response times. Network security, global in-tranet, custom queuing, and routed priority services. (2 lecture, 4 lab hours; field trips) (Formerly IT 163)

IT 71. Metallurgical Processes (3)
(Same as MEAG 50.) Fundamentals of metallurgy; properties and characteristics of metals; survey of metal welding processes, equipment, and procedures; theory-discussion and laboratory experience in oxygen-fuel welding, cutting, brazing, and shielded metallic arc welding. (2 lecture, 3 lab hours) (Course fee, $7)

IT 74. Manufacturing Processes (3)
Study of how consumer and industrial products are manufactured, focusing on how raw materials (primarily metal and plastic) are changed into finished products. Topics include production processes of material addition, forming, casting, removal, separation, assembly, and finishing. (2 lecture, 2 lab hours) (Course fee, $7)

IT 80. Wood Processing Technology (3)
Wood properties, materials, finishing; hand, portable electric, and machine tool processing; design, production planning; safety, adhesives, and cutting principles; machine design and use. (6 lab hours) (Course fee, $10)

IT 92. Safety Management (3)
Principles of safety management in an industrial and agricultural environment; safety legislation and programs; management/supervisory and employee responsibilities and attitudes; physical hazards associated with chemicals, equipment, fire, compressed gases; other topics include eye, stress, drugs, lifting, office, and noise safety.

IT 102. Industrial Computer Concepts and Applications (3)
Introduction to computer systems hardware and software, operating system basics and installation, computer maintenance and troubleshooting. (2 lecture, 2 lab hours)

IT 103. Network Operating Systems (3)
Prerequisite: IT 102. Introduction to multi-user and multitasking network operating systems. Covers characteristics of the Linux, Windows 2000, NT, and XP network operating systems. Installation procedures, security issues, backup procedures, and remote access. (2 lecture, 2 lab hours)

IT 104. Product Design (3)
Prerequisite: IT 114 and 115. Elements, principles, and methods of design. Emphasis will be placed on the development of models and prototypes with attention to standard components, productivity, and packaging. (2 lecture, 2 lab hours)

IT 106. Energy Conversion and Utilization (3)
Fundamental sources of energy, including the following energy conversion systems: direct mechanical, external combustion, internal combustion, solar power, wind power, electrical and atomic systems. Experiments and demonstrations. (2 lecture, 2 lab hours; field trips)

IT 107. Facilities Planning and Materials Handling (3)
Facility planning techniques as applied to facility location, zoning, building codes, line balancing, shipping-receiving, offices, material handling, storage, project scheduling, and computerized layout.

IT 110. Fluid Power (3)
Selective study of fluid power principles and applications; hydraulics, pneumatics, and vacuum; includes pumps, controls, transmission systems, actuators, and fluidics. In-depth study of air conditioning-heating theory and applications. (6 lab hours; field trips) (Course fee, $5)

IT 112. Industrial Process Control Systems I (3)
Prerequisite: IT 52. Process control principles; components and principles; transducers, actuators, sensors, and instrumentation; computer interface software, terminologies, standards, and trends in control technologies. Programmable logic controller principles, hardware, and software. (2 lecture, 2 lab hours)

IT 114. Industrial Materials (3)
Chemical and physical properties of metals, polymers, ceramics, composites. Atomic structure and phases of matter emphasizing crystalline and amorphous solids. Mechanical properties, strength and testing of materials including impact, hardness, and tensile. Metallographic, microscopic inspection of electronic, and metallic specimens. (2 lecture, 2 lab hours)

IT 115. Design and Documentation Systems (3)
IT 41 recommended prior to enrollment. Design and documentation systems used in business and industry. CAD principles and applications, product development process, design process management, design review, concurrent engineering, value analysis. (2 lecture, 2 lab hours)

IT 116. Applied Visual Programming (3)
Contemporary computer language used in office automation and manufacturing industry; basic concepts on structural programming, object-oriented language, programming mechanics, user interface development, and Internet applications. (2 lecture, 2 lab hours)

IT 117. Quality Assurance (3)
Prerequisites: DS 73 or MATH 11. Quality assurance principles and practices in industry: quality assurance systems, acceptance sampling, testing, source surveillance; probability and statistical concepts, process control techniques and measurement procedures as applied to quality.

IT 118. Production Operations (3)
A survey of production manufacturing operations: quality assurance, work sampling, testing, time and motion study; routing, scheduling, and inventory control; flow processes, material handling, and automation. (Field trips)

IT 120. Vehicle Engine Systems (3)
Prerequisites: IT 12, 52 or concurrently. Advanced study of vehicle engines and support systems. Includes engine theory, fuel and electrical systems, turbochargers, LPG, diesel, computerized emission and engine controls, and dynamometer testing analysis. (6 lab hours; field trips)

IT 121. Automotive Engine Machining (3)
Prerequisites: IT 12, 74. Advanced study of automotive engine machining including precision measurements, principles of engine operation, machining of engine components, crack detection, assembly procedures, lubricating and cooling systems. (6 lab hours; field trips) (Course fee, $6)

IT 122. Vehicle Chassis Analysis (3)
Prerequisite: IT 12. Advanced study of vehicle chassis components including power transmission, brake systems, wheel suspension, air conditioning, body repair and refinishing, computer controls and diagnostics. (2 lecture, 2 lab hours; field trips)