



Technological Studies-also see TADT/TADD Courses

IT 1210 Materials And Processes - Forming (4 credits)

An overview of forming processes used in manufacturing such as welding, casting, spraying, compacting, bending, laminating, extruding, rolling, shaping, fastening, and drawing. Also included are the primary materials which are formed in the manufacturing environment and the application of the forming processes to contemporary industry.

IT 1220 Materials And Processes - Separating (4 credits)

A comprehensive study of the separating processes which occur in manufacturing production. Traditional and non-traditional processes are introduced, along with the primary materials which are utilized in the separation processes.

IT 1310 Mechanical Power (2 credits)

An introduction to the general field of power. Theory and operation of the power source converters and a study of the sources themselves. Covers the sun, fuels, external combustion, turbojet, diesel and gas turbine operation.

IT 1350 Electronic Technology (4 credits)

Fundamental principles of electricity and electronics. Various topics are explored including basic circuits, transformers and motors.

IT 1460 Technical Graphics (3 credits)

An introduction to the principles and practices of technical drawing. The course provides a working familiarity with computer-aided design and drafting through the study of multi view and pictorial drawing systems.

IT 2100 Impact of Technology (2 credits)

Defines technology and examines the relationship between technology, human civilization, and other disciplines. Course includes a focus on the related social, cultural, environmental and economic impacts of technology and encourages students to understand the development of technology from the earliest civilizations to implications for the 21st Century. This course is designed primarily for the liberal education program. Liberal Education Goal Areas 5 & 9.

IT 2110 Manufacturing Materials and Processes (3 credits)

Survey of the raw materials commonly used in manufacturing and the processes used to create products from them. Processes include separating, forming, joining, treating, finishing, and assembly.

IT 2210 Advanced Fabrication Technology (3 credits)

Welding techniques with gas, arc, MIG, TIG, applied to a variety of metals. Other joining processes of assemblies also applied. Prerequisite: IT 1210. Might not be offered every year.

IT 2250 Construction Technology (2 credits)

A broad study of the building and heavy construction industries. Emphasis is given to residential and light commercial applications of materials, methods, tools, equipment, structural systems and personnel. Prerequisite: IT 1220.

IT 2310 Small Gasoline Engines (3 credits)

The theory and operation of small 2 cycle and 4 cycle engines. Laboratory exercises and rebuilding of components and engines. Prerequisite: IT 1310. Might not be offered every year.

IT 2370 Automation Technology (3 credits)

An introduction to the field of automation as found in the industrial environment. Concepts of CNC, CAM PLC's, vision systems, bar coding and robotics are explored.

IT 2608 Computer-Controlled Machining (3 credits)

Introduction to computer-controlled machining operations. Emphasis on tools and materials as applied in a wide variety of manufacturing and modeling applications. Prerequisites: IT 1210, IT 1220, and IT 1460, or consent of instructor.

IT 2931 Experimental Course (3 credits)

A course proposed for inclusion in the University curriculum. May not be offered more than two times as an experimental course.

IT 3100 Principles and Practices of Professional Development (2 credits)

An overview for professionals in the field of Industrial Technology. Students research and report on such topics as historical and future technological developments, personality inventories, trade and professional organizations, professional publications, and personal professional development plans. Educational degree requirements and policies to meet development plans are also reviewed.

IT 3217 Materials Science And Metallurgy (3 credits)

A study of the five primary classifications of materials used in manufacturing. Basic physical and chemical aspects are reviewed, including fundamental laboratory testing processes, structure analysis and engineering requirements.

IT 3218 Advanced Machining Processes (3 credits)

An extended study of the traditional and non-traditional machining processes used in manufacturing. Thread cutting, gear design and manufacture, precision grinding and application of CNC concepts are focused upon in this course. Prerequisites: IT 1220 or consent of instructor.

IT 3240 Construction Materials And Practices (3 credits)

Comprehensive study of construction materials, their characteristics, applications and testing. Prerequisites: IT 1220 and IT 2250 or consent of instructor.

IT 3250 Print Reading and Project Documentation (3 credits)

An introductory course in production specifications and contract usage. Includes the study of materials, methods and labor functions as they relate to use of specifications, contracts and drawings. Prerequisite: IT 2250 or consent of instructor.

IT 3260 Project Bidding And Estimating (3 credits)

A foundational course in the analysis and determination of construction and manufacturing project costs. Bidding strategies and proposals; material, equipment and labor estimates, as well as overhead and profit are examined. Prerequisite: IT 3250 or consent of instructor.

IT 3267 Engineering Cost Analysis (3 credits)

Introduction to the methods for determining costs related to developing and producing a product, for analyzing the present and future value of liquid and physical assets, and for analyzing the present and future value of a time series of payments. Other topics include basic accounting practices, cost estimating, and forecasting.

IT 3310 Fluid Power (3 credits)

Theory of fluid power systems including both hydraulics and pneumatics. Study and systematic analysis of industrial systems, components, circuitry and the laws relating to pressure and force development. Prerequisite: IT 1310 or consent of instructor.

IT 3330 Industrial Automation (3 credits)

The integration of robotics and automated controls into manufacturing operations. Topics include planning for, specifying, and integrating sensors, actuators, part feeding devices, fixtures, material handling equipment, robotics, and programmable logic controllers in an automated environment, such as a work cell or an assembly line. Two hours lecture and two hours lab per week. Prerequisites: IT 2608, MATH 2610, and PHYS 2500.

IT 3350 General Power (3 credits)

Theory and operating principles of internal combustion engines with over fifty cubic inches of displacement. Laboratory experiences include rebuilding procedures and related technical specifications and data. Prerequisite: IT 1310. Might not be offered every year.

IT 3380 Emerging Technologies (4 credits)

In this laboratory-based course, students experience a variety of emerging technologies and understand how such content could be delivered in a technology education program. Examples of emerging technologies include transportation, space colonization, and biotechnology. Prerequisites: IT 3850 and Junior status.

IT 3460 Parametric 3-D Modeling (3 credits)

Examines current topics, research, exploration, testing, and evaluation of computer-aided drafting and design programs for Windows computers. Prerequisite: IT 1460.

IT 3570 Commercial Architecture (3 credits)

Planning and design of commercial buildings and their structural systems, city and industrial planning, and landscaping. Might not be offered every year.

IT 3610 Industrial Prototypes (4 credits)

Development of industrial quality prototypes from engineering or designer prints. Includes the selection of materials and processes for production feasibility and market testing prototypes. Prerequisites: IT 1600, IT 2607, IT 2608, or consent of instructor.

IT 3700 Production Planning and Control (3 credits)

The concepts, tools, techniques, and quantitative methods used to plan for and control operations in the production of goods and services. Topics include, but are not limited to, traditional inventory management, just-in-time inventory, materials- and enterprise-resource planning, facilities location and layout, process strategies, aggregate planning, scheduling, maintenance and reliability, project management, and supply chain management.

IT 3850 Foundation Of Technology Education (2 credits)

Survey of the history, philosophy, curriculum, and instructional practices of the industrial technology education field. Emphasizes the goals and objectives of technology education programs in the K-12 public school system. Includes current issues, career options, professional organizations, and licensure requirements. Prerequisite: IT 1100.

IT 3857 Methods Of Teaching Industrial Technology/Vocational Education (4 credits)

Approaches and delivery strategies for teaching technology education. Instructional technologies, records management, lesson planning and classroom practice. Prerequisites: IT 4850, Junior or Senior status, or consent of instructor.

IT 3870 Technical Sales/Presentations (2 credits)

The philosophy and practice of consultative selling. The course stresses the methodology and planning, design and negotiation of technical sales. The course also covers the basics of designing technical proposals and presentations.

IT 3877 Engineering Problem Solving (3 credits)

Investigates the terminology, concepts, and analytical techniques essential to solving complex problems which occur in manufacturing.

IT 3878 Industrial Production Studies (2 credits)

Study and visitations of the production industry, highlighting the expanding role of technical and managerial employees.

IT 3879 Performance Measurement (3 credits)

The establishment of time standards essential to the decision making, forecasting, and process control efforts of manufacturing engineering groups and operations management.

IT 3880 Human Resource Development (2 credits)

Examines the trends of training and organizational development. Includes skills and training, design and implementation.

IT 3890 Material Handling And Plant Layout (2 credits)

Introduction to the scope, problems, management, concepts and organization of material handling and the relationships between plant layout and material handling.

IT 3897 Ergonomics and Human Factors (3 credits)

Students learn how to apply human-centered design principles to minimize the risk of harm while simultaneously facilitating the use of man-made artifacts. These principles may be applied in the work environment to design or improve work methods and work environments. They may also be used in the design of consumer goods. Includes a course project and lab activities. Two hours lecture and two hours lab per week. Prerequisites: IT 1460, IT 3879, and MATH 2610. (Might not be offered every year)

IT 4259 Construction Management (3 credits)

An advanced study of construction project planning, contracting, and supervision. The management functions of a construction business environment are emphasized. Attention is given to the differences between construction management and construction contracting.

IT 4340 Industrial Controls (4 credits)

A study of industrial controls including electromechanical devices, programmable logic controllers and computer control. Prerequisite: IT 1350. Might not be offered every year.

IT 4349 Principles Of Technology (3 credits)

A laboratory based study of electrical, mechanical, thermal and optical systems which combines theory and practice to develop an understanding of technological systems based on mathematical and physical models.

IT 4370 Computer Integrated Manufacturing (3 credits)

Study of how to synchronize operations in an environment that incorporates automated production equipment, material handling systems, plant control systems, design engineering functions, production- and inventory-control systems, and various management functions. Prerequisites: IT 2110, IT 2608, IT 3330, and IT 3460.

IT 4460 Design for Manufacturability (3 credits)

A study of the tools, techniques, and guidelines used to design parts and products, while minimizing costs, facilitating manufacturing operations, maximizing quality and functionality, and supporting modern production management techniques. (Might not be offered every year)

IT 4464 Machine Element Design (3 credits)

Application of mechanical principles, such as physics, stress analysis, motion analysis, mechanical power, fluid power, fastening and joining techniques, and electric motor selection/control to the design of components and mechanisms. Prerequisites: IT 3217, IT 3310, IT 3460, PHYS 2210, and PHYS 2220. (Might not be offered every year)

IT 4465 Mechanical Analysis of Parametric 3D Models (3 credits)

The use of a parametric 3D CAD package, in conjunction with either add-on or third-party software applications, to create virtual part and assembly models, and to analyze their physical performance using computer simulation techniques. Topics include shape optimization, and stress-, fatigue-, and kinematic-analysis, plus additional analysis techniques as planned by the instructor. Prerequisites: IT 3460 and IT 4464. (Might not be offered every year)

IT 4537 Industrial Design (3 credits)

Exploration of the industrial design process balancing form and function. Includes defining specific customer needs and the research, identification, testing, evaluation and implementation of effective solutions to technological problems. Also included is the development of a design proposal, written and graphic documentation, determining appropriate materials, processes and the ethical, environmental, social and economic impacts of design solutions. Prerequisites: IT 1210, IT 1220, IT 1410, IT 1460, or consent of instructor.

IT 4777 Advanced Topics in Quality (3 credits)

This course addresses the theory, implementation, and application of advanced quality topics. It may examine quality systems and quality topics such as Six Sigma, Malcolm Baldrige award, and other current quality topics. Prerequisite: IT 4878 or consent of instructor. (Might not be offered every year)

IT 4830 Foundations in Career and Technical Education (2 credits)

Students will research learning theory and demonstrate basic instructional competencies unique to career & technical education, including philosophy, methods of teaching, and student assessment. Course also addresses the inclusion of teaching strategies in reading, reading comprehension and writing.

IT 4837 Evaluation in Career and Technical Education (2 credits)

A study of testing and measurement techniques and applications in occupational programs. The construction of teacher-made performance test, written tests, rating scales and checklists is emphasized. Vendor and standardized are included. Might not be offered every year.

IT 4839 Industrial/Career and Technical Education Student Organization (2 credits)

Acquaints students with the issues of planning and implementation of student organizations. Also includes student organizations at the secondary and post-secondary levels and their relationship to state and federal policy and legislation.

IT 4847 Methods of Teaching Career and Technical Education (2 credits)

Instructional methodology used in the implementation of occupationally and technically orientated curriculum.

IT 4849 Classroom Management in Career and Technical Education (2 credits)

Managing the career and technical education learning classroom, including impact on effective teaching approaches, laboratory safety, material purchase and inventory, equipment purchase and maintenance, and program budgeting.

IT 4850 Philosophy of Career and Technical Education (2 credits)

A study of the history, philosophy, and practices of career and technical education. Includes a survey of curriculum characteristics, certification requirements, professional organizations, and career options.

IT 4858 Curriculum Development in Technology Education & Career & Technical Ed (2 credits)

The philosophy of curriculum and course construction. Gives special attention to the formulation of purposes, selection and sequence of activities and learner outcomes and assessment. Prerequisite: IT 4850 or consent of instructor.

IT 4859 Special Needs in Career and Technical Education (2 credits)

Objectives, materials, and methods of developing and modifying curriculum in the various vocational fields for students with special needs.

IT 4860 Management In Industrial Technology Education (4 credits)

Managing the learning environment, budget, equipment and student projects in the technology education setting. Also covers safety considerations and investigates strategies for learning within the technological clusters and for accommodating special needs students. Prerequisites: IT 4850, IT 3857, IT 4858, or consent of instructor.

IT 4870 Production Management (3 credits)

Practical experience in starting a manufacturing business, elements of entrepreneurship applied to designing, manufacturing and marketing a product. Prerequisites: All IT BS technical professional core courses or consent of instructor.

IT 4877 Industrial Maintenance And Safety (3 credits)

A study of maintenance and safety management within industry. Preventive and maintenance, planning and scheduling of maintenance. OSHA and the development of safety awareness.

IT 4878 Quality Assurance (3 credits)

The course teaches the theory and applications of statistical analysis, quality problem solving and implementation.

IT 4879 Service Process Design and Improvement (3 credits)

The design and improvement of work processes in the service industries and in the service functions of manufacturing organizations. Topics include, but are not limited to, the tools and techniques required for designing, setting up, and managing service systems; improving service quality; the impacts of technology on service management; managing nonprofit service organizations; services strategies; and the positioning and marketing of services. Prerequisites: IT 3267, IT 3879, and IT 3897.

IT 4880 Total Quality Management (3 credits)

An overview of the current quality control management techniques including process capability, action research and the international standards organization (ISO 9000). Prerequisite: IT 4878 or consent of instructor.

IT 4887 Career Development Theory And Practice (2 credits)

A course designed to acquaint professionals with the various phases of lifetime career development. Strategies are reviewed to provide a comprehensive understanding of career awareness and the role that it plays in the life of each individual and society. Might not be offered every year.

IT 4888 Work/Occupational Assessment Of Learners (2 credits)

An investigation of the use of informal and formal techniques used in the design and implementation of occupational assessment with school systems. Might not be offered every year.

IT 4889 Coordination Techniques of Career and Technical Education (2 credits)

The course involves the role of teacher-coordinators in the design and implementation of internships and other cooperative experimental learning methods.

IT 4890 Industrial Organization And Leadership (3 credits)

A study of organizational structure and supervision. Course deals with the work of supervisor as leader, staff relations and the improvement of industrial operations.

IT 4897 Project Management (3 credits)

The combination of people, systems and techniques required to coordinate the resources needed to complete a project according to established goals, standards and deadlines.

IT 4898 Simulation of Industrial Processes (3 credits)

Application of computer-based, discrete event simulation to improve or design work processes in business and industry. Emphasizes building mathematical systems models of work processes to be analyzed and optimized using simulation software such as, but not limited to, Promodel or Arena. Two hours lecture and two hours computer lab per week. Prerequisites: IT 3879, IT 3890, MATH 2610, and PHYS 3400. (Might not be offered every year)

IT 4899 Design of Experiments (3 credits)

Planning, execution, and analysis of factorial-based industrial experiments. Topics include, but are not limited to, analysis of variance, fitting of regression models, two-level factorial designs, blocking strategies and confounding of variables, fractional factorial designs, response surface methods, nested and split-plot designs, three-level and mixed-level designs, and experiments with random factors. Prerequisites: MATH 2610 and PHYS 3400.

IT 4970 Internship (1-12 credits)

Prerequisite: Junior or senior Status

All-University Courses

The course numbers listed below, not always included in the semester class schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted. Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

1910, 2910, 3910, 4910 DIRECTED INDEPENDENT STUDY
 1920, 2920, 3920, 4920 DIRECTED GROUP STUDY
 1930, 2930, 3930, 4930 EXPERIMENTAL COURSE

1940, 2940, 3940, 4940 IN-SERVICE COURSE
1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR
1960, 2960, 3960, 4960 SPECIAL PURPOSE INSTRUCTION
1970, 2970, 3970, 4970 INTERNSHIP
1980, 2980, 3980, 4980 RESEARCH
1990, 2990, 3990, 4990 THESIS