

Course Descriptions Continued

IT 38500 Industrial Ergonomics—Class 3, cr. 3 or class 2, lab 2, cr. 3. *Prerequisite: Math 115.* A course designed to focus on work design and ergonomics in manufacturing. Specific attention will be focused on introducing the terminology and the techniques used in work design and on the fundamental concepts embodied in industrial ergonomics. During scheduled laboratory times, exercises will permit the student to apply the concepts of industrial ergonomics.

IT 44200 Production Planning—Class 3, cr. 3, or class 2, lab 2, cr.3. *Prerequisite: IT 121400 and MET 24500.* A study of industrial organization and management, research and development, production, personnel, and sales. Examples of the procedures necessary to provide a product or service are included. Field trips may be required.

IT 44500 Problem-Solving with Automatic Data Collection—Class 3, cr. 3, *Prerequisite: IT 34500.* The problem-solving skills learned in IT 34500 are applied to manufacturing, distribution, or business data collection problems. Depending on the problem, one or more of the available data collection technologies will be used to address the issue of concern.

IT 45000 Production Cost Analysis—Class 3, cr. 3 or class 2, lab 2, cr. 3. *Prerequisite: Math 115.* An introduction to financial statements and to the study of the costs of production in terms of break-even and least-cost alternatives, including present and future costs when related to the time value of money, budgeting, labor and overhead, production, cost control, and the role of the supervisor and the engineering technologist to cost control. Computer applications for determining rate of return for complex problems are introduced.

IT 44600—Six Sigma Quality—Class 3, cr. 3. A study of the six sigma quality and process improvement methodology, using the define, measure, analyze, improve, and control (DMAIC) process. The course addresses advanced topics in statistical quality as they pertain to the six sigma methodology and provides preparation for the Green Belt Certification exam.

IT 48300 Facility Design for Lean Manufacturing—Class 3, cr. 3, or class 2, lab 2, cr. 3. *Prerequisite: IT 44200 and MET 24500.* This capstone course integrates all aspects of manufacturing activities and materials handling focusing on lean concepts. A systematic approach is used to design a manufacturing facility integrating principles of lean production systems and eliminating waste through continuous improvement. Computer simulation and projects are required.

OTHER REQUIRED TECHNICAL COURSES

CGT 11000 Technical Graphics Communications—Class 2, lab. 2, cr. 3. This course is an introduction to the graphic

language used to communicate design ideas using CAD. Topics include: sketching, multiview drawings, auxiliary views, pictorial views, working drawings, dimensioning practices, and section views.

CNIT 13600 Personal Computing Technology & Apps—Class 1, lab 4, cr. 3. This course provides an intermediate coverage of PC technology and problem solving. Topics include computer hardware, operations and ethics, and operating systems and environments. Students will gain hands-on skills with applications such as desktop and file management; word processing; spreadsheets; presentation graphics; electronic mail; personal information management; and Internet browsing, searching, and publishing. Not available for credit to Computer & Information Technology majors.

ECET 21400 Electricity Fundamentals—Class 2, lab. 2 cr. 3. *Not open to ECET students. Prerequisites: MATH 115.* An introduction to elemental electrical components and their characteristics, basic electrical circuit theory, and use of basic laboratory test equipment, , electrical motors, and industrial motor controls.

MET 14300 Materials & Processes I—Class 2, lab. 2, cr. 3 An overview of structures, properties, processing, and applications of metals and ceramics commonly used in industry is presented. Problem solving skills are developed in the areas of materials selection, evaluation, measurement, and testing.

MET 24500 Manufacturing Systems—Class 2, lab. 2, cr. 3. *Prerequisites: MET 14300 or MET 14400, Math 115 or Math 126, or MET 16000.* This course surveys the manufacturing processes and tools commonly used to convert cast and molded, formed, and joined materials into finished products. It includes the fundamentals of material removal, measurement, statistical quality control, assembly processes, process planning and optimization, CNC programming and automated manufacturing.

MFET 30000 Application of Automation in Manufacturing—Class 2, lab 2, cr. 3. *Prerequisites: MET 24500, ECET 21400*

This course is an introductory to computer automated manufacturing methods. The emphasis of this course will be on those methods most closely related to Computer Integrated Manufacturing.

MET 45100 Manufacturing Quality Control—cr. 3. Quality control practices used in manufacturing industries; management, statistical control charts, reliability, sampling plans, economics, computer methods, and test equipment are presented and applied. Credit will not be granted for both MET 45100 and MFET 45100.

Program Strengths

- Student-oriented faculty who are experts in their fields.
- Excellent, varied job opportunities for all graduates with very high placement rates.
- Broad education in several technical and management areas.
- Electives permit students to specialize in an area of choice.
- The curriculum is attractive and relevant to the life and careers of our students.

Job Outlook

Many entry-level job openings will occur for general technologists as automation and modernization continues to be applied in business and industry.

The best opportunities will exist for graduates from recognized college-level technical programs.

An increased demand for interdisciplinary technologists in manufacturing support jobs is expected.

Growing job market in the automatic data collection and identification area.

Job Titles

- Automatic Data Capture System Analyst
- Facilities Planner
- Industrial Engineer
- Industrial Trainer & Training Manager
- Manufacturing Engineer
- Operation Specialist
- Process Design Engineer
- Product Manager
- Production Manager
- Quality Assurance Engineer
- Safety System Specialist
- Sales Engineer
- Service Parts Engineer
- Technology Educators
- Technical Manager
- Technical Sales Account Manager

Industrial Technology



Industrial Technology

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Bachelor of Science Degree Plan of Study—IT

Semester 1 - Fall	CR	Semester 2 - Spring	CR	Semester 3 - Fall	CR	Semester 4 - Spring	CR
IT 10400 Industrial Organizations	3	IT 21400 Introduction to Lean Manufacturing	3	IT 28100 Industrial Safety OR IT 35100 Adv Ind Safety & Health Mgt	3	IT 23000 Industrial Supply Chain Management	3
CGT 11000 Technical Graphics Communication	3	CNIT 13600 Personal Computing Technology & Applications	3	MET 245 Manufacturing Systems	3	Technical Elective ³	3
ENG W131 English Composition I	3	ENG-W 234 Technical Report Writing OR ENG-W 231 Professional Writing	3	Humanities or Social Science Elective	3	General Elective ¹	3
MATH 115 Precalculus and Trigonometry	5	Math or Computing Selective ⁴	3	ECET 21400 Electricity Fundamentals	3	ECON 103 Intro. to Microeconomics OR 104 Intro. to Macroeconomics	3
MET 14300 Materials & Processes I	3	SPCH 121 Public Speaking	3	PHYS 201 or 221 General Physics I	5	General Elective ¹	3
Total Credit Hours	17	Total Credit Hours	15	Total Credit Hours	17	Total Credit Hours	15

Semester 5 - Fall	CR	Semester 6 - Spring	CR	Semester 7 - Fall	CR	Semester 8 - Spring	CR
IT 34200 Introduction to Statistical Quality	3	IT 38500 Industrial Ergonomics	3	IT 44200 Production Planning	3	IT 48300 Facility Design for Lean Manufacturing	3
MFET 30000 Application of Automation in Manufacturing	3	Technical Elective (300 Level or above) ³	3	IT 45000 Production Cost Analysis	3	Technical Elective (300 Level or above) ³	3
Technical Elective ³	3	Technical Elective (300 Level or above) ³	3	Technical Elective (300 Level or above) ³	3	Technical Elective (300 Level or above) ³	3
Technical Elective ³	3	Science Selective ²	4	Science Selective ²	3	General Elective ¹	3
Communications Selective ⁵	3	General Elective ¹	3	General Elective ¹	3	Math or Computing Selective ⁴	3
						CAND 99100 ⁶	0
Total Credit Hours	15	Total Credit Hours	16	Total Credit Hours	15	Total Credit Hours	15

Degree Code: IT-GEN-BS
Date POS Effective: Fall 2006

BS TOTAL CREDIT HOURS (as listed) 125
Minimum Required 122

DEPARTMENTAL POLICIES: It is the responsibility of each student to assure that he/she schedules the necessary prerequisites and courses to meet graduation requirements. Questions may be directed to your academic advisor.

¹General Electives - Courses from any discipline at the 100-400 level.

²Science Electives - Science Electives are courses taken from the following disciplines (can be 3 or 4 credit hours):

Astronomy (AST)	Biology (BIOL)	Chemistry (CHEM)
Geology (GEOL)	Microbiology (MICRO)	Physiology (PHYSL)
Physics (PHYS)		

³Technical Electives - Courses taken from the following disciplines:

Technical Disciplines available in South Bend

Electrical & Computer Engineering Technology (ECET)
Industrial Technology (IT)
Mechanical Engineering Technology (MET)

Technical Disciplines NOT available in South Bend

Civil Engineering Technology (CET)
Computer Graphics Technology (CGT)
Computer & Information Technology (CNIT)
Computer Integrated Manufacturing Technology (CIMT)
Construction Technology (CNT)
Industrial Engineering Technology (IET)

⁴Math and Computing Selectives - Math and Computer Selectives are courses taken from the following disciplines:

Informatics (INFO)
Computer & Information Technology (CNIT)
Computer Science (CSCI)
Mathematics—above the level of Math 115

⁵Communication Selectives

Speech S223 Business & Professional Speaking
Speech S380 Nonverbal Communication
Speech S450 Gender & Communication

⁶CAND 991 - Students MUST enroll in CAND 991 in conjunction to their last course(s) for graduation. **This is the student's application for graduation.** There are no fees for this course. No class attendance is required and no grade will be assigned.

Course Descriptions

IT 10400 Industrial Organizations—*Class 3, cr. 3* A detailed survey of organizational structures, operational, financial, marketing, and accounting activities; duties of management, planning, control, personnel, safety, wages, policy, and human factors necessary for effective management.

IT 21400 Introduction to Lean Manufacturing—*Class 3, cr. 3*

Lean manufacturing is a systematic approach to eliminating non-value added activities throughout a production system. Five basic principles characterize a lean production system: value definition, value stream mapping, flow optimization, pull production, and continuous improvement.

IT 23000 Industrial Supply Chain Management —*Class 3, cr. 3,*

or class 2, lab 3, cr. 3 A study of industrial supply chains. Emphasis is on in-plant shipping and receiving functions; modes of distribution; functions of, and services provided by supply chains. Emphasis is placed on how manufacturers, distributors and end users can provide value in the supply chain.

IT 28100 Industrial Safety—*Class 3, cr. 3. Prerequisite: IT 10400* A course designed to develop understanding of, and insight into, the basic aspects of accident prevention and safety. Specific attention will be given to (1) the psychological aspects of accident prevention; (2) the principles of accident prevention; (3) the practical aspects of planning, implementing, and maintaining a safe environment; and (4) standards, current laws, and regulations. Field trips may be required.

IT 33000 Industrial Sales & Sales Management—*Class 3, cr.3.* Sales & Sales management techniques for analyzing distribution challenges and providing solutions through effective communication; establishing credibility, effective questioning techniques, development and presenting solutions, anticipating objections and gaining a commitment, plus techniques for building, developing and compensating an effective sales organization.

IT 33200 Purchasing, Inventory, & Warehouse Mgt—*Class 3, cr.3.* A course designed to develop understanding of types of warehouses, methods of organizing the warehouse environment, and determining efficient inventory control procedures. Purchasing of products, storage of inventory, placement of inventory and other internal logistics management topics will be explored.

IT 34200 Introduction to Statistical Quality—*Class 3, cr.3, or class 2, lab 2, cr. 3. Prerequisite: Math 115.* Basic concepts of quality systems in business and manufacturing settings are presented. Basic statistical methods as applied to quality control, and an introduction to sampling plans are included. Field trips may be required.

IT 34500 Automatic Identification and Data Capture—

Class 3, cr. Prerequisite: CNIT 17500 or IT 21400

The course studies systems used to automate data collection and identify physical objects. Keyless data entry, biometrics, electromagnetics, magnetics, optics, smart cards, and touch input will be utilized. The role of electronic data interchange (EDI) will be studied. Field trips may be required.

IT 35100 Adv Industrial Safety and Health Mngt—*Class 3, cr.*

An introduction to OSHA and standards development for occupational health in general industry. Special emphasis is on fire protection and egress, flammable and combustible liquids, electrical, personal protective equipment, machine guarding, industrial hygiene/blood borne pathogens, ergonomics, and ISO 9000/14000 integration.

IT 38100 Total Productive Maintenance—*Class 3, cr. 3 or*

class 2, lab2, cr. 3. Prerequisite/Corequisite: Math 115. This course is a study of the role and scope of total productive maintenance (TPM) in manufacturing. The three types of maintenance activities: corrective, preventive, predictive, and their associated quantitative techniques are studied. Reliability and queuing theory are discussed. Team projects are required.