QUINSIGAMOND Community College

Manufacturing Technology – Associate in Science
Course Descriptions

CIS 111 Intro to Microcomputer Applications
Credits: 3
This course focuses on basic working knowledge and hands-on experiences in word processing, spreadsheet processing, database processing, and presentation software. Students acquire an overview of computer concepts, the most common business office operating systems, the Internet, and the World Wide Web.

MAT 123 College Mathematics I: Precalculus
Credits: 3
Prerequisites: MAT 100 or appropriate Placement score
This course focuses on the knowledge and skills necessary for advanced mathematics. Students expand binomial expressions using the binomial theorem; solve non-linear, and rational inequalities and write their solutions using interval notation; determine and write linear equations in several forms; explain the concept of function; graph functions using symmetry test; recognize and graph functions, including constant, linear, quadratic, polynomial, rational, exponential, and logarithmic functions; use function transformation techniques; perform composition and arithmetic operations on functions; find and graph inverses of functions; use properties of logarithms; and solve logarithmic and exponential equations.

MNT 101 Mechanical CAD I
Credits: 3
This course introduces computer-aided design (CAD) software. Students develop an understanding of the commands needed to produce a two-dimensional drawing. Topics include drawing setup, geometry creating, editing functions, layer techniques, dimensioning, model and paper space, title block creation, and plotting a completed drawing. Other related topics include multi-view drawings, selection and arrangement of orthographic views, section and auxiliary views, and isometric and oblique drawings. Students gain proficiency in the operation of a PC-based CAD system and a functional understanding of basic computer-aided drafting techniques.

MNT 110 Manufacturing Processes I
Credits: 3
This course examines present day manufacturing processes and occupations. Students learn various manufacturing processes including precision inspection and measurement, forging and casting, and powder metal processing. Students gain an understanding of the properties of metal, process automation, and the basics of cost estimating. In addition, students learn a practical approach to managing a project to provide the technical experience necessary in current manufacturing industries.

MNT 100 Manufacturing Safety
Credits: 3
This course provides an introduction to the principles of safety, guidelines for the design of equipment, and explanations of why certain practices should or should not be followed in the manufacturing environment. Students evaluate human reactions in normal and abnormal conditions, and compare features required for safe working conditions to industry standards.

ENG 101 English Comp & Lit I
Credits: 3
Prerequisites: ENG 100
This course focuses on how to develop essential writing skills including organization, correctness, and support of ideas. A research project is required to produce a documented essay that integrates materials from Internet and traditional sources according to standard disciplinary format. Students develop and sharpen the interpretive and analytical skills necessary to evaluate the soundness and appropriateness of sources for their work.

MAT 124 College Mathematics II: Trigonometry
Credits: 3
Prerequisites: MAT 123 or appropriate placement score
Students solve right and oblique triangles and related applications; perform vector computations and use vector concepts to solve applications; determine the values of trigonometric ratios of angles and the values of inverse trigonometric ratios of real numbers; work with angles measured in degrees-minutes-seconds or radians; solve uniform circular motion problems; learn the traditional trigonometric identities and use them to prove other identities; perform transformations of basic trigonometric graphs; write equations to describe specific instances of harmonic motion; and solve trigonometric equations.

MNT 106 Manufacturing Quality Assurance & Quality Control Techniques
Credits: 4
Prerequisites: MNT 101
This course enhances the use of blueprint reading skills through the study of geometric dimensioning and tolerances. Students analyze the dimensional and performance requirements of individual parts or components. Students utilize industry-standard practices in the field of inspection to qualify component part conformance to a given blueprint. Quality control techniques drive the success of engineering and manufacturing companies. This course provides students with an understanding of the critical nature of quality, and recognizing potential problems before they appear. Students use high precision measuring equipment and statistical process control (SPC) methods to determine and support quality control requirements. Three hours lecture, three hours laboratory.

MNT 115 Maintenance and Instrumentation in Manufacturing
Credits: 3
Prerequisites: MNT110
This course covers practical applications of instruments that are frequently used in current manufacturing industries. Students learn an overview of basic electronic theory with an emphasis on the operational aspect components such as programmable logic controllers (PLCs), pressure gauges, transducers, strain gauges, electronic recorders, and controllers. Class projects help students develop the analytical ability necessary for using manufacturing instrumentation.

ENG 102 English Comp & Lit II
Credits: 3
Prerequisites: ENG 101
This course employs literary texts to provide examples for students to continue and refine writing and reading skills. Assigned readings include plays, poems, novels, short stories, epic narratives, personal essays, and satire. Writing assignments emphasize students close reading skills and their interpretation and analysis of creative works.

MNT 103 Solid Modeling (SolidWorks)
Credits: 3
Prerequisites: MNT 101
This course focuses on computer aided design topics needed to produce parts, assemblies and drawings using Industry prevalent Solid Modeling software. Students become familiar with screen layout, cursor feedback symbols, feature manager, constraint geometry, editing functions, and template creation. Extensive hands-on exercises allow students to create complex 3D extrusions from a series of 2D sketches and apply fillets, rounds, chamfers, and patterns. Additional topics include revolving sketches and extruding using shelling, ribbing, sweeping and lofting. Upon completion of this course, students are proficient in creating and animating drawing assemblies and associated part drawings, and producing a bill of materials, and have functional understanding of 3D parametric modeling software.

MNT 217 Process Automation & Robotics
Credits: 3
Prerequisites: CIS 111, MNT110
This course provides students with an overview of the systems and concepts involved in today's highly automated manufacturing environments. Robotic systems, an important component of an automated system, are also studied. Topics include automation design, robotic systems, manufacturing execution systems (MES), statistical process control (SPC), and Visual Basic programming. Students learn and practice systematic troubleshooting, using a highly automated manufacturing system as well as robotic systems.

PHY 101 Physics I
Credits: 4
Prerequisites: Coreq MAT 124
This course focuses on the basic concepts of measurement, kinematics, dynamics, work, energy, power, momentum, rotational motion, thermodynamics, and waves through working with problems and laboratory experiments. Students perform related laboratory experiments and write research-quality laboratory reports. This course is not required for Basic Engineering but may be recommended for students who have not yet completed calculus.

MNT 210 Computer Numerical Control
Credits: 4
Prerequisites: MNT 101
This course introduces the essential concepts of computer numerical control (CNC) and its impact on manufacturing and productivity. The course focuses on manual programming of different types of CNC systems, with a strong emphasis on the understanding of G and M codes used in current applications. Students learn to write a variety of part programs for both milling and turning operations. **Three hours lecture, three hours laboratory.**

MNT 215 Fundamentals of Computer-Aided Manufacturing
Credits: 4
Prerequisites: MNT 102 or MNT 103, MNT 210
This course explores the fundamental concepts of computer-aided manufacturing through lectures and laboratory experience. Topics include machining using a graphical software package to generate part programs for a CNC mill and a thorough review of manual part programming with emphasis on how to use the CNC program. Students learn how to integrate the program with the machine to fabricate the part. Students develop proficiency in editing graphics and using turning software to create part programs for full-size CNC turning centers. **Three hours lecture, three hours laboratory.**

MNT 216 Manufacturing Processes II
Credits: 4
Prerequisites: MNT 102 or MNT 103, MNT 210, Coreq MNT 215
This course develops and expands skills learned in previous manufacturing courses. Students solve problems in manufacturing through analysis, measurement, and implementation of computer aided design (CAD), computer aided manufacturing (CAM), statistical process control (SPC), and computer numerical control (CNC) applications. Students participate in group projects to gain proficiency in various methods and tools. Students gain competency in critical thinking, working in teams, and project management skills applicable to process creation, maintenance, and development. **Three hours lecture, three hours laboratory.**

MNT 218 Lean Manufacturing and Six Sigma
Credits: 3
Prerequisites: CIS111, MNT 110
This course focuses on entry-level knowledge of the "Lean Manufacturing" methodology and includes the fundamentals of "Six Sigma". It familiarizes students with the fundamental philosophy of "Lean Manufacturing" and provides them with the tools that enable the identification, measurement, and elimination of non-value-added activities in a manufacturing setting. Students gain the understanding that "Lean Manufacturing" maximizes product profit, has a positive effect on product quality, and reduces overhead costs. Students develop a working knowledge of the best practices in quality and process management.

MNT 299 Cooperative Work Experience & Seminar
Credits: 3
Prerequisites: Approval of Program Coordinator
This course provides students with a structured learning experience while applying classroom theory to a practical work experience. Students participate in a seminar to exchange information about their work experience. The number of credits earned is determined by the number of weeks and hours per week required by the cooperative work experience and the established learning objectives.

PHY 102 Physics II
Credits: 4
Prerequisites: PHY 101
This course focuses on selected topics in the areas of waves, optics, and electromagnetism. Students learn how to apply the basic principles of problem-solving techniques. Students perform related laboratory experiments and write research-quality laboratory reports.