

# Industrial Technology

## LOWER DIVISION

**IT 104. Beginning Wood** (3). Create, plan, design, and implement ideas with wood. Aesthetic/subjective appeal; incorporating wood in design; technical constraints; personal interests; cultural impact. [Weekly: 2 hrs lect, 3 hrs lab. GE.]

**IT 110. Contemporary Trends in Technology** (3). Contemporary technology contexts & competency skill sets. Basic concepts of industrial technology and primary areas of technological application. Careers and employability skills. Visits to local industry.

**IT 111. Special Interest Topics** (1-2). Technology-related topic of interest to general student population. [CR/NC. May not apply toward IT major. Lect/activ as appropriate. Rep with different topic.]

**IT 111A. Special Interest Topic Activity** (2). Basic machine tool lab is a project-based lab where students can work on their own projects after learning the safety and proper use of machinery used to cast, form, cut, weld, and shape metals. Students will have to furnish all of their own material for their projects. [CR/NC.]

**IT 140. Technical Drawing & Computer-Aided Design** (3). Theoretical principles and methods for industrial graphics. Functional skill development in Computer-Aided Design (CAD). [Weekly: 2 hrs lect, 3 hrs lab.]

**IT 151. Electricity & Electronics** (3). Sources of electricity in DC and AC circuits with components, applications, and analysis. Emphasis on measurement and understanding residential, industrial, and maintenance. [Weekly: 2 hrs lect, 3 hrs lab.]

**IT 220. Technical Woodworking** (3). Technical aspects of industrial woodworking facilities, equipment, tools, and processes. Design standards, sizes, maintenance requirements, safe and efficient setup, operation, and care of tools and machines. [Prereq: IT 104 (C).]

**IT 222. Technological Systems** (3). Strategies for management of technology and innovation. Nature of technological systems and transformation models. Application of technology development to manufacturing, construction, operations, and supply chains.

**IT 225. Construction Systems** (3). An overview of construction trends, methods, materials, practices, and building codes. Integration of construction systems, selection criteria, energy efficiency, and seismic safety.

**IT 230. Basic Machine Tool** (3). Applied technical skills in metal shaping and chip removal using lathe and milling tool equipment. Tool set-ups, machine operations, sequencing, tool geometry, and precision measurement. [Weekly: 2 hrs lect, 3 hrs lab.]

**IT 232 / JMC 232. Technical Writing** (3). Basic principles of technical writing using traditional and web-based approaches. Convey complex information using precise language and correct format for technical reporting, user manuals, instruction, memorandums, and scientific articles. [Prereq: ENGL 100.]

**IT 250. Industrial Health & Safety** (3). Providing safe/healthful working conditions; safe practices by employees; management leadership. Accident anticipation/prevention; industrial hygiene; compliance codes, regulations, and standards.

**IT 251. Industrial Control Electronics** (3). Signal conditioning electronics for controlling motors, servos, industrial processes and mobile applications. Introduction to feedback systems and data acquisition. [Prereq: IT 151 (may not be concurrent) and MATH 115 (C). Weekly: 2 hrs lect, 3 hrs lab.]

**IT 265. Construction Management Methods** (3). Methods, techniques, and equipment for all facets of a construction project or task, including pre-planning techniques, management methods, and construction processes from excavation to final finishing. [Prereq: IT 225 (C).]

**IT 290. Mechatronics & Robotics** (3). Mechanical and electrical applications of industrial power, robotics, and production systems. Fabrication and test of electromechanical systems. [Prereq: IT 251 (C) and PHYX 106.]

## UPPER DIVISION

**IT 308. Socio-Technological Thinking Processes** (3). Critical assessment of technical problems in social and environmental contexts through practice of scientific analysis, visual description, and collaboration. Analyses, technical writing, and public presentations on current community issues. [Prereq: Completion of lower division GE Area B.]

**IT 311. Industrial Materials & Processes** (3). Physical, mechanical, and chemical properties of metals, woods, polymers, ceramics, synthetics, and composites. Contemporary methods of industrial materials processing. [Prereq: CHEM 107.]

**IT 335. Construction Law** (3). Legal aspects of construction contracts and specifications; contract formation, interpretation, rights and duties, and changes; legal liabilities and professional ethics of architects, engineers, and contractors. [Prereq: IT 225 (C).]

**IT 340. Architectural Design** (3). Architectural design and planning. Sustainable and green building design concepts. Design methodology, graphical representation, constraints, and problems associated with commercial and residential design. [Prereq: IT 140 (C) and IT 225. Weekly: 1.5 hrs lect, 4.5 hrs lab.]

**IT 345. Advanced Computer-Aided Design** (3). Principles and applications of interactive computer graphics using 2-dimensional and 3-dimensional modeling programs. [Prereq: IT 140. Weekly: 1 hr lect, 6 hrs lab.]

**IT 349. Principles of Industrial Design** (3). Application of product development design methods and principles to industrial products. Application of design analysis techniques, tools, design reviews, and problem-solving protocols. [Prereq: IT 140.]

**IT 371. Power & Energy** (3). Principles of power production and energy. A critical examination of historical and contemporary development of energy and power; operating fundamentals, and power devices. [Weekly: 2 hrs lect, 3 hrs lab.]

**IT 374. Operations Management** (3). Fundamentals of operations management practice. Systematic design, and control of internal production and external supply chain processes. Methods and techniques for analysis, forecasting, inventory control, scheduling, and facilities planning.

**IT 389. Industry Practicum** (3). Application of technological and managerial techniques in field-based settings. Problem definition, problem-solving protocols, formulation of business solutions, and recommendations using technical professional formats. [Prereq: IT 311 (C), IT 250 (C), IT 232 (C) or JMC 232 (C).]

**IT 391. Design Ergonomics** (3). Introduction to basic human factors and biometrics for the design of practical tools, artifacts, and the workplace. Design considerations including aesthetics, ease of use, and injury prevention. [Prereq: IT 250 with passing grade of C- (C).]

**IT 399. Institute Seminar** (1). Problems considered by Institute for Industrial Technology. Managerial and technical concepts. Strategies for solutions. [Prereq: IT 220 and IT 230. Rep once.]

**IT 420. Advanced Construction Materials** (3). Mechanics of stress, strain, and deflection for structural elements in construction, including timber; steel, reinforced concrete, and alternative building materials. Rational for sizing major structural elements and design of connections. [Prereq: IT 311.]

**IT 425. Estimating & Scheduling** (3). Material and process estimating. Techniques for making reliable cost and schedule estimates of a construction task or project. Introduction to project scheduling software. [Prereq: IA.]

**IT 430. Computer Numerical Control** (3). Numerical control systems for machine tool guidance. Three-axis milling machine program development and data input. Absolute and incremental systems; MDI; G and M codes. [Prereq: IT 230 or IA. Weekly: 2 hrs lect, 3 hrs lab.]

**IT 431. Design Prototyping & CAD/CAM** (3). Stereo lithography, rapid prototyping, and computer-aided manufacturing processes. Deposition modeling, rapid manufacturing, solid modeling formats, and layered construction techniques. Development of three-dimensional models and engineering prototypes. [Prereq: IT 345. Weekly: 2 hrs lect, 3 hrs lab.]

**IT 470. Principles of Fluid Power** (3). Fluid power conversion systems: pneumatics, hydraulics, fluidics. Both industrial and mobile types. [Prereq: IT 290. Weekly: 2 hrs lect, 3 hrs lab.]

**IT 475. Project Management Fundamentals** (3). Basic terminology, tools, and techniques of task-based project management. Organizational project structures and delivery systems, work breakdown structure, critical path scheduling, control systems, earned value analysis, and risk management.

**IT 480. Selected Topics** (.5-3). [Prereq: IA. Rep with different topic.]

**IT 490. Senior Thesis** (3). Supervised investigation of a specific technological problem. A culminating experience of practical, conceptual, or theoretical application with an emphasis on research. [Prereq: IT 399, IT 475 (C), IT 493 (C).]

**IT 492. Senior Project** (3). Supervised investigation of specific technological problem. A culminating experience of practical, conceptual, or theoretical application. [Prereq: IT 399, IT 475 (C), IT 493 (C).]

**IT 493. Statistical Process Control & Quality Systems** (3). Quality management theory, data management, statistical process control, and capability analysis. Data management reporting, gauge studies, designed experiments, and acceptance sampling methods. [Prereq: STAT 108.]

**IT 494. Production Operations Management** (3). Management of production systems; production tooling and equipment; lean, agile, and mass production techniques; organization of materials, processes, facilities; group analysis of production problems in manufacturing and logistics. [Weekly: 2 hrs lect, 3 hrs lab.]

**IT 499. Directed Study** (1-3). Individual study of selected topics. For advanced students. Maximum of 4 units may count toward major. [Prereq: IA.]