

2011-13 Cal Poly Catalog

Industrial Technology Area, Orfalea College of Business

IT 137 Electrical/Electronic Systems (4)

Introduction to electrical and electronic circuit fundamentals. Essential information for technical managers regarding the universal law, theory, principles, application and troubleshooting of AC and DC circuits and devices. Familiarity with concepts used extensively in manufacturing/production and countless electronic products. Understanding of inductance, capacitance, resistance, integrated circuit components and the relationship they have with each other. Strategic decision and problem solving skills developed using electricity/electronics as the environment. 3 lectures, 1 laboratory.

IT 150 Industrial Power Systems (4)

Introduction to systems that supply energy, convert energy to power, transmit energy and power, and use energy and power to drive industrial enterprises. Energy systems include fossil, atomic and prominent alternative resources. Power conversion systems include reactors, internal and external combustion, direct conversion, and alternative technologies. Power transmission and end-use systems include mechanical, thermal, fluid, and electrical. Industrial facilities management strategies including advantages and disadvantages of economics, safety, conservation, design and maintenance. 3 lectures, 1 laboratory. Prerequisite: IT 137.

IT 233 Decision Making and Problem Solving Using CAD (4)

Fundamental theory and practice of technical design communication and management of information systems. The basic application of 2-D and 3-D computer-aided design (CAD) and fundamental skills in communication of product design and their impact on the industrial organization. 2 lectures, 2 laboratories.

IT 260 Manufacturing Processes (4)

Manufacturing processes; emphasis on shaping metallic products. Precision measuring, technical drawings, safety and equipment use as they apply to metal machining, welding, casting and sheet metal fabrication. 2 lectures, 2 activities. Prerequisite: ~~FF-150~~ *Sophomore standing. Change effective Fall 2012.*

IT 270 Selected Topics (1-4)

Directed group study of selected topics. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Open to undergraduate students and consent of instructor.

IT 300 Symposium Organization (2) (CR/NC)

Managing the development of a technical information symposium from concept through symposium presentation. Organization of facilities, speakers, dinner meeting, professional meetings, industrial displays, food services, personnel, finances, and advertising. Credit/No Credit grading only. Total credit limited to 6 units. 2 seminars. Prerequisite: Completion of Area A or equivalent.

IT 326 Product Evaluation (4)

Value engineering, product dissection and the study of reverse product engineering as they relate to product design for manufacturing; improved product quality; reduced usage of energy and materials; material recycling and reuse; product design and development, proving value to the customer and society. 3 lectures, 1 laboratory. Prerequisite: Completion of GE Area B3 via a college course in physics (PHYS), or PSC 101.

IT 329 Industrial Materials (4)

Structure, properties, applications and limitations of select industrial materials to include ferrous and nonferrous metals, ceramics, glasses, composites, and organic materials. Materials testing and material selection. 3 lectures, 1 activity. Prerequisite: CHEM 110 or CHEM 111 or equivalent, and junior standing.

IT 330 Issues of Packaging (4)

GE Area F

Overview of packaging. Historical development, functions, and materials. Processes and technology employed to protect goods through the supply chain. Container types, package design, development, research and testing. Economic and international importance and perspective as an industrial activity. Packaging and the environment, and laws affecting packaging. 3 lectures, 1 laboratory. Prerequisite: Junior standing; completion of GE Area B3 via a course in physics (PHYS), Honors Contract physics (HNRS), or physical science (PSC). Fulfills GE Area F.

IT 336 Textile Technology (4)

GE Area F

Physical and chemical characteristics of natural and manufactured fibers. Production of synthetic polymers. Technology of fabric production and finishes. Industrial and consumer applications. Textiles as a global industry. Legislation. Laboratory identification of fibers and evaluation of performance properties of fabrics. 3 lectures, 1 laboratory. Prerequisite: Junior standing, completion of Area A and one laboratory science course, or consent of instructor. Fulfills GE Area F.

IT 341 Plastic Processes and Applications (4)

GE Area F

Cultural, social and economic implications of plastics in a worldwide environment. Study of materials, costs, processes, resource management, recycling, safety, laws and regulations. Applied laboratory experiences with common industry processes, i.e., injection, blow, rotational and compression; molding with plastic casting and fabrication. Application of laboratory experiences to improve consumer conformance to specifications and economic analysis of raw material cost and availability. Evaluation of current materials and technologies to reduce waste and improve reuse and recycling plastics. 3 lectures, 1 laboratory. Prerequisite: Junior standing and completion of GE Area B3. Recommended: CHEM 110 or CHEM 111. Fulfills GE Area F.

IT 371 Decision Making in Supply Chain, Services, and Project Management (4)

Introduction to supply chain, services, and project management decision making using information technology tools. Application of flowchart, project management network and spreadsheet software to process improvement, project planning, forecasting, and inventory management planning and control in manufacturing and service industries. Understanding current practices for decision making in manufacturing and service operations and project management. 4 lectures. Prerequisite: A grade of C- or better, or consent of instructor, in: MATH 141 or MATH 221, and ~~STAT 211~~ *STAT 217 or STAT 218 or STAT 252. Change effective Winter 2012.*

IT 381 Industrial Management (4)

Organization and functioning of management in industry. Planning, direction, and control of the business enterprise in terms of policy formation, organizational structure, finance, sales, procurement, plant location, facilities and production processes. 4 lectures. Prerequisite: Junior standing.

IT 400 Special Problems for Advanced Undergraduates (1-4)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 8 units, with a maximum of 4 units per quarter. Prerequisite: Consent of instructor.

IT 402 Analyzing and Presenting the Operations Infrastructure for New Industrial Enterprises (4)

Taking a new industrial enterprise from concept to successful launch. The planning and management of a successful product-based start-up to include the integration of: product development; manufacturability and costs of production; manufacturing/outsourcing decisions; market channel selection; supply chain and distribution alternatives; inventory investment and scheduling to meet estimated demand. Successful new enterprises and application to a class project case study. Special emphasis on skills associated with developing effective technical presentations. 2 lectures, 2 activities. Prerequisite: COMS 101 or COMS 102, BUS 346.

IT 403 Quality Systems Management (4)

Quality assurance as viewed from a systems perspective that includes cost, time, and process elements. Lean thinking applied as a problem solving approach to achieve continuous process improvement through the elimination of waste and the reduction of variability. 4 lectures.

Prerequisite: IT 341 or IT 371 and STAT 217, or STAT 218, or STAT 251; Business majors must have formally declared their concentration to enroll.

IT 406 Industrial Sales (4)

Development of the technical competencies required in industrial selling and purchasing through the application of value stream mapping techniques and the philosophies and tool sets encompassing the discipline of process management as it relates to sales, marketing and customer service in Industrial settings.

Includes guest speakers and team-based projects with local business organizations, individual and team product presentations, with written proposals. 3 lectures, 1 activity. Prerequisite: BUS 346 ~~and IT 341~~. *Change effective Fall 2011.*

IT 407 Applied Business Operations (4)

An integrative experience replicating a manufacturer's business/production systems, including the design, fabrication, processing, quality control, resource management, cost-control, marketing, sales and packaging functions. Focus of instruction methodology on the development of the student's comfort with ambiguity and change inherent in business/production systems. Builds upon the foundational concepts developed throughout the Industrial Technology curriculum. 2 lectures, 2 laboratories. Prerequisite: IT 411, BUS 346, IT 326, IT 260, and IT 233.

IT 408 Paper and Paperboard Packaging (4)

Physical and chemical properties, manufacture, conversion and use of paper, paperboard, corrugated board and related components. Design, use and evaluation of packages made from these materials. Survey of tests and procedures for paper based packaging materials and packaging products following ASTM, TAPPI, and ISO standards. 2 lectures, 2 activities. Prerequisite: IT 330.

IT 409 Machinery For Packaging (4)

Analysis of major types of packaging machinery from a practical, operational and marketing viewpoint. Basic processes utilizing packaging machinery. Specialized operations, contract specifications, selection, operation and maintenance. Material handling and distribution equipment and systems, and storage and retrieval systems. Required field trips to packaging operations. 3 lectures, 1 activity. Prerequisite: IT 330, ~~PHYS 104 or PHYS 121~~, or consent of instructor. *Change effective Fall 2012.*

IT 410 Operations Planning and Control (4)

Linking supply chain operations to deliver value to the end customer. Contrasting of advanced manufacturing concepts, such as pull systems, sales and operations planning, mixed model manufacturing, level production, and theory of constraints to traditional materials requirements planning systems. 3 lectures, 1 activity. Prerequisite: IT 341 or IT 371 and BUS 391.

IT 411 Industrial Safety and Quality Program Leadership (4)

Effective program development and leadership required to implement safety and quality process improvement in industry. Application of industrial leadership, knowledge, skills and methods to develop and implement total safety and quality management programs. Class safety/quality process project includes the oral presentation. 3 lectures, 1 activity. Prerequisite: IT 150, senior standing.

IT 419 Cooperative Education/Internship (2-12) (CR/NC)

Work experience in business, industry, government and other areas of student career interest. Periodic written progress reports, final report, and evaluation by work supervisor required. Credit/No Credit grading. Major credit limited to 4 units; total credit limited to 12 units. Prerequisite: Approval of area chair, junior standing, and a CPSLO cumulative GPA of at least 2.5 without being on academic probation.

IT 422 Computer Process Simulation of Operational Systems (4)

Focus on management of business process flows, utilizing computer process simulation software. Transformation of inputs into outputs by means of capital and labor resources. Models, modeling tools, solution approaches and methodologies for process improvement, including product development within both service and manufacturing organizations. 2 lectures, 2 laboratories. Prerequisite: IT 407.

IT 428 Commercialization of New Technologies (4)

Concepts, frameworks, and experiences necessary to understand the business potential of technology innovations and determine if one or more sustainable market opportunities can be identified to exploit them. Hands-on exercises and real new inventions to illustrate concepts. 4 lectures. Prerequisite: IT 326 or BUS 342 or BUS 346 and BUS 212 or BUS 214.

IT 435 Packaging Development (4)

The development of industrial and consumer goods packaging from concept to marketplace. Interplay of package design for marketing, production and distribution. Development of the package function for optimal market and consumer performance. Case studies of domestic and international package/product successes and failures with critical examination of performance, economic and social factors. Class project for analysis and solution. 3 lectures, 1 activity. Prerequisite: IT 330 and IT 233.

IT 445 Computer Numerical Control and Robotics (4)

Automated manufacturing systems, including computer numerical control (CNC), flexible manufacturing systems, computer-integrated manufacturing and robotics. Laboratory work in manual/automatic programming and set-up of CNC machines and robots. 2 lectures, 2 laboratories. Prerequisite: IT 233, IT 260, or consent of instructor.

IT 446 Textile Product Design and Development (4) Organization/structure of the textile and apparel industries. Creating and developing a textile product line; sourcing, pre-production, and production processes; costing. Markets, distribution channels, store and non-store retailing. Quick response. Quality assurance. Trade associations and professional organizations. 4 lectures. Prerequisite: IT 336.

IT 451 Facility Equipment and Systems (4)

Develop an understanding of how major mechanical equipment and systems are incorporated in the utility and production support systems of a modern industrial facility. Includes field trips to industrial/commercial facilities. 4 lectures. Prerequisite: IT 150 or consent of instructor.

IT 454 Facilities Development (4)

Construction and maintenance of physical facilities and equipment as related to plant layout/design, regulatory and environmental compliance, safety/security, energy conservation, and process improvement. 4 lectures. Prerequisite: IT 451 or consent of instructor.

IT 457 Radio Frequency Identification in Supply Chain Management (4)

An overview of Radio Frequency Identification (RFID) technology from the managerial standpoint. Developing simple RFID solutions using development kits. 2 lectures, 2 laboratories. Prerequisite: PHYS 121 or PHYS 122, MATH 141 or MATH 221.

IT 461, 462 Senior Project I, II (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems graduates must solve in their field of employment. Project results presented in a formal report, and must be completed in two quarters. Minimum 120 hours total time. Prerequisite: Consent of instructor.

IT 464 Applied Industrial Technology Senior Project Seminar (4)

Selection and analysis of industrial and technological problems and opportunities in directed individual or group-based projects. Problems typical to those which graduates could encounter in their fields of employment. Formal report required. 4 seminars. Prerequisite: Senior standing.

IT 470 Selected Advanced Topics (1-4)

Directed group study and seminars in selected topics in industrial technology. Open to undergraduate students. The Schedule of Classes will list title selected. Total credit limited to 12 units. 1 to 4 lectures. Prerequisite: Consent of instructor.

IT 471 Selected Advanced Laboratory (1-4)

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 laboratories. Prerequisite: Consent of instructor.

IT 475 Packaging Performance Testing (4)

Survey of tests and procedures for packaging materials and packaging products following ASTM and ISTA standards. The testing procedures include tests for shock, vibration, drop and impact as prescribed for shipment by truck, rail, sea, and air. Hands-on product/packaging testing for quality control. 2 lectures, 2 laboratories. Prerequisite: IT 330.

IT 482 Advanced Operations Management (4)

Advanced principles in operations management as applied to both manufacturing and service organizations. Product-service conversion systems, capacity planning and utilization, aggregate planning, scheduling and control, inventory management, and operations subsystem coordination with the organization's strategy. 4 lectures. Prerequisite: IT 371, and senior standing.

IT 487 Seminar in Quality Management (4)

Principles and techniques of quality and performance management as applied to organizations in the private and public sector. Emphasis on competitive implications. Integrations of fundamental management techniques, existing improvement efforts, technical tools, and new management technologies focused on continuous organizational improvement. 4 seminars. Prerequisite: Senior standing, IT 371.

IT 500 Individual Study (1-6)

Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Maximum of 6 units may be applied to degree requirements. Prerequisite: OCOB graduate standing and formal petition with approval from the Associate Dean.

IT 521 Training in Industrial and Technical Systems (4)

Developing and managing technological training in industry. The integration of people, technology, philosophy, corporate visions, missions, goals, objectives, resources, populations, facilities, budgets and evaluation in the development of industrial training curriculum and instruction. 4 lectures. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 522 Facilities Planning (4)

Introduction of prospective managers to the methods and techniques used in the planning of the modern industrial facility, including but not limited to: site selection, layout, materials handling, utilities, color and lighting, sound, air, safety standards, and current trends. 4 lectures. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 523 Industrial Sales (4)

Development and implementation of a base of competencies that support the sale of products whose intended application is in manufacturing. Refinement of technical knowledge and selling in an industrial setting. 4 lectures. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 527 Trends and Issues in Technology Management (4)

Advanced study of key current trends and issues relative to technology management of industrial and technical systems. 4 seminars. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 531 Lean Six Sigma Value Chain Management (4)

Familiarization with the Lean Six Sigma process improvement methodology and practice using Six Sigma Black Belt tools. A Six Sigma Black Belt is an individual skilled in applying basic and advanced process improvement and project management methods in order to complete projects that will result in significant, sustainable improvements within an organization. 2 lectures, 2 laboratories. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 532 Technology Entrepreneurship (4)

An understanding of the technology entrepreneurship processes by which new and innovative technologies are developed, embodied in products and/or services, brought to market, financed, and yield significant company growth. Focus on the technology startup experience, which has become a critical ingredient in national competitiveness as well as the career path of many former IT students. 2 lectures, 2 laboratories. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 533 Industrial Processes and Materials (4)

Survey of emerging industrial processes and materials, and enterprise management implications of alternatives. Integrative problems such as concurrent engineering, material and process selection. 2 lectures, 2 laboratories. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 534 Advanced Packaging Dynamics for Distribution (4)

The latest technologies and techniques utilized to protect a product from common and singular distribution hazards. Distribution hazards, product fragility, cushion performance, structural package design and the ASTM, ISTA and military packaging regulations and testing protocols. Distribution environment measurement using data recorders and simulation of the captured data in a packaging dynamics lab. 2 lectures, 2 laboratories. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 545 Product Conceptualization and Execution Using Rapid Prototyping (4)

Product development using current solid modeling and rapid prototyping technologies. Comprehensive simulation of the product development life cycle from initial concept to completed prototype. Applications of three-dimensional solid modeling and rapid prototyping to follow a product from concept to completion. 2 lectures, 2 laboratories. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 570 Selected Advanced Topics (1-4)

Directed group study of selected topics for advanced students. Open to undergraduate students. The Schedule of Classes will list title selected. Total credit limited to 16 units. 1-4 seminars. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 571 Selected Advanced Topics Laboratory (1-4)

Directed group laboratory study of selected topics for advanced students. The Schedule of Classes will list title selected. Total credit limited to 16 units. 1-4 laboratories. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 591, 592 Applied Industry Project I, II (2) (3)

Initiation, completion and presentation of an individual project, involving research, allowing an opportunity to apply knowledge, skills, and competencies to address a significant business issue in the field of industrial technology, preferably in connection with the student's employment. As part of IT 591 a formal written project proposal must be accepted and approved by the Industrial Technology Area Chair before work begins. Prerequisite: OCOB graduate standing or approval from the Associate Dean.

IT 594 Business and Technology Project I(3)

Development of a comprehensive applied research project proposal, including problem statement, literature review, questions and hypotheses, research design and methodology, procedures, research sample, proposed data collection and analyses. The project proposal must be accepted and approved by the Industrial Technology Area Chair. Prerequisite: Graduate standing in the Master of Science in Business and Technology program or approval from the Associate Dean.

IT 595 Business and Technology Project II (3)

Execution of the comprehensive applied research project proposal developed in IT 594. Included by illustration: securing a study sample, developing data collection instruments and procedures, completing data collection, and preparing the project data set for statistical or qualitative analyses. Prerequisite or corequisite: Satisfactory completion of IT 594 and Graduate standing in the Master of Science in Business and Technology program or approval from the Associate Dean.

IT 596 Business and Technology Project III (3)

Completion of the applied research project executed in IT 595. Included by illustration: final analyses, developing data displays, writing the final discussion chapter, editing project report and making an oral presentation to IT faculty. Prerequisite or corequisite: Satisfactory completion of IT 595 and Graduate standing in the Master of Science in Business and Technology program or approval from the Associate Dean.

IT 599 Industrial and Technical Studies Thesis (3)

Completion of a thesis involving individual research that is significant to the field of industrial and technical systems. A formal written proposal must be accepted by the Associate Dean of OCOB Graduate Programs before work begins. Course satisfies culminating experience requirement through the completion of the comprehensive thesis. Total credit limited to 9 units. Prerequisite: OCOB graduate standing or approval from the Associate Dean.