

**TECHNOLOGY (TEC) 510****215 Turner Hall, (309) 438-3661****Website: Tec.IllinoisState.edu****Chairperson: Ted Branoff.****General Department Information**

The mission of the Department of Technology is to prepare individuals to become technology-oriented professionals and leaders in organizations and society. Students in the Department of Technology are required to select one of the following majors: Construction Management, Engineering Technology, Graphic Communications, Industrial Technology, Renewable Energy, or Technology and Engineering Education.

**HONORS IN TECHNOLOGY**

The Department of Technology offers honors work in the different departmental programs to majors who have completed 60 semester hours with a cumulative 3.50 GPA. Students interested in the program should see the departmental advisor. Requirements for honors in the Technology Honors Program are available in the departmental office, 215 Turner Hall. Further details about the University Honors program are available at Honors.IllinoisState.edu.

**Technology Programs****MAJOR IN CONSTRUCTION MANAGEMENT**

Degree Offered: B.S.

Construction Management is an interdisciplinary curriculum that provides a background in construction means and methods, business administration, communication skills, architectural and engineering fundamentals, applied science, and mathematics. The goal of the major is to prepare construction professionals capable of managing projects to completion from construction documents prepared by design professionals. Coursework emphasizes the allocation of labor, equipment, and material to construction projects in order to achieve completion at maximum efficiency of time and cost. The program focus is on production and management capabilities. The Construction Management major is accredited by the American Council on Construction Education (ACCE). Graduates are prepared to assume leadership positions in residential, commercial and specialty construction. Initial employment

may include field supervision, project management, estimating, and scheduling. Positions are also available in related areas such as code enforcement, construction financing, product sales, quality control, and safety management.

—88 hours required.

—17 hours in General Education: CHE 102; MAT 120; MQM 100; PHY 105; PSY 110.

—50 hours in Construction Management core courses: HSC 272; TEC 100, 117, 120, 121, 123, 217, 222, 223, 224, 226, 229, 292, 325, 326, 327, 329, 394.

—A minimum of 5 hours of elective courses from the following: TEC 111, 225, 240, 322, 324, 328, 398 (3 hours).

—16 hours in management core to include: ACC 131; ECO 105; FIL 185; MKT 230; TEC 270.

**MAJOR IN ENGINEERING TECHNOLOGY**

Degree Offered: B.S.

Engineering Technology is a multidisciplinary curriculum that provides experiences in the following areas: Automation, Product Design, Process Control, Plastic Materials, Quality Management, and/or Technical Project Management. The goal of the major is to prepare professionals capable of managing projects and processes in government and private enterprise settings. Coursework emphasizes the management of people, processes, and materials through hands-on activities. Initial employment opportunities include: project management, process control, production management, product design, quality control support, and technical sales. The Engineering Technology program is accredited by the Association of Technology, Management, and Applied Engineering (ATMAE).

—78 hours required.

—17 hours in General Education: CHE 102; MAT 120; MQM 100; PHY 105; PSY 110.

—52 hours in Engineering Technology core courses: TEC 100, 111, 116, 130, 151, 216, 233, 234, 240, 263, 270, 285, 293, 313, 320, 330, 392; HSC 271.

—9 hours minimum of elective courses selected from the following: TEC 243, 244, 333, 345, 370 and 398 (3 hours only); ACC 131; ECO 105 (4 hours); and FIL 185. Students should see the department advisor for specific course recommendations.

## MAJOR IN GRAPHIC COMMUNICATIONS

Degree Offered: B.S.

Graphic Communications is a management-oriented technical curriculum related to the processes, products, services and opportunities within the diverse printing, media publishing and packaging industries. Students will learn about technology and management practices related to the production and distribution of graphic media in its many forms. Two concentrations within the graphic communications major may be pursued for more in-depth study: (1) cross media and packaging technology, or (2) web content management. The goal of the major is to prepare professionals to enter the field in positions such as project manager, production coordinator, digital media developer, Web content manager, quality control manager, sales representative, cost estimator, and production associate. The Graphic Communications Technology Program is accredited by the Accrediting Council for Collegiate Graphic Communications (ACCGC).

—78 hours required.

—17 hours in General Education: CHE 102; MAT 120; MQM 100; PHY 105; PSY 110.

—49 hours in Graphic Communications core: TEC 100, 116, 150, 151, 152, 250, 253, 257, 270, 313, 317, 320, 330, 352, 354, 356, 358.

—Students will select 9 hours of required courses from one of the following concentrations:

**Cross Media and Packaging Technology Concentration:** TEC 350, 351, 353.

**Web Content Management Concentration:** TEC 283, 319, 378.

—An additional 3 hours of elective courses selected from the following (if not already taken for credit): TEC 283, 319, 350, 351, 353, 370, 378, 398 (3 hours), ACC 131, COM 160, ECO 105, FIL 185.

## MAJOR IN INDUSTRIAL TECHNOLOGY

Degree Offered: B.S.

### Computer Systems Technology Sequence

Computer Systems Technology is an interdisciplinary curriculum that provides a background in computer technology, software,

programming, information imaging, and other industry-related technologies. The goal is to prepare professionals for the management and supervision of technical computer systems in industrial settings. Coursework emphasizes the use of computer systems to provide students with a diverse technical and professional background in communications, networking, interfacing, and electronic principles related to a variety of computer systems. Computer Systems Technology is accredited by the Association of Technology, Management, and Applied Engineering (ATMAE).

—75 hours required.

—17 hours in General Education: CHE 102; MAT 120; MQM 100; PHY 105; PSY 110.

—46 hours of required Computer Systems Technology core courses: TEC 100, 143, 151, 243, 244, 245, 270, 283, 284, 313, 319, 320, 330, 378, 383, and 390.

—12 hours of additional courses selected from the following: IT 168, 178, 254, 261, 262; TEC 116, 152, 216, 250, 348, 358, 370, and 398 (3 hours only).

## MAJOR IN RENEWABLE ENERGY

Degree Offered: B.S.

The Major in Renewable Energy is an interdisciplinary program that prepares students for careers in renewable energy and related industries, including wind energy, solar power, biofuels, and energy management. The curriculum is designed to provide students with a broad understanding of energy management concepts and the roles played by renewable resources. Students will develop expertise in an interdisciplinary core of subjects fundamental to renewable energy as well as more in-depth studies in a related minor.

—67 total hours required.

—23 hours in General Education: CHE 102; HSC 156; MAT 120; MQM 100; PHY 105, 207; PSY 110.

—38 hours in required core courses: AGR 225; ECO 105 (4 hours), 236; GEO 211; TEC 100 (1 hour), 111, 160, 258, 259, 260, 262, 270, 360.

—6 hours selected from: FIL 185, SOC 330, TEC 116, 117, 217, 320, 370, 398A02.

—Students are required to choose a minor from the following: Business Administration, Business Environment and Sustainability, Economics, Environmental Studies, Geography, or Technology.

## MAJOR IN TECHNOLOGY AND ENGINEERING EDUCATION

Degree Offered: B.S.

Technology and Engineering Education includes: (1) a study of the concepts practiced in modern technological systems of energy utilization, communication, production, and transportation, and engineering-related fields; (2) the development of cognitive, psychomotor, and affective skills in these five areas related to the use of tools, materials, processes, resources, techniques, scientific principles, work (skill and organization), and products as well as their impacts on society; and (3) the professional competencies of planning, executing and evaluating instruction.

The following requirements are part of the entitlement program leading to endorsement at the secondary 6-12 grade levels. Initial employment opportunities include: Junior High/Middle School Technology and Engineering Teacher (middle school endorsement also requires PSY 302 and TCH 233), High School Technology and Engineering Teacher, Vocational/Trade School Teacher, School District Technology Coordinator, Community/Junior College Instructor, Industrial Trainer/Instructor. A cumulative and major GPA of 2.50 is required for student teaching and graduation. The Technology and Engineering Education Program is accredited by the Illinois State Board of Education (ISBE) and NCATE/CTTE.

—78 hours required.

—4 hours General Education: PHY 105.

—35 semester hours of required technical core courses: TEC 101, 111, 116, 120, 130, 150, 216, 243, 303, 304, 305; and MAT 108.

—9 semester hours of required elective Technology courses.

—30 semester hours Professional Education courses that include: TCH 212, 216, 219; EAF 231 (EAF 228 or EAF 235 may also be used to meet this requirement); PSY 215; STT 399A33; TEC 307. Successful completion of 100 clinical hours required before student teaching.

If technology majors want an endorsement for middle school, PSY 302 and TCH 233 are required.

## CLINICAL EXPERIENCES IN TEACHER EDUCATION

A variety of clinical (pre-student teaching) experiences, as well as student teaching, are included in the teacher candidates professional preparation. Observations, small and large group instruction, tutoring, field experiences, and student teaching are included in the Clinical Experiences Program. The experiences offered prior to student teaching are integral parts of specific college courses. Clinical experiences are provided in off-campus professional development schools, local schools, campus laboratory schools, agencies and other approved non-school settings. The Cecilia J. Lauby Teacher Education Center monitors and documents all clinical experiences. Teacher candidates will show verification of having completed clinical experiences commensurate with attaining local, state, and national standards. Teacher candidates must provide their own transportation to clinical experiences sites.

Candidates are required to provide documentation of meeting all State of Illinois, district, and university requirements in regard to criminal background checks BEFORE beginning any clinical experiences. Criminal background checks must remain current as of the last day of the clinical experience. Candidates should consult with clinical course faculty and the Cecilia J. Lauby Teacher Education Center well in advance of clinical experiences to determine specific requirements needed each semester.

The approximate number of clinical hours associated with each course offering can be found with the appropriate course description in this Undergraduate Catalog. The following legend relates to the type and kind of activity related to a specific course.

### Clinical Experiences Legend

- Observation (including field trips)
- Tutoring one-on-one contact
- Non-instructional assisting
- Small group instruction
- Whole class instruction
- Work with clinic client(s)
- Graduate practicum
- Professional meeting

**MINOR IN TECHNOLOGY**

- 21 hours required through advisement.
- 6 of the 21 hours required must be upper level coursework.
- No more than 9 hours from the major program of study may be applied to the minor.
- Courses must be chosen from the following list: TEC 111, 116, 117, 120, 121, 123, 130, 143, 150, 151, 152, 216, 217, 222, 223, 224, 225, 226, 229, 233, 234, 240, 243, 244, 245, 250, 253, 257, 263, 270, 283, 284, 285, 292, 313, 317, 319, 320, 322, 325, 326, 327, 328, 329, 330, 345, 348, 350, 351, 352, 353, 354, 356, 358, 383, 390, 392, 394.

**Allowable substitutions for Technology Majors:**

- Acceptable substitutions for CHE 102 are CHE 110 and 112, or 140.
- Acceptable substitution for HSC 385 is HSC 271.
- Acceptable substitutions for MAT 120 are MAT 121, 144 or 145.
- Acceptable substitution for MQM 100 is ECO 138.
- Acceptable substitutions for PHY 105 are PHY 108 or 110.
- Acceptable substitution for TEC 270 is MQM 220.
- Acceptable substitutions for TEC 330 are ACC 131 and ACC 132.

**Technology Courses****100 PROFESSIONAL DEVELOPMENT IN TECHNOLOGY****1 sem. hr.**

Introduction to career and leadership opportunities, employer expectations, job search skills, and placement resources within technology fields of study. Lecture. Materials charge optional. Formerly *INTRODUCTION TO INDUSTRIAL TECHNOLOGY*.

**101 INTRODUCTION TO TEACHING TECHNOLOGY****3 sem. hrs.**

Methodological insights and understanding for teaching technical subject matter; emphasis on observing programs, developing, conveying and evaluating technology-based curricula. Includes Clinical Experience. Lecture.

**111 FUNDAMENTALS OF POWER TECHNOLOGY****3 sem. hrs.**

Principles of electrical, electronic, mechanical, and fluid power components and systems as they apply to industrial applications. Lecture and lab. Prerequisite: Major or minor only or consent of the department advisor.

**116 INTRODUCTION TO TECHNICAL DRAWING AND CONSTRAINT-BASED SOLID MODELING****3 sem. hrs.**

Introduction to technical drawing with emphasis on Computer Aided Design (CAD) constraint-based solid modeling, sketching, and basic blueprint reading. Lecture and lab. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**117 CONSTRUCTION GRAPHICS****3 sem. hrs.**

Studies in graphical representation of architectural and construction ideas. Emphasis on sketching, spatial visualization, and computer-aided drafting methods. Lecture and lab. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**120 INTRODUCTION TO BUILDING CONSTRUCTION****3 sem. hrs.**

Introduction to the principles, practices, and materials used in residential and commercial construction. Lecture. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**121 CONSTRUCTION METHODS****2 sem. hrs.**

Applications of the principles, practices, and materials used in residential and commercial construction. Lecture and lab. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**123 CONSTRUCTION DOCUMENTS AND QUANTITY TAKEOFF****3 sem. hrs.**

Introduction to blueprint reading, construction specifications, and quantity takeoff procedures. Lecture and lab. Prerequisites: A grade of C or better in TEC 120. Major or minor only or consent of the department advisor.

**130 INTRODUCTION TO MANUFACTURING PROCESSES****3 sem. hrs.**

Secondary material processes including industrial machinery usage and study in the areas of forming, casting, separating, joining, and conditioning. Lecture and lab. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**143 INTRODUCTION TO ELECTRONICS FOR DATA COMMUNICATION****3 sem. hrs.**

Overview of the fundamentals, concepts, and theory of basic electronics essential to telecommunications systems. Lecture and lab. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**150 GRAPHIC COMMUNICATIONS TECHNOLOGY****3 sem. hrs.**

Introduction to the history, vocabulary, tools, materials, and process of the graphic communications industry. Lecture and lab. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**151 INTRODUCTION TO COMPUTER SYSTEMS TECHNOLOGY****3 sem. hrs.**

Study and use of basic methods and software used in computer applications for imaging, graphics, and communications. Lecture and lab. Materials charge optional. Formerly *INTRODUCTION TO INDUSTRIAL COMPUTER SYSTEMS*. Prerequisite: Major or minor only or consent of the department advisor.

**152 DIGITAL MEDIA APPLICATIONS****3 sem. hrs.**

Study of technology used for digital media and communications. Lecture and lab. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**160 INTRODUCTION TO RENEWABLE ENERGY****3 sem. hrs.**

An exploration of renewable energy systems, emphasizing physical principles and practical applications of various renewable energy system technologies. Lecture. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**170 ENERGY FOR A SUSTAINABLE FUTURE SMT****3 sem. hrs.**

The nature and role of energy in daily lives, with an emphasis on using our knowledge to make informed decisions. Prerequisite: MAT 113, 120, 130 or 145.

**216 CONSTRAINT-BASED SOLID MODELING AND PRODUCTION DRAWINGS****3 sem. hrs.**

Intermediate course focusing on constraint-based solid modeling, technical drawing practices, and blueprint/tolerance interpretation. Lecture and lab. Materials charge optional. Prerequisites: TEC 116. Major or minor only or consent of the department advisor.

**217 BUILDING INFORMATION MODELING****3 sem. hrs.**

Using building information modeling systems to design and document architectural and construction ideas. Emphasis on modeling, annotating, and document creation. Lecture and lab. Materials charge optional. Prerequisites: TEC 117. Major or minor only or consent of the department advisor.

**222 MECHANICAL AND ELECTRICAL SYSTEMS FOR BUILDINGS****3 sem. hrs.**

Introduction to design, operation, and installation of heating, ventilation, air conditioning, plumbing, fire protection, and electrical systems. Lecture and lab. Materials charge optional. Prerequisites: A grade of C or better in TEC 120; MAT 120; and PHY 105. Major or minor only or consent of the department advisor.

**223 FIELD ENGINEERING****3 sem. hrs.**

Principles and practices of construction geomatics, project control, and administration from a field supervision perspective. Lecture and lab. Formerly *SURVEYING AND BUILDING LAYOUT*. Prerequisites: A grade of C or better in TEC 120; MAT 120. Major or minor only or consent of the department advisor.

**224 SOILS AND FOUNDATIONS****3 sem. hrs.**

Principles and practices used in concrete and masonry structures and the affect of soil characteristics on foundation design and construction. Lecture and lab. Prerequisites: A grade of C or better in TEC 120; TEC 121. Major or minor only or consent of the department advisor.

**225 CONSTRUCTION EQUIPMENT MANAGEMENT****3 sem. hrs.**

Equipment productivity, selection, allocation, economics, and safety related to residential and commercial construction. Lecture. Prerequisites: A grade of C or better in TEC 120; TEC 121 or concurrent registration. Major or minor only or consent of the department advisor.

**226 CONSTRUCTION CONTRACTS AND LAW****2 sem. hrs.**

Duties, rights, and liabilities of all parties to a construction contract. Lecture. Prerequisites: A grade of C or better in TEC 120. Major or minor only or consent of the department advisor.

**229 COST ESTIMATING****3 sem. hrs.**

Methods and procedures for cost estimating in construction using take-off quantities, productivity and material costs. Lecture and lab. Prerequisites: TEC 117, 123, 222, and 224. Major or minor only or consent of the department advisor.

**233 CNC AND MACHINING****3 sem. hrs.**

An introduction to metals machining processes with an emphasis on automation using Computer Numerical Control (CNC). Lecture and lab. Materials charge optional. Prerequisites: TEC 111, 130; TEC 216 or concurrent registration. Major or minor only or consent of the department advisor.

**234 ROBOTIC SYSTEMS INTEGRATION****3 sem. hrs.**

An introduction to robotics including common applications, programming, safety, and integration principles. Lecture and lab. Materials charge optional. Prerequisites: TEC 111; TEC 151. Major or minor only or consent of the department advisor.

**240 ELECTRIC CIRCUITS AND MACHINES****3 sem. hrs.**

Electrical principles and applications including circuit diagrams, switches, relays, motors, and transformers. Lecture and lab. Materials charge optional. Prerequisites: TEC 111 or TEC 143 or concurrent registration. Major or minor only or consent of the department advisor.

**243 COMPUTER NETWORKING SYSTEMS****3 sem. hrs.**

Implementation of the principles of local area network architecture, including server and client hardware specifications and configurations. Lecture and lab. Materials charge optional. Prerequisite: Major or minor only or consent of the department advisor.

**244 DIGITAL ELECTRONICS****3 sem. hrs.**

Operation, characteristics, and applications of discrete and integrated solid state devices in selected digital circuits. Lecture and lab. Materials charge optional. Prerequisites: MAT 120. Demonstrated equivalent competencies. Major or minor only or consent of the department advisor.

**245 APPLICATIONS OF OPERATING SYSTEMS****3 sem. hrs.**

The introduction of operating systems software to enhance productivity, control, and connectivity, using open source code and proprietary systems. Lecture and lab. Materials charge optional. Formerly *FUNDAMENTALS OF OPERATING SYSTEMS IN INDUSTRIAL APPLICATIONS*. Prerequisites: TEC 151 or concurrent registration. Major or minor only or consent of the department advisor.

**250 GRAPHIC MEDIA COMPOSITION****3 sem. hrs.**

Study of graphic media production technology to plan and create documents including advertisements, brochures, books, packages, and e-books. Lecture and lab. Materials charge optional. Prerequisites: TEC 150. Major or minor only or consent of the department advisor.

**253 IMAGE CAPTURE AND EDITING****3 sem. hrs.**

Digital photography, scanning, image editing software tools, PostScript output, halftones, tone reproduction, densitometry, and reproduction concerns. Lecture and lab. Materials charge optional. Prerequisites: TEC 150. Major or minor only or consent of the department advisor.

**257 PRINT MEDIA PRODUCTION****3 sem. hrs.**

A study of printing production processes including lithography, flexography, screen printing, and digital printing production. Lecture and lab. Materials charge optional. Prerequisites: TEC 150. Major or minor only or consent of the department advisor.

**258 RENEWABLE ENERGY  
TECHNOLOGY APPLICATIONS**  
3 sem. hrs.

Analysis, selection, and implementation of cost-effective renewable energy technologies including solar and wind energy. Lecture and lab. Materials charge optional. Prerequisites: TEC 111 and 160. Major or minor only or consent of the department advisor.

**259 POWER GENERATION:  
PRODUCTION, CONVERSION AND  
STORAGE**  
3 sem. hrs.

Application of governing laws and principles to describe thermal, mechanical and electrical energy conversion and storage systems. Lecture and lab. Materials charge optional. Prerequisites: TEC 111. Major or minor only or consent of the department advisor.

**260 RESEARCH AND ANALYTICAL  
TOOLS IN RENEWABLE ENERGY**  
3 sem. hrs.

Introduction to quantitative research methods and analytical tools in renewable energy including data collection, data analysis, and simulation tools. Lecture and lab. Prerequisites: TEC 160; MQM 100. Major or minor only or consent of the department advisor.

**262 ENERGY PLANNING AND  
MANAGEMENT: FROM BUILDINGS  
TO COMMUNITIES**  
3 sem. hrs.

Application of the principles and practices of energy management to improve energy efficiency, sustainability, and renewable resource usage. Lecture. Formerly *ENERGY MANAGEMENT*. Prerequisites: TEC 111. Major or minor only or consent of the department advisor.

**263 AUTOMATED FLUID POWER  
SYSTEMS**  
3 sem. hrs.

Theory and operation of fluid power circuits and intermediate level PLC (Programmable Logic Controller) programming. Lecture and lab. Materials charge optional. Prerequisites: TEC 111 or 143. Major or minor only or consent of the department advisor.

**270 MANAGING TECHNOLOGICAL  
SYSTEMS**  
3 sem. hrs.

Principles, practices and methods used to plan, organize, lead, and control technological systems. Lecture. Prerequisites: PSY 110 or concurrent registration. A minimum of 45 hours completed. Major or minor only or consent of the department advisor.

**275 TECHNOLOGY AND QUALITY  
OF LIFE SMT**  
3 sem. hrs.

Future-oriented course that analyzes the interface of technology with social forces that cause social change and affect quality of life; includes technological assessment. Lecture. Prerequisite: MAT 113, 120, 130, or 145.

**283 INFORMATION AND IMAGING  
TECHNOLOGIES**  
3 sem. hrs.

Principles of information and imaging systems including databases, Web design, and digital imaging. Lecture and lab. Prerequisites: Grade of C or better in TEC 151. Major or minor only or consent of the department advisor.

**284 TECHNICAL COMPUTER  
APPLICATIONS**  
3 sem. hrs.

Application of computer hardware and software solutions for production and control problems. Lecture and lab. Materials charge optional. Prerequisites: TEC 143 and 283 or concurrent registration. Major or minor only or consent of the department advisor.

**285 INDUSTRIAL PLASTICS**  
3 sem. hrs.

Resins, processing, fabrication, injection molding, extrusion, rotational molding, compression molding, thermoforming, fiberglass lay-up, identification and testing. Lecture and lab. Materials charge optional. Prerequisites: TEC 130 or concurrent registration. Major or minor only or consent of the department advisor.

**292 CONSTRUCTION MATERIALS  
TECHNOLOGY**  
3 sem. hrs.

Construction materials, material properties and standardized testing procedures. Lecture and lab. Materials charge optional. Not for credit if had TEC 292A01 *MATERIALS TECHNOLOGY: CONSTRUCTION MANAGEMENT*. Prerequisites: MAT 120 or concurrent registration. Major or minor only or consent of the department advisor.

**293 MECHANICAL PROPERTIES OF MATERIALS****3 sem. hrs.**

Theory and practice of standardized testing procedures to determine the modulus and strength of engineering materials. Lecture and lab. Materials charge optional. Not for credit if had TEC 292 *MATERIALS TECHNOLOGY*. Prerequisites: PHY 105 or concurrent registration; MAT 120 or concurrent registration. Major or minor only or consent of the department advisor.

**303 ENGINEERING DESIGN****3 sem. hrs.**

Foundational concepts of engineering design including history, technology, tools, computer applications, pedagogical, and professional issues. Lecture and lab. Materials charge optional. Prerequisites: TEC 216; MAT 108 and PHY 105 or concurrent registration, or graduate standing.

**304 MEDICAL, AGRICULTURAL, AND BIO-RELATED TECHNOLOGIES****3 sem. hrs.**

A study of technological systems related to medical, agricultural, and bio-related technologies. Lecture and lab. Prerequisite: TEC 101, or graduate standing.

**305 TEACHING TRANSPORTATION, ENERGY, AND POWER TECHNOLOGIES****3 sem. hrs.**

Instruction and practice developing, teaching, and assessing transportation, energy, and power technologies curricula using a standards-based approach. Lecture and lab. Prerequisites: TEC 101 or 301 or demonstrated equivalent competencies. TEC 111 and 116 or concurrent registration, or graduate standing.

**306 COORDINATION TECHNIQUES OF CAREER AND TECHNICAL COOPERATIVE EDUCATION PROGRAMS****3 sem. hrs.**

Coordination techniques needed for high school and post-secondary teacher-coordinators in integrating classroom activities with daily employment. Also offered as BE/FCS 382. Includes Clinical Experience.

**307 COMPETENCIES FOR TEACHING****4 sem. hrs.**

Curriculum planning, teaching, and evaluation strategies, and professionalism for Technology Education teachers. Includes Clinical Experience. Lecture. Prerequisites: TEC 305 and TCH 216 or concurrent registration, or graduate standing. Concurrent registration in Student Teaching or within one semester.

**310 STEM EDUCATION FOUNDATIONS****3 sem. hrs.**

Foundations of pedagogical content knowledge for developing, implementing, and assessing integrated/interdisciplinary science, technology, engineering, and mathematics (STEM) education at the secondary level. Prerequisite: Education major, graduate standing, or practicing teacher.

**313 QUALITY SYSTEMS FOR TECHNOLOGY****3 sem. hrs.**

A managed quality system using statistical tools; control charts, paretos, histograms, scattergrams, flowcharts and problem-solving techniques for continuous improvement. Lecture. Prerequisites: MQM 100; MAT 120; 8 hours in a TEC sequence. Major or minor only or consent of the department advisor, or graduate standing.

**317 COMPUTER-AIDED RENDERING AND ANIMATION****3 sem. hrs.**

Using computer systems to create renderings and animated presentations of design ideas in an industrial or architectural setting. Lecture and lab. Prerequisites: TEC 116 or 217. Major or minor only or consent of the department advisor, or graduate standing.

**319 GRAPHICAL SOFTWARE INTERFACES****3 sem. hrs.**

Combination of graphic and programming techniques to interpret and solve technological problems and enhance productivity. Lecture and lab. Formerly *COMPUTER GRAPHICS*. Prerequisites: Grade of C or better in TEC 283. Major or minor only or consent of the department advisor, or graduate standing.

**320 PROJECT MANAGEMENT****3 sem. hrs.**

Fundamentals of project management emphasizing planning techniques to meet stakeholder expectations regarding project scope, time, cost, and quality. Lecture. Prerequisites: TEC 270 and a minimum of 60 hours completed. Major or minor only or consent of the department advisor, or graduate credit (unless TEC 431 or 432 has been taken).



**322 BUILDING CODES AND INSPECTION****2 sem. hrs.**

Analysis of model building codes and their application and administration for minimum standards of public safety and welfare. Lecture. Prerequisites: TEC 120. A minimum of 45 hours completed. Major or minor only or consent of the department advisor, or graduate standing.

**324 ADVANCED MECHANICAL AND ELECTRICAL SYSTEMS****3 sem. hrs.**

Advanced study of the design, installation, operation, and automation of mechanical and electrical systems. Lecture and lab. Prerequisites: TEC 222. Major or minor only or consent of the department advisor.

**325 CONSTRUCTION SCHEDULING****3 sem. hrs.**

Planning and scheduling construction projects including resource allocation, CPM, and computer applications. Lecture and lab. Formerly *COMPUTERIZED ESTIMATING AND SCHEDULING*. Prerequisites: TEC 117, 123, 222, and 224. Major or minor only or consent of the department advisor, or graduate standing.

**326 CONSTRUCTION FINANCE AND ACCOUNTING****3 sem. hrs.**

Practical application of financial and accounting fundamentals specific to the construction industry. Lecture and lab. Prerequisites: ACC 131, ECO 105; and MAT 120. Major or minor only or graduate standing or consent of the department advisor.

**327 DESIGN OF BUILDING STRUCTURES****3 sem. hrs.**

Analysis and design of permanent and temporary structural systems for wood, steel, and concrete construction. Lecture. Prerequisites: TEC 292; MAT 120; and PHY 105. Major or minor only or consent of the department advisor, or graduate standing.

**328 RESIDENTIAL DEVELOPMENT****3 sem. hrs.**

Principles and practices of residential development including land acquisition and improvement, regulations, construction, and sales. Lecture. Prerequisites: ECO 105; TEC 229; TEC 325 or concurrent registration; and a minimum of 45 hours completed. Major or minor only or consent of the department advisor, or graduate standing.

**329 SUSTAINABLE BUILDINGS AND URBAN DEVELOPMENT****3 sem. hrs.**

Principles and practices of sustainable development in urban environments including building, transportation, and neighborhoods. Lecture. Prerequisites: TEC 120 and a minimum of 45 hours completed. Major or minor only or consent of the department advisor, or graduate standing.

**330 APPLIED ECONOMIC ANALYSIS FOR TECHNOLOGISTS****3 sem. hrs.**

Applied economic techniques used to determine the relative worth of alternative systems, products, and services. Lecture and lab. Prerequisites: MAT 120 and six credit hours of 200-level TEC coursework. Major or minor only or consent of the department advisor, or graduate standing.

**333 GEOMETRIC DIMENSIONING AND TOLERANCING****3 sem. hrs.**

Interpretation and application of geometric dimensioning and tolerancing. Includes inspection of parts using a coordinate measuring machine. Lecture and lab. Prerequisites: TEC 130 and 216 or demonstrated equivalent competencies. Major or minor only or consent of the department advisor, or graduate standing.

**345 PROCESS CONTROL NETWORKS****3 sem. hrs.**

Programmable Logic Controller (PLC) programming within process control networks connecting machines, devices, sensors, and computers. Lecture and lab. Materials charge optional. Prerequisites: TEC 240 and 263 or demonstrated equivalent competencies. Major or minor only or consent of the department advisor, or graduate standing.

**348 SELECTED TOPICS IN COMPUTER SYSTEMS TECHNOLOGY****3 sem. hrs.**

Study of advanced topics in computer technology, with laboratory experiences that apply current knowledge and skills. Lecture and lab. Multiple enrollment are allowed if content differs; maximum 6 hours. Materials charge optional. Formerly *SELECTED TOPICS IN INDUSTRIAL COMPUTER SYSTEMS*. Prerequisites: TEC 245 and completion of 75 hours or consent of the instructor, or graduate standing. Major or minor only or consent of the department advisor.

**348A06 E-COMMERCE****3 sem. hrs.**

This course enables students to examine, develop, and manage e-Commerce related projects. One focus is the development of secure e-Commerce sites on Windows (IIS Server) and UNIX (Apache) platforms. This course also enables students to understand and apply the concepts of entrepreneurship, e-Business, and examine business models and to understand and apply on-line database management systems and web security. Prerequisites: TEC 245 and completion of 75 hours or consent of the instructor. Major or minor only or consent of the department advisor.

**349 TECHNICAL WRITING II****3 sem. hrs.**

Instruction and practice in editing, proposals, and analytical writing; attention given to style manuals, research writing, and (as needed) publication. Lecture. Also offered as ENG 349. Materials charge optional. Prerequisite: ENG 249, or graduate standing.

**350 PACKAGE DESIGN AND PRODUCTION****3 sem. hrs.**

Study of design, materials, and production processes used in the manufacture of packages and displays. Lecture, lab and field trips. Materials charge optional. Formerly *FLEXOGRAPHY*. Prerequisites: TEC 116, 257. Major or minor only or consent of the department advisor, or graduate standing.

**351 CROSS-MEDIA TECHNOLOGY****3 sem. hrs.**

Technology and processes used in cross-media production, with emphasis on interactive digital print products. Lecture and lab. Formerly *ADVANCED IMAGE TRANSFER SYSTEMS*. Prerequisites: TEC 250. Major or minor only or consent of the department advisor, or graduate standing.

**352 PREPRESS TECHNOLOGY****3 sem. hrs.**

Utilization of advanced pre-press methods and technologies in the creation and management of print media. Lecture, labs and field trips. Formerly *ADVANCED PREPRESS TECHNOLOGY*. Materials charge optional. Prerequisites: TEC 250. Major or minor only or consent of the department advisor, or graduate standing.

**353 COLOR MANAGEMENT****3 sem. hrs.**

Study of color theory and measurement, device calibration and profiling, color reproduction variables, color proofing, and color management workflow. Lecture, labs and field trips. Materials charge optional. Prerequisites: TEC 253. Major or minor only or consent of the department advisor, or graduate standing.

**354 PRINT PRODUCTION****PLANNING AND PROFITABILITY****3 sem. hrs.**

Printing production workflow analysis, cost estimating, scheduling, job costing, and profitability. Use of computer-assisted management software. Lecture. Prerequisites: MAT 120; TEC 257. Major or minor only or consent of the department advisor, or graduate standing.

**356 GRAPHIC COMMUNICATIONS BUSINESS PRACTICES****3 sem. hrs.**

Current management trends in the profession, with specific emphasis on production management and legal issues for graphic communications businesses. Lecture. Prerequisites: TEC 257. Major or minor only or consent of the department advisor, or graduate standing.

**358 E-PUBLISHING MANAGEMENT****3 sem. hrs.**

Study of ePublishing technology, media production management, and digital asset management for graphic communications businesses. Lecture, labs and field trips. Materials charge optional. Formerly *DIGITAL MEDIA MANAGEMENT*. Prerequisites: TEC 152, 250. Major or minor only or consent of the department advisor, or graduate standing.

**360 RENEWABLE ENERGY CAPSTONE****3 sem. hrs.**

A research-focused synthesis of the skills and knowledge acquired in the Renewable Energy major coursework. Lecture and lab. Prerequisites: TEC 260 and a minimum of 45 hours completed. Major or minor only or consent of the department advisor.

**370 SUPPLY CHAIN LOGISTICS****3 sem. hrs.**

Supply chain networks for technology-based companies. Activities associated with transforming goods from raw materials through delivery to end user. Lecture. Prerequisites: TEC 270 or concurrent registration. A minimum of 60 hours completed or graduate standing. Major or minor only or consent of the department advisor.

**378 E-COMMERCE****3 sem. hrs.**

A study of technological concepts, business models, entrepreneurship, and policy related to e-transactions in trade and commerce. Lecture and lab. Not for credit if had TEC 348A06. Prerequisites: TEC 283. Major or minor only or consent of the department advisor, or graduate standing.

**383 TELECOMMUNICATIONS TECHNOLOGY****3 sem. hrs.**

Interfacing computers locally and through telecommunications networks. Identification of existing standards and hardware and evaluation of specific needs. Lecture and lab. Materials charge optional. Prerequisites: TEC 243 or IT 254. Major or minor only or consent of the department advisor, or graduate standing.

**390 COMPUTER SYSTEMS APPLICATIONS****3 sem. hrs.**

Development of managers and supervisors with technical and professional background in communications, networking, and interfacing, related to computer systems. Lecture and lab. Materials charge optional. Formerly *INDUSTRIAL COMPUTER APPLICATIONS*. Prerequisites: TEC 270 and PHY 105; 9 senior hours of technical courses in Computer Systems Technology. Major or minor only or consent of the department advisor, or graduate standing.

**392 MANUFACTURING ORGANIZATION AND MANAGEMENT****3 sem. hrs.**

The study of industrial production systems including product, manufacturing, and plant engineering through the managing of a production project. Lecture and lab. Materials charge optional. Prerequisites: TEC 398A02 or 400 hours of documented engineering technology related work experience; TEC 270 and 9 senior hours of technical coursework in Engineering Technology and senior standing or consent of the instructor. Major or minor only, or graduate standing.

**394 CONSTRUCTION MANAGEMENT AND ADMINISTRATION****3 sem. hrs.**

Principles, practices, and standard documentation utilized in construction project management and administration. Lecture and lab. Prerequisites: TEC 226, 229, and 325; TEC 398 or 800 hours documented construction experience. Major or minor only or consent of the department advisor, or graduate standing.

**398 PROFESSIONAL PRACTICE: DEPARTMENT OF TECHNOLOGY****1-8 sem. hrs.**

Planned and supervised management-oriented work-study experiences in businesses, industries, and governmental agencies. Forty hours of work per credit hour. Internship and Coop options listed separately below. CR/NC only. No more than 3 hours may apply toward major. Multiple enrollments are allowed: maximum 16 hours applicable for graduation. Prerequisites: Major only. ISU overall and major GPA of 2.50 and consent of the department Professional Practice Coordinator. Evidence of health insurance required. Please see student manual for additional information and application procedures.

**398A02 PROFESSIONAL PRACTICE: INTERNSHIP IN TECHNOLOGY****1-8 sem. hrs.**

Eight-week full-time/320 hours part-time minimum work term duration. CR/NC only. Prerequisites: Must have completed at least 30 hours of college coursework. Completion of 12 hours coursework at ISU. TEC 100-level required courses and three hours of 200/300-level courses in your TEC major.

**398A52 PROFESSIONAL PRACTICE: COOP IN TECHNOLOGY****1-8 sem. hrs.**

Eight-week full-time/320 hours part-time minimum work term duration; 3 work terms minimum. CR/NC only. Prerequisites: TEC 100-level required courses.