

Department of Technology and Engineering

Undergraduate Course Offerings

TEC 201 Microcomputers – Applications and Techniques (3) Two hours lecture and two hours lab per week. An introduction to microcomputer hardware and applications of the microcomputer in industry. Hands-on experience with computer system hardware and software.

TEC 209 Introduction to Industrial Technology (3) This course examines fundamental topics in Industrial Technology. Topics include: role and scope of Industrial Technology, career paths, problem solving in Technology, numbering systems, scientific calculators, dimensioning and tolerancing and computer applications in Industrial Technology.

TEC 210 Machining/Manufacturing Processes (3) An introduction to machining concepts and basic processes. Practical experiences with hand tools, jigs, drills, grinders, mills and lathes is emphasized.

TEC 211 AC/DC Circuits (3) Prerequisite: MS 112. Two hours lecture and two hours lab. Scientific and engineering notation; voltage, current, resistance and power, inductors, capacitors, network theorems, phaser analysis of AC circuits.

TEC 225 Electronic Devices I (4) Prerequisites: MS 112 and TEC 211. Three hours lecture and two hours lab. First course in solid state devices. Course topics include: solid state fundamentals, diodes, BJTs, amplifiers and FETs.

TEC 250 Computer-Aided Design I (3) Prerequisites: MS 112, TEC 201 or equivalent. Two hours lecture and two hours lab. Interpreting engineering drawings and the creation of computer graphics as applied to two-dimensional drafting and design.

TEC 252 Programmable Controllers (3) Prerequisite: TEC 201 or equivalent. Two hours lecture and two hours lab. Study of basic industrial control concepts using modern PLC systems.

TEC 302 Advanced Technical Mathematics (4) Prerequisite: MS 112 or higher. Selected topics from trigonometry, analytic geometry, differential and integral calculus. Emphasis on problem solving applications relating to technology.

TEC 307 Industrial Training (3) Prerequisite: TEC 201 or equivalent. Study of time analysis methods used to determine training requirements, assessing personnel and training resources as well as planning, coordinating and evaluating training.

TEC 311 Electronics – Digital (4) Prerequisite: TEC 201 or equivalent. Three hours lecture and two hours lab per week. Introduction to digital logic, binary numbers and codes, Boolean algebra, gating networks, flip-flops and registers, sequential and combinatorial logic circuits and semi-conductor memories.

TEC 316 Advanced Electronics (4) Prerequisites: TEC 225, TEC 311 or equivalents. Three hours lecture and two hours lab per week. In-depth study of selected electronic concepts. Topics include: Computer analysis of major digital logic families, introduction to state logic, transmission lines, and A/D conversion.

TEC 326 Electronic Devices II (3) Prerequisite: TEC 225. Second course in solid state devices. Topics include: amplifier frequency characteristics, UJT, SCR, OPTO devices, operational amplifiers, filters, and voltage regulators.

TEC 327 Electronic Devices Lab (1) Corequisite: TEC 326. Three hours lab per week. Experiments involving basic electronic devices.

TEC 330 Production and Inventory Control (3) Prerequisite: Sophomore Standing. Examines the issues involved in effective manufacturing, production and inventory control and shows their interrelatedness.

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TEC 341 Motion and Time Study (3) Prerequisite: MS 112. Analysis of motions necessary to perform industrial operations; motion economy; development of ratings, allowances, standard data, formula construction, work sampling, wage payment and performance training.

TEC 342 Employer-Employee Relations (3) Prerequisite: Sophomore Standing. Theory and policy to perform industrial relations; organization and administration, theories of work, labor relations, commitment and morale, communications, employee benefits and services.

TEC 343 Managing Engineering Technology (3) Prerequisite: Sophomore Standing. Examination and planning of manufacturing operations, personnel, control methods, equipment and supplies.

TEC 344 Manufacturing Cost Analysis (3) Prerequisites: MS 112 and TEC 201 or equivalent. Technical and economic evaluation of manufacturing operations to determine cost and feasibility.

TEC 351 Computer-Aided Design II (3) Prerequisite: TEC 250. Two hours lecture and two hours lab. An in-depth continuation of TEC 250 to include three-dimensional wireframe modeling, three-dimensional surface modeling, and software customization. Instruction based on an AutoCAD platform.

TEC 361 Materials and Processes of Industry (3) Prerequisite: TEC 210 or equivalent. Selection and altering of industrial materials to increase their value, and how they are used in manufacturing. Emphasis on metals and plastics but other materials are discussed.

TEC 365 Strength of Industrial Materials (3) Prerequisite: TEC 302 or MS 113 or equivalent. Internal stresses and deformation of bodies resulting from action of external forces; concepts and techniques of testing tensile, compression, shear, transverse, hardness, elasticity on various metals and fasteners.

TEC 366 Control Systems Technology (3) Prerequisite: TEC 211. Coverage of control systems fundamentals to include: open and closed loop systems, measuring instruments characteristics, sensors in control systems, manipulation methods, and types of control systems.

TEC 370 Continuous Quality Improvement (3) Prerequisite: TEC 210 or equivalent. An introduction to the concept of continuous quality improvement and its implementation using process improvement teams.

TEC 371 Quality Control in Industry (3) Prerequisites: MS 112 and TEC 370. Methods and procedures employed in industrial quality control, theories of measurement, error, prediction, sampling, tests of significance and models.

TEC 373 Reliability Technology (3) Prerequisites: MS 204 and TEC 370. Examination of failure analysis and calculation of individual component and system reliabilities, maintainability and availability, and their relationships to product liability and safety.

TEC 380 Industrial Safety and Health (3) Principles of hazard identification. Engineering and administrative controls and personal protective equipment. Accident analysis and corrective action.

TEC 382 Standards of Industrial Safety (3) Prerequisites: TEC 210 and TEC 380. Standards for plants and manufacturing operations. Enforcement of safety standards and OSHA checklist.

TEC 390 Hazard Control Technology (3) Prerequisites: TEC 211, TEC 210 and TEC 380. Principles and methods for the analysis and design of processes, equipment, products, facilities, operations, and environment.

TEC 392 Fire Safety Technology (3) Prerequisite: MS 112. Fire chemistry and propagation. Recognition and control of fire hazards, fire codes, risk, reports and records, and emergency response.

TEC 416 Manufacturing Automations and Robotics (3) Prerequisite: TEC 201. Examination of how industrial controls and industrial robots function in an automated manufacturing environment. Students learn the theory of operation, how to program, and the practical application of robotic systems. Topics will also include software applications and the integration of control systems for manufacturing.

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TEC 418 Electronics – Microprocessors (3) Prerequisite: TEC 201 or equivalent. Two hours lecture and two hours lab per week. Introduction to 16-bit computer technology, microcomputer programming, instruction set, breadboarding circuits, device selection and interfacing.

TEC 424 Safety and Health in the Automotive Industry (3) This course introduces the Safety and Health issues confronting the Automotive Industry. Included is a comprehensive examination of issues with automotive manufacturing as well as issued pertaining to consumer product safety. Extensive use of recent Automotive Industry Case Studies.

TEC 428 Electronics – Communications (3) Prerequisite: TEC 225. RF transmitting and receiving circuits, amplitude and frequency modulation and detection, phase modulation, antennas, RF transmission lines, and data transmission. Two hours lecture and two hours lab per week.

TEC 429 Applied Digital Communications Systems (3) Prerequisite: TEC 201 or equivalent. A detailed study of digital communications techniques. Topics include: sampling and digital pulse modulation, communications networks and standards, protocol and troubleshooting, digital multiplexing and cellular communications.

TEC 436 Inventory Management (3) Prerequisite: TEC 330. Prepares students for positions in the field of production and inventory management through understanding of production scheduling, implementation and design.

TEC 437 Capacity Management (3) Prerequisite: TEC 330. Basic issues in capacity management, planning principles, techniques, including resource planning, rough cut capacity planning, loading, scheduling, work order release and input/output control.

TEC 440 Manufacturing Management Systems (3) Prerequisites: TEC 343 and TEC 344. The analysis, design, and implementation of world class manufacturing systems for the manufacture of superior, low cost parts. Topics include lean manufacturing, cellular manufacturing, manufacturing teams, integrated quality systems, and other current manufacturing management strategies.

TEC 441 Project Management (3) Prerequisites: TEC 201 and TEC 343. Prepares students for managing projects in manufacturing and service industries through understanding of how to plan, manage, and deliver projects on time and within budget and how to effectively contribute in project teams.

TEC 451 Advanced Programmable Controllers (3) Prerequisite: TEC 252. Two hours lecture and two hours lab. Study of advanced control concepts using modern programmable controllers with detailed study of selected controllers. Study of recent controller architectures with emphasis on data communications.

TEC 452 Managing and Networking CIMs (3) Prerequisites: TEC 250 and 460. Two hours lecture and two hours lab. CIM group productivity techniques to include basic CIM management concepts, basics of networking, and advanced customization.

TEC 460 Computer-Aided Manufacturing (3) Prerequisite: TEC 250 and TEC 302. Three hours lecture and one hour lab. Utilization of computer technology in the automation of manufacturing systems.

TEC 472 Quality Assurance (3) Prerequisite: TEC 371. A continuation of TEC 371 with emphasis on the management aspect of the quality function.

TEC 474 Quality Costs (3) Prerequisite: TEC 472. A management-level analysis of the principles and strategies required to understand, implement, and use a quality cost system.

TEC 476 Quality Auditing (3) Prerequisite: TEC 472. A thorough coverage of quality audit principles and standards including a wide range of planning tools.

TEC 484 Industrial Ergonomics (3) Prerequisite: TEC 302. Concepts and techniques of work measurements, human factors, and industrial safety and hygiene are merged to provide a comprehensive view of the workplace.

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TEC 485 Industrial Safety Management (3) Prerequisites: TEC 380 and TEC 343. Planning, implementation and evaluation of industrial safety programs.

TEC 487 Systems Safety (3) Prerequisites: TEC 380 and MS 204 or TEC 371. Principles and techniques of systems safety analysis to assure safe operation of systems and facilities throughout the life cycle from design to disposal.

TEC 488 Industrial Hygiene (3) Prerequisite: TEC 380. Recognition, evaluation, and control of toxic hazards in the work environment. Acute and chronic systemic effects of environmental toxins in the workplace.

TEC 489 Hazardous Material Technology (3) Prerequisite: TEC 380. Practical management and control of hazardous materials and wastes for the safety professional.

TEC 493 Senior Seminar (1) Prerequisites: EH 322 or equivalent, Senior Standing and consent of Instructor. Corequisite: TEC 494. Provides Technology majors with practical industrial experiences via an approved internship arrangement. Pass/Fail only. This class may be taken twice.

TEC 494 Industrial Internship (2) Prerequisites: EH 322 or equivalent, Senior Standing and consent of Instructor. Corequisite: TEC 493. Provides Technology majors with practical industrial experiences via an approved internship arrangement. Pass/Fail only. This class may be taken twice.

TEC 495 Special Topics in Technology (3) Prerequisites: Senior status and approval of Department Head. Special topics of current interest to groups of students in the Technology program concerning content not presented in regular course offerings.

TEC 496 Advanced Problems in Technology (3) Prerequisites: Senior status and approval of Department Head and EH 322 or CBA 350. Problems involving the application and integration of electronics, industrial safety, quality, industrial management, and/or computer integrated manufacturing technology. This may include an industrial practicum and/or internship.

TEC 498 SME Preparation (2) Prerequisite: Senior status. An in-depth and thorough coverage of the terms, concepts, tools and skills needed to obtain the certification of Certified Manufacturing Technologist.

EG 112 Engineering Methods (3) Prerequisite or Corequisite: MS 113 or permission of instructor. The use of applied mathematics in solving elementary scientific and engineering problems. Topics include basic mathematical analysis, the calculator, unit systems, metrication, engineering statistics, laboratory procedures and measurements, and computer applications. Three hours lecture.

EG 121 Engineering Graphics I (3) Prerequisites: Plane geometry or evidence of previous instruction in mechanical drawing. Orthographic and isometric projections; multi-view projection on principal and auxiliary planes; dimensioning; detail and assembly working drawings. Interactive computer-aided graphics based on an AutoCAD platform. Two hours lecture and two hours laboratory each week.

EG 201 Applied Mechanics – Statics (3) Prerequisites: EG 112, PHS 211, and/or concurrently, MS 126. Analysis of the principles of mechanics and their engineering applications. Forces; moments and couples; resultants of force systems; equilibrium, friction, centroids, moments of inertia.

EG 202 Applied Mechanics – Dynamics (3) Prerequisites: EG 201 and MS 126. Absolute and relative motion; force, mass and acceleration; work and energy; impulse and momentum; mechanical vibrations.

EG 226 Electrical Circuits Analysis I (3) Prerequisites: PHS 211 and MS 125. Electric and magnetic circuit concepts; transient and steady-state solutions of simple circuits. Phasor analysis of AC circuits and network theorems.

EG 251 Engineering Surveying (3) Prerequisite: EG 112. The use of tapes, levels, transits, and surveying instruments including the theodolite will be studied and applied to problems involving position, area, volume, grade, mapping, distance, evaluation, analysis or error, and land surveying. Two hours lecture and three hours lab.

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EG 255 Engineering Computation (3) Prerequisite: MS 113 or equivalent. Programming, with introduction to numerical methods useful in the solution of engineering, scientific, and mathematical problems. The course is implemented using a high-level programming language. Two hours lecture and two hours integral non-scheduled laboratory required each week.

EG 320 Engineering Economy (3) Prerequisite: EG 226. Experiments related to electrical circuits. Application and verification of the principles in electrical circuits. Three hours laboratory per week.

PHYSICS 331 and 331L Introduction to Electronics (3) and Electronics Laboratory (1) May be counted as courses in Engineering. For description, see JSU academic catalog for PHS 331 and PHS 331L.

EG 343 Strength of Materials (4) Prerequisites: EG 201 and MS 126. Stress-strain relationships; behavior of materials in tension, compression and shear; column formulae; combined stress computations; theorem of three moments; composite structural members.

EG 361 Thermodynamics (3) Prerequisites: MS 227 and PHS 211. Heat and work; thermodynamic systems and equations of state; the zeroth, first and second laws of thermodynamics; change of phase; the combined first and second laws; irreversibility and availability of energy; mixtures of ideal gases; psychrometry.

EG 373 Fluid Mechanics (3) Prerequisites: MS 126 and PHS 211. Fluid statics; the conservation equations and their applications; dimensional analysis and similitude; flow in closed and open conduits; one-dimensional compressible flow.

EG 374 Fluid and Thermal Laboratory (1) Laboratory in fluid mechanics, thermodynamics, and related areas. Typical experiments are flow in pipes and channels, flow control devices, gas laws, compressible flow, engine performance. Three laboratory hours per week.