

MMET - MFG & MECH ENGR TECH (MMET)

MMET 105 Engineering Graphics

Credits 2. 1 Lecture Hour. 3 Lab Hours.

(ENGR 1204, ENGR 1304) Engineering Graphics. Graphical approach to the engineering design process as applied to products; methods of graphical communications, three-dimensional geometry, working drawings, data analysis, computer graphics, introduction to team dynamics and creative problem solving.

MMET 181 Manufacturing and Assembly Processes I

Credits 3. 2 Lecture Hours. 3 Lab Hours.

A survey of metal manufacturing processes; traditional machining, non-traditional machining, welding, fabrication, casting and assembly.

Prerequisite: Grade of C or better in MMET 105, ENGR 102, or ENGR 111, or concurrent enrollment.

MMET 201 Manufacturing and Materials

Credits 4. 3 Lecture Hours. 2 Lab Hours.

Survey of metallic and non-metallic materials; selection and applications of materials; introduction to traditional and non-traditional manufacturing processes, assembly processes, and metrology.

Prerequisite: Grade of C or better in ENGR 102 or ENGR 111; grade of C or better in CHEM 107 and CHEM 117 or CHEM 120; industrial distribution major.

MMET 206 Nonmetallic Materials

Credits 3. 2 Lecture Hours. 3 Lab Hours.

Introduction to structure, properties, processing and application of forest products, plastics, ceramics and composites; laboratory includes processing, physical and mechanical testing, applications, surface treatment and material identification.

Prerequisite: Grade of C or better in CHEM 120 or CHEM 107 and CHEM 117; manufacturing and mechanical engineering technology or industrial distribution major or approval of department.

MMET 207 Metallic Materials

Credits 3. 2 Lecture Hours. 2 Lab Hours.

Introduction to structure, properties and engineering application of ferrous and nonferrous materials; beneficiation, production of ferrous and nonferrous metals, destructive and nondestructive testing, protective coatings, strengthening and heat treatment; laboratory includes metallographic procedures, mechanical testing, heat treatment, surface treatment, corrosion testing, recrystallization and failure analysis.

Prerequisite: Grade of C or better in CHEM 120 or CHEM 107 and CHEM 117; manufacturing and mechanical engineering technology or industrial distribution major or approval of department.

MMET 275 Mechanics for Technologists

Credits 3. 3 Lecture Hours.

(ENGR 2301, ENGR 2401) Mechanics for Technologists. Forces, moments and couples in 2-D and 3-D systems; equilibrium of rigid bodies; structural analysis; friction and applications; centroids and moments of inertia.

Prerequisites: Grade of C or better in MATH 152 and PHYS 206 or PHYS 218; manufacturing and mechanical engineering technology major.

MMET 281 Manufacturing and Assembly Processes II

Credits 3. 2 Lecture Hours. 2 Lab Hours.

Survey of Polymer manufacturing processes, casting, expansion, extrusion, molding and thermoforming; additive manufacturing processes, material extrusion, vat photopolymerization, material jetting, binder jetting, sheet lamination, powder bed fusion and directed energy deposition.

Prerequisite: Grade of C or better in MMET 181 and MMET 206; manufacturing and mechanical engineering technology major or approval of department.

MMET 301 Mechanical Power Transmission

Credits 3. 2 Lecture Hours. 2 Lab Hours.

Overview of the engineering concepts of mechanical power and the components within a system to provide transmission of that power into useful work; experimental application of the related theory as it relates to the industrial distributor; "real world" knowledge learned for application in industry.

Prerequisites: Grade of C or better in ENGL 103 or ENGL 104; grade of C or better in MATH 151, MATH 152, PHYS 206, and ENGR 216/PHYS 216 or PHYS 216/ENGR 216; grade of C or better in CHEM 107 and CHEM 117 or CHEM 120; grade of C or better in MMET 201 or concurrent enrollment; junior or senior classification in industrial distribution.

MMET 303 Fluid Mechanics and Power

Credits 4. 3 Lecture Hours. 2 Lab Hours.

Fluid mechanics and fluid power applications for technologists; fluid properties; conservation of energy and momentum; incompressible flow in pipes; standard symbols: components and control of hydraulic systems and pneumatic systems.

Prerequisites: Grade of C or better in MMET 275; manufacturing and mechanical engineering technology major.

MMET 307 Computer Design Graphics

Credits 3. 3 Lecture Hours.

Use of microcomputers with currently available CAD software as an aid in the design process and as a means of increasing engineering productivity; review of ANSI standards and an introduction to a variety of computer graphics applications encountered in industry; user-oriented.

Prerequisites: Grade of C or better in MMET 105 or MMET 181.

MMET 313 Industrial Welding Processes

Credits 3. 2 Lecture Hours. 3 Lab Hours.

Theory and practical applications of industrial welding and cutting processes; experience in operation of various machines and processes.

Prerequisite: Grade of C or better in MMET 181 and MMET 207; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 320 Quality Assurance

Credits 3. 2 Lecture Hours. 3 Lab Hours.

Applied statistical process control and design-of-experiment techniques for quality improvement and process characterization; emphasis on organizations operating in a continuous-improvement, customer-driven environment; statistical thinking; control charts; capability analysis of product, process and measurement system; experimental process characterization, prediction models and input variable control.

Prerequisites: Grade of C or better in STAT 211; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 361 Product Design and Solid Modeling**Credits 3. 2 Lecture Hours. 2 Lab Hours.**

Design processes and methodologies including quality function deployment, materials and process selection, and design for manufacturing and assembly; fundamentals of modeling part geometry and mechanical assembly using parametric CAD software.

Prerequisites: Grade of C or better in ENGR 216/PHYS 216 or PHYS 216/ENGR 216, MMET 181, MMET 206, MMET 207, and MMET 275; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 363 Mechanical Design Applications I**Credits 3. 3 Lecture Hours.**

Principles of design of mechanical components; theories of failure; Soderberg and Goodman diagrams; fatigue and fracture design criteria; materials and their selection to engineering applications; component assembly aspects; design of fasteners and springs as examples.

Prerequisite: Grade of C or better in MMET 376; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 370 Thermodynamics for Technologists**Credits 4. 3 Lecture Hours. 2 Lab Hours.**

Thermal and mechanical energy transformations; relationships applied to flow and non-flow processes in power and refrigeration cycles; devices include compressors, turbines, heat exchangers, nozzles, diffusers, pumps and piston-cylinder models; computer modeling.

Prerequisites: Grade of C or better in PHYS 206, and ENGR 216/PHYS 216 or PHYS 216/ENGR 216; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 376 Strength of Materials**Credits 4. 3 Lecture Hours. 2 Lab Hours.**

Stress and strain; elastic moduli Poisson's ratio; torsion, bending, unsymmetrical bending; design of beams and shafts; deflection of beams; buckling of columns; material and strength characterization laboratory tests.

Prerequisites: Grade of C or better in ENGL 103 or ENGL 104; grade of C or better in MMET 207, MMET 275, MATH 151, MATH 152, CHEM 107 and CHEM 117 or CHEM 120, PHYS 206, and ENGR 216/PHYS 216 or PHYS 216/ENGR 216; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 380 Computer-Aided Manufacturing**Credits 3. 2 Lecture Hours. 3 Lab Hours.**

Basic concepts in computer-aided manufacturing with emphasis on a system approach to manufacturing activities; use of numerical control machine tools and other computer based software as applied to different industries.

Prerequisites: Grade of C or better in MMET 181 and MATH 152; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 383 Manufacturing Information Systems**Credits 4. 3 Lecture Hours. 3 Lab Hours.**

Use of information technology for manufacturing enterprise applications, including computer-integrated manufacturing, database, computer networking, web-technology and enterprise resource planning.

Prerequisites: Grade of C or better in MMET 380; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 401 Fluid Power Transmission**Credits 3. 2 Lecture Hours. 2 Lab Hours.**

Engineering concepts of hydraulics and pneumatic power and its components within a system to provide transmission of that power into useful work; experimental application of the related theory as it relates to the industrial distributor; real world knowledge learned for application in industry.

Prerequisites: Grade of C or better in MMET 201, MMET 301, PHYS 207, and ENGR 217/PHYS 217 or PHYS 217/ENGR 217; junior or senior classification in industrial distribution.

MMET 402 Inspection Methods and Procedures**Credits 3. 2 Lecture Hours. 2 Lab Hours.**

Methods and procedures in nondestructive inspection of materials and industrial products; ultrasonics, dye penetrants, magnetic particle, radiography and supportive evaluation methods such as weld sectioning, polishing, etching and macroscopic analysis.

Prerequisites: Grade of C or better in MMET 281 and MMET 376; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 405 Weldability of Ferrous Metals**Credits 3. 3 Lecture Hours.**

Applied principles of metallurgy with reference to weldability of ferrous metals.

Prerequisites: Grade of C or better in MMET 207 and MMET 313; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 410 Manufacturing Automation and Robotics**Credits 3. 2 Lecture Hours. 3 Lab Hours.**

Hardware for automated work handling, conveyors, loaders, robots, storage devices; power sources and methods of control, electric motors, controllers, program logic controllers, robot programming; interfacing of equipment controls; and manufacturing work cells.

Prerequisites: Grade of C or better in MMET 361, MMET 376, MMET 383 and ESET 300; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 412 Production and Inventory Planning**Credits 3. 2 Lecture Hours. 2 Lab Hours.**

An introductory treatment of models and techniques for the planning of production and inventory systems.

Prerequisites: Grade of C or better in MMET 320, MMET 383 and ISEN 302; senior classification in manufacturing and mechanical engineering technology.

MMET 414 Micro/Nano Manufacturing**Credits 3. 2 Lecture Hours. 3 Lab Hours.**

Product miniaturization and impact; review of atomic structure, electrical and physical properties of materials; ultraprecision machining; microlithography; dry and wet etching/sputtering techniques; isotropic and anisotropic processes; pattern transfer with additive processes; surface micromachining; microreplication processes; introduction to packaging technology and nanometrology; manufacturing of selected microsystems (MEMS) and their applications.

Prerequisites: Grade of C or better in CHEM 107, PHYS 207, and ENGR 217/PHYS 217 or PHYS 217/ENGR 217; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 418 Medical Manufacturing**Credits 3. 2 Lecture Hours. 3 Lab Hours.**

Surveys relevant regulations, biocompatibility of engineering materials, and emphasizes suitable techniques for medical device manufacturing.

Prerequisites: Grade of C or better in MMET 181; junior or senior classification in manufacturing and mechanical engineering technology.

MMET 422 Manufacturing Technology Projects**Credits 2. 1 Lecture Hour. 3 Lab Hours.**

A capstone projects course utilizing a team approach to an analysis and solutions of manufacturing problems.

Prerequisite: Grade of C or better in MMET 429; grade of C or better in MMET 410, MMET 412 and MMET 463, or concurrent enrollment; ENTC 399 or concurrent enrollment; must be taken in fall or spring semester; senior classification in manufacturing and mechanical engineering technology.

MMET 429 Managing People and Projects in a Technological Society**Credits 3. 3 Lecture Hours.**

Supervisory and project management duties and responsibilities in technology based organizations and the methods required to fulfill these functions.

Prerequisites: Grade of C or better in ISEN 302 and MMET 361; grade of C or better in MMET 363, or concurrent enrollment; must be taken in the fall or spring semester immediately prior to MMET 422; senior classification in manufacturing and mechanical engineering technology.

MMET 463 Mechanical Design Applications II**Credits 3. 3 Lecture Hours.**

Applications of principles of analysis and design of machines and machine elements including linkages, robots, cam and follower systems, shafts, gears, clutches, belt and chain drives; introduction to the mathematical tools for the analysis and design of these machines and machine elements.

Prerequisites: Grade of C or better in MMET 361 and MMET 363; senior classification in manufacturing and mechanical engineering technology.

MMET 485 Directed Studies**Credits 1 to 6. 1 to 6 Other Hours.**

Directed study of selected problems in an in an area of manufacturing and mechanical engineering technology not covered in other courses.

May be repeated for credit.

Prerequisites: Senior classification and approval of instructor.

MMET 491 Research**Credits 0 to 4. 0 Lecture Hours. 0 Lab Hours. 0 to 4 Other Hours.**

Research conducted under the direction of faculty member in the college of engineering. May be repeated three times for credit.

Prerequisites: Junior or senior classification and approval of instructor.