Manufacturing Technology

Blueprint Reading for Machinists

MANUF 0480 - 1 Credits

Lines, dimensions, tolerances, notes, symbols, specifications, materials, manufacturing processes and standards. Orthographic and pictorial projections. Machine shop terminology. (1 lecture hour)

Industrial Design/CAD

MANUF 1101 - 3 Credits

An introduction to the use of microcomputers for design of industrial blueprints of intermediate complexity. Sketching, lettering, orthographic projections, descriptive geometry, point, line and basic geometric shapes. The use of menus, layers, fonts and weights. Basic dimensioning, tolerancing and pictorial drawings. The student is expected to draw a blueprint with simple dimensions label and notes using different layers. (2 lecture hours, 2 lab hours)

Technical Mechanics

MANUF 1104 - 2 Credits

Analysis and solution of practical problems in technical mechanics. Application of basic calculations and standards for design and maintenance of mechanical systems. (2 lecture hours)

Metrology

MANUF 1110 - 3 Credits

Initial course in the science of precision measurement techniques. Basic and advanced methodology behind measurement principles and tools used in the measurement process. Emphasis on laboratory skills in dimensional measurement using micrometers, calipers and gage blocks. Basics of geometric tolerancing and data analysis. Various applications of measurement including the Coordinate Measuring Machine (CMM), roundness measurement, and surface finish measurement. Additional topics include optical systems and quality control methods, as well as calibration standards. (2 lecture hours, 2 lab hours)

Physical Metallurgy

MANUF 1121 - 3 Credits

Functions of the metallurgical laboratory and equipment including mechanical testing, metallography, heat treatment and extractive metallurgy. Basic principles concerning materials science including atomic and crystal arrangements and their effect on mechanical properties. Simple phase equilibrium. Ferrous and nonferrous metals and alloys classification systems. (2 lecture hours, 2 lab hours)

Introduction to Plastics

MANUF 1126 - 3 Credits

The theory and use of plastics in industry. Physical, chemical and electrical properties of plastics and testing criteria are discussed. Processes such as injection molding, extrusion, blow molding, rotational molding, and thermoforming are covered. Control factors affecting the quality of parts, applications, benefits and limitations of plastics are explained. Related topics include process relationships, parameter setting techniques, rapid changeover techniques, process control and troubleshooting. (3 lecture hours)

Engineering Materials of Industry

MANUF 1127 - 3 Credits

Basic principles of materials technology including the internal structures of materials, physical and mechanical properties, fusion and bonding, annealing and plastic deformation (3 lecture hours)

Machine Shop I

MANUF 1151 - 3 Credits

Designed for students with little background in the use of metal-working machine tools. Basic principles and operations on the engine lathe, vertical milling machine and surface grinder. Precision measurement. (2 lecture hours, 2 lab hours)

Advanced Machine Processes

MANUF 1153 - 3 Credits

The application of skills that are commonly known in the industry as "machine shop." The development of operation skills of traditional engine lathes, vertical/horizontal mills and grinding as well as operations on similar machines. Emphasis is on those skills needed by trades persons who have achieved proficiency in the operation of machines and related tooling and equipment. Quality skills related to machining and some planning and job control skills related to machine work. Prerequisite: Manufacturing Technology 1151 or equivalent or consent of instructor (2 lecture hours, 2 lab hours)

Technical Static & Strength of Material

MANUF 1160 - 4 Credits

Basic analysis of external force systems acting upon bodies in equilibrium with subsequent treatment of the stresses and strains induced. Laboratory projects involve the use of nondestructive and destructive testing equipment to determine the various mechanical properties of materials and

their behavior under load. Not intended for engineering students. Prerequisite: Physics 1201 or equivalent and Mathematics 1432 (or college equivalent) or qualifying score on the mathematics placement test or qualifying A.C.T. math score or consent of instructor (3 lecture hours, 2 lab hours)

Quality Control

MANUF 1180 - 3 Credits

An introduction to quality control and the development of the concept of total quality control engineering, process improvement, and quality information systems. A broad overview of total quality control and its scope throughout the business organization enables the student to analyze the various costs of quality and improve productivity. Topics will include 100 percent inspection versus statistical inspection and process control charts, as well as some of the tools of Organizational Development (OD) useful in promoting a Total Quality Control (TQC) and Total Quality Management (TQM) environment (3 lecture hours)

Fundmntls of Plastics & Plastic Products

MANUF 1700 - 3 Credits

Fundamentals of plastics materials as they pertain to plastic products. Topics include comparing and contrasting elastomers and plastics, and testing methods. Data sheet analysis used to predict product characteristics. Prerequisite: Manufacturing Technology 1126 with a grade of D or better or equivalent (3 lecture hours)

Selected Topics I

MANUF 1820 - 1-10 Credits

Introductory exploration and analysis of selected topics with a specific theme indicated by course title listed in college course schedule. This course may be taken four times for credit as long as different topics are selected. (1 to 6 lecture hours, 2 to 8 lab hours)

Independent Study

MANUF 1840 - 1-4 Credits

Exploration and analysis of topics within the discipline to meet individual student-defined course description, goals, objectives, topical outline and methods of evaluation in coordination with and approved by the instructor. This course may be taken four times for credit as long as different topics are selected. Prerequisite: Consent of instructor is required (1 to 4 lecture hours)

Production Technology

MANUF 2200 - 4 Credits

The theory of process planning and process control in manufacturing. Emphasis is on the study of these concepts as they apply the manufacturing production process, safety,quality and continuous improvement, and maintenance awareness. (4 lecture hours)

Geometric Dimensioning and Tolerancing

MANUF 2201 - 3 Credits

Introduces the principles of industrial drafting as specified by the American National Standards Institute (ANSI). Topics include part dimensional control techniques, interchangeability of parts and the differences between traditional dimensioning and geometric dimensioning. Symbols and terms for dimensioning, datum and materials condition symbols are introduced. Various tolerances of form, profile orientation, run-out and location are demonstrated. Feature control frames are discussed. Prerequisite: Manufacturing Technology 1101 or consent of instructor (3 lecture hours)

Solid Modeling and Design

MANUF 2202 - 3 Credits

The theory and application of solid modeling techniques for product design and manufacturing. Prerequisite: Manufacturing Technology 1101 or consent of instructor (2 lecture hours, 2 lab hours)

Manufacturing Processes and Design

MANUF 2203 - 3 Credits

A survey of manufacturing methods and materials employed in cold working processes. The student will understand the various methods of product fabrication and the manufacturing processes for sound economic decision making in manufacturing and product design. Other topics include the interrelationship among materials, their selection for use in product design and processes, and conversion of these materials into finished components. Prerequisite: Manufacturing Technology 2202 or consent of instructor (2 lecture hours, 2 lab hours)

Mechanical Computr-Aided Drafting/Design

MANUF 2206 - 3 Credits

Computer-aided drafting/design (CADD) as drafting tool for the creation of mechanical production drawings. Solids modeling concepts and application of geometric dimensioning techniques are explained. The student is expected to finish detail and assembly drawings from a layout and demonstrate an understanding of the principles of engineering and design. Prerequisites:

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Manufacturing Technology 2201 or equivalent and Manufacturing Technology 2202 or equivalent and consent of instructor (2 lecture hours, 2 lab hours)

Tool Design

MANUF 2207 - 3 Credits

An advanced course on the designing of manufacturing production tools, molds, dies, jigs and fixtures. Prerequisite: Manufacturing Technology 2202 or equivalent or consent of instructor (2 lecture hours, 2 lab hours)

Mechanical Design Portfolio

MANUF 2208 - 3 Credits

Practical overview of the design process with case materials and real-life design problems. Provides the student with an opportunity to create a design portfolio. Prerequisite: Manufacturing Technology 2207 or equivalent, or consent of instructor (2 lecture hours, 2 lab hours)

Basic Parametric Design-Pro/E

MANUF 2240 - 3 Credits

A basic course in creating 3-dimensional (3-D) parametric parts, 2-dimensional (2-D) drawings and 3-D assemblies. Includes multi-part models. Emphasis is on the philosophy of parametric design and constraints. Prerequisite: Experience in design and drafting (2 lecture hours, 2 lab hours)

Advanced Parametric Design-Pro/E

MANUF 2242 - 3 Credits

Advanced course in creating multi-part parametric assemblies, exploded assemblies, parts having complex surface features, and design of sheet metal parts in both a flattened and bent state using parametric modeling software. Includes associated drawing files. Prerequisite: Manufacturing Technology 2240 with a grade of D or better or equivalent, or consent of instructor (2 lecture hours, 2 lab hours)

Computer Numerical Control (CNC)

MANUF 2251 - 3 Credits

An introduction to CNC machinery as it applies to the operator and programmer. Introduction to CNC programming coding, set-up, tooling, operation and troubleshooting. Basic principles and applications of numerically controlled equipment and the set- up and operation of CNC machines.

Prerequisite: Manufacturing Technology 1151 or equivalent, or consent of instructor (2 lecture hours, 2 lab hours)

Computer-Aided Manufacturing (CAM)

MANUF 2253 - 3 Credits

Introduction to computer assisted part of programming (CAM) as it applies to computer numerical control (CNC). Various types of programming systems. Piece part geometry definition, computer input of this geometry, and post processing this information into CNC code. This code is then used to machine parts. Familiarity with CAM software and mathematical skills required. The student is expected to demonstrate a measurable level of skill in geometry definition of the CAM system, post processor knowledge to modify CNC code, and application of computer aided design (CAD) to generate CNC code. Prerequisite: Manufacturing Technology 2251 or equivalent (2 lecture hours, 2 lab hours)

Basic Die Making I

MANUF 2261 - 4 Credits

Fundamental theory and study of tool and die making, including punch press sizes and feeds for dies, and their uses and relationships to each other. Prerequisite: Consent of instructor is required (4 lecture hours)

Basic Die Making II

MANUF 2262 - 4 Credits

Continuation of Basic Die Making I. Principles and processes used in sheet metal work, using stock-strip layouts, cutting and stripping pressures, and flat blank layouts. Prerequisite: Manufacturing Technology 2261 or equivalent or consent of instructor (4 lecture hours)

Mold Making I

MANUF 2265 - 4 Credits

Mold construction, elastics, die casting, proper selection and heat treatment. Prerequisite: Consent of instructor is required (4 lecture hours)

Mold Making II

MANUF 2267 - 4 Credits

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An advanced class in mold making. Emphasis is on the use of side cores, various methods of mold construction, fitting clearances, locking devices, and finishes required in mold cavities. Prerequisite: Manufacturing Technology 2265 or equivalent, or consent of instructor (4 lecture hours)

Robotic Application

MANUF 2271 - 3 Credits

Industrial applications of robots with emphasis on set-up, programming and operations. End effect or design and production line interfacing are studied. Prerequisite: Manufacturing Technology 1171 (2 lecture hours, 2 lab hours)

Advanced Die Making and Engineering I

MANUF 2272 - 4 Credits

An introduction to draw dies: the theory of the drawing of metal, metal reaction, problems and solutions used, lubricants and draw die reductions along with advanced work in gages, fixtures and intricate progressive dies. Prerequisite: Manufacturing Technology 2262 or equivalent, or consent of instructor (4 lecture hours)

Advanced Die Making and Engineering II

MANUF 2274 - 4 Credits

An advanced study of draw dies including types, materials used, lubricants, and the theory of draw die reductions with a continuation of advanced work in gages, fixtures and intricate progressive dies. Prerequisite: Manufacturing Technology 2272 or equivalent, and consent of instructor (4 lecture hours)

Advanced Mold Making and Engineering I

MANUF 2276 - 4 Credits

Theory and process of mold cavities using electrical impulse methods, thread molding and automatic unscrewing methods. Prerequisite: Manufacturing Technology 2267 or equivalent, or consent of instructor (4 lecture hours)

Advanced Mold Making and Engineering II

MANUF 2277 - 4 Credits

A continuation of Advanced Mold Making and Engineering I. Product standards for die casting and analysis of mold cavities by electrical impulse methods. Thread molding and automatic unscrewing

methods, current advances in molds, molding machines, and mold-making methods. Prerequisite: Manufacturing Technology 2276 or equivalent, and consent of instructor (4 lecture hours)

Industrial Safety

MANUF 2280 - 2 Credits

Survey and analysis of current problems and trends in the design and supervision of industrial accident prevention programs. (2 lecture hours)

Cost Analysis

MANUF 2281 - 2 Credits

Study of the economic interdependency of the design, tooling, manufacturing, inspection and testing decisions and the means of quantifying such decisions. Sources and controls of direct, indirect and fixed costs. Influences of cost-accounting practices on engineering decisions. Generating alternatives based on the principles of time and motion economics and work simplification. Cost estimation procedures and controls. (2 lecture hours)

Internship (Career & Technical Ed)yCoop Ed/Internship Occup

MANUF 2860 - 1-4 Credits

Course requires participation in Career and Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.

Internship Advanced (Career & Tech Ed)

MANUF 2865 - 1-4 Credits

Continuation of Internship (Career and Technical Education). Course requires participation in Career & Technical Education work experience with onsite supervision. Internship learning objectives are developed by student and faculty member, with approval of employer, to provide appropriate work-based learning experiences. Credit is earned by working a minimum of 75 clock hours per semester credit hour, up to a maximum of four credits. Prerequisite: 2.0 cumulative grade point average; 12 semester credits earned in a related field of study; students work with

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Career Services staff to obtain approval of the internship by the Associate Dean from the academic discipline where the student is planning to earn credit.