean enterprises, process development, supply networks, JIT tools - SMED, Kaisen, 5S, Poka-yoke, value stream mapping, time studies, motion studies, ergonomics, sustainability, sustainable operations, and carbon footprint calculations. Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Odd Falls)

TECH 6282. Technology Seminar — 1 hr.

Selected advanced topics in technology and engineering technology as needed. May be repeated for a maximum of 3 hours. (Variable)

TECH 6288. Master Internship/Project — 3 hrs.

Masters' students may choose to do an internship or a research project, but not both. An internship is a supervised practicum in an industrial organization, public service agency, or education setting. A research project is a major industrial assignment ending with a measured deliverable with a substantial written report required. Approval by department graduate advisor is required for registration. Students should not take this course during their first semester. Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Variable)

TECH 6292. Research Methods in Applied Engineering — 3 hrs.

Introduction to research and scholarly investigation. Critical Analysis of Research, Research Problem Purpose, Characteristics of Good Research Questions, Hypothesis Variables, The Value of a Literature Review, Purpose, Need, Validity, Reliability, Quantitative Research Methodologies, Experimental Research, Correlational Research, Causal - Comparative Research, Samples, Survey research, Qualitative Research methodologies, Historical, Ethnographic Research, Individual exploration of possible thesis topics, Research proposal, Presentation methods. Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Spring)

TECH 6295. Advanced Management and Supervision Technology — 3 hrs.

Development of knowledge, skills, and advanced application experiences of management technologies utilized in industrial supervision and management. Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Even Falls)

TECH 6299. Research (Master's Thesis).

Prerequisite(s): Admitted to the MS Technology Program OR Instructor Consent. (Fall and Spring)

TECH 6300. Advanced Technical Project Management for Engineering and Technology — 3 hrs.

Technical project management and system management ensure technical progress toward objectives, proper deployment and conversation about human and financial resources, and achievement of cost and schedule targets. The course focuses on technical, industrial systems development, scheduling technical project planning and control; structuring performance measures and metrics; technical teams and technical project management. Prerequisite(s): TECH 3131/5131 or background knowledge in PM BOK and consent of instructor. (Odd Springs)

TECH 6400. Introduction to Applied Systems Development & Management — 3 hrs.

This course presents the foundations of operational analysis, systems engineering architecture, systems engineering, and project management, in at integrated format. Through a synchronized combination of in-class lectures, industrial guest speakers, and individual and team assignments, this course provides an overall perspective for corporate decision making using a systems of systems approach. Prerequisite(s): consent of department. (Fall)

TECH 6420. Systems Architecture & Management — 3 hrs.

Systems Engineering Architecture combines the structure of all engineering systems, elements and the tactical insights of operational planning to deliver a specific capability, element or product. This course takes an analytical and data-driven approach to decompose and analyze the constituent parts of a mission in order to identify measurable trade-offs and draw conclusions. Prerequisite(s): TECH 6400. (Fall)

TECH 6440. Systems Engineering & Management — 3 hrs.

As systems/products/processes grow increasingly complex to meet the demands of the contemporary global market, companies are challenged to consistently deliver high-quality products under tighter and tighter budgets and schedules. This Systems Development course provides a multidisciplinary set of tools and techniques for understanding, organizing, and managing the complexity of product development throughout the product life cycle. This course brings together current industry best practices to ensure robust, cost-effective approaches that meet stringent functional, performance, and cost requirements. Prerequisite(s): TECH 6400. (Spring)

TECH 6460. Systems Life Cycle Management & Applications — 3 hrs.

This course provides a comprehensive overview of the applied solution design and management system acquisition life-cycle management, technical and business processes. The course also presents the program management integration process that ties them all together. The course goal is to immerse the students in applied system design management, acquaint them with the specialized terminology, familiarize them with the roles of the primary life cycle stakeholders and demonstrate how it all fits together. Prerequisite(s): TECH 6400. (Spring)

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TECH 6500. Applied Systems Development & Management

Capstone — 6 hrs.

The capstone teach project will incorporate all aspects of the Applied Systems Engineering Management program. As the student progresses through the sequence of courses, each will be applied to the identified capstone project to build toward completion. Prerequisite(s): consent of instructor. Corequisite(s): TECH 6400. (Summer)