

Central Ohio Technical College
Course Description Listing – Advanced Manufacturing Technology Courses
2009-2010 Academic Year

AMT-3413 Production Planning and Control

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: None. Course is graded A-E.

Production planning and control is one of four major management functions within the production activity of manufacturing. It is involved with the systems and controls within the manufacturing environment that provides the efficient transformation of raw materials into a form that can be sold.

AMT-3415 Statistical Process Control

3 credit hours, 3 contact hours (3 hours lecture and 0 hours lab). Prerequisite: MTH-1210 (or a score of at least 71 on the COMPASS Elementary Algebra test). Course is graded A-E.

Quality control is one of four major functions of the production activity within the manufacturing environment. The concern for quality production has led to a "building it right the first time" philosophy of manufacturing. Developing a product that meets quality standards now requires several activities: 1) designing for quality; 2) implementing quality processes; and 3) manufacturing for quality. This course will present an overview of the quality management system in today's manufacturing environment. The student will study the basic statistical methods and applications of Statistical Process Control within the production function of manufacturing.

AMT-3433 Principles of Manufacturing

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: None. Course is graded A-E.

This course introduces concepts and techniques used in manufacturing. Topics include process control, process capability, management and quality improvement. The commonalities of theory and skills associated with various branches of the manufacturing industry are explored. An overview of departments including engineering design, job planning, process documents, manufacturing support team responsibilities, as well as production workforce member's duties and responsibilities will be discussed.

AMT-3434 Machining Calculations

2 credit hours, 2 contact hours (2 hours lecture and 0 hours lab). Prerequisite: None. Course is graded A-E.

This course introduces calculations as they relate to machining occupations. This course combines mathematical functions with practical machine shop applications and problems. Emphasis is placed on gear ratios, lead screws, indexing problems, and their applications in the machine shop.

AMT-3435 Metrology

2 credit hours, 4 contact hours (1 hours lecture and 3 hours lab). Prerequisite: AMT-3434 (or concurrent enrollment). Course is graded A-E.

This course introduces the care and use of precision measuring instruments and measuring techniques. Emphasis is placed on the inspection of machine parts and use of a wide variety of measuring instruments. The course consists of a theoretical and practical study incorporating the metric system, geometric dimensioning/tolerancing, sine bars/plates for compound angles and more.

AMT-3436 CAD for Machining

4 credit hours, 8 contact hours (2 hours lecture and 6 hours lab). Prerequisite: DDT-3706. Course is graded A-E.

This course covers creating, reading and interpreting basic to complex industrial blueprints, CAD drawings and sketches. Topics include visualization of objects, machine terminology, multi-view drawings; interpretation of conventional lines, notes, and thread notations; geometric dimensioning and tolerancing; auxiliary and section views; assembly drawings, advanced sectioning, violations of true project, applications of GD & T, operation sheets and tool drawings.

**COTC Course Description Listing – Advanced Manufacturing Technology Courses
2009-2010 Academic Year****AMT-3437 Principles of Machining**

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: None. Course is graded A-E.

This course covers changes in machining technologies, major advancements in the machine tool field or specialty training items. The course will also offer practice in basic bench work, setup and layout for lathe and milling operations and precision measuring instruments. Other activities will include finding solutions of related problems, preparation of weekly laboratory reports and a variety of maintenance tasks necessary for the upkeep and operation of a machine shop.

AMT-3438 Machining Turning I

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: AMT-3437 (or concurrent enrollment). Course is graded A-E.

This course covers terminology, setup, operation, and daily care of conventional metal working engine and related lathes. Theory and practical skill development exercises will focus on cutting tool preparations for completing external surface machining such as; straight turning, threading, chucking and tailstock operations, as well as internal surface piece-part machining operations. Accident prevention practices and procedures will be stressed throughout the course. Concepts and mathematical calculations for part geometry determination, specific lathe (machining) requirements, and the use of digital readout units will be covered. Carbide/ceramic/diamond cutting tool material, insert, and tool holder identification and selection requirements for lathe work will be explained in detail. Process planning and Geometric Dimensioning and Tolerancing (GD&T) characteristics appropriate for lathe machining will also be addressed.

AMT-3439 Machining Turning II

3 credit hours, 7 contact hours (1 hours lecture and 6 hours lab). Prerequisite: AMT-3438 (or concurrent enrollment). Course is graded A-E.

Continuation of Machining-Turning I. This course covers terminology, setup, operation, and daily care of conventional metal working engine and related lathes. Theory and practical skill development exercises will focus on cutting tool preparations for completing external surface machining such as; straight turning, threading, chucking and tailstock operations, as well as internal surface piece-part machining operations. Accident prevention practices and procedures will be stressed throughout the course. Concepts and mathematical calculations for part geometry determination, specific lathe (machining) requirements, and the use of digital readout units will be covered. Carbide/ceramic/diamond cutting tool material, insert, and tool holder identification and selection requirements for lathe work will be explained in detail. Process planning and Geometric Dimensioning and Tolerancing (GD&T) characteristics appropriate for lathe machining will also be addressed.

AMT-3445 CNC Turning I

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: AMT-3439. Course is graded A-E.

This course covers terminology, set-up, operation, and daily care of CNC turning machines. Theory and practical skill development exercises will focus on the use of CNC metal working turning machines and attachments. Accident prevention practices and procedures will be stressed throughout the course. Other activities will include finding solutions of related problems, preparation of weekly laboratory reports and a variety of maintenance tasks necessary for the upkeep and operation of a machine.

AMT-3446 CNC Turning II

3 credit hours, 7 contact hours (1 hours lecture and 6 hours lab). Prerequisite: AMT-3445. Course is graded A-E.

This course covers the production, properties, testing, classification, microstructure, and heat treating effects of ferrous and non-ferrous metals. Topics include the iron-carbon phase diagram, ITT diagram, ANSI code, quenching, tempering, and other processes concerning metallurgical transformations. Upon completion, the student should be able to understand the iron-carbon phase diagram, ITT diagram, microstructure images, and other phenomena concerning the behavior of metals.

**COTC Course Description Listing – Advanced Manufacturing Technology Courses
2009-2010 Academic Year****AMT-3447 Materials in Manufacturing**

3 credit hours, 4 contact hours (2 hour lecture and 2 hours lab). Prerequisite: None. Course is graded A-E.

This course covers the production, properties, testing, classification, microstructure, and heat treating effects of ferrous and non-ferrous metals. Topics include the iron-carbon phase diagram, ITT diagram, ANSI code, quenching, senescing, and other processes concerning metallurgical transformations. Upon completion, students should be able to understand the iron-carbon phase diagram, ITT diagram, microstructure images, and other phenomena concerning the behavior of metals.

AMT-3448 CNC Graphic Programming

4 credit hours, 8 contact hours (2 hours lecture and 6 hours lab). Prerequisite: AMT-3436, AMT-3475 and AMT-3445. Course is graded A-E.

This course covers computer numerical controlled (CNC) programming utilizing CAD/CAM with concepts for turning and milling center applications. G and M code programming including fixture offsets, thread milling, looping, macro, and sub program development/utilization/ execution will be included. Criteria relevant to accident prevention practices and procedures, process planning, machine and tool selection, operational sequence, speed, feed, and cutting depth, program proof-out and quality control for a multi-axis CNC program tooling will also be addressed. Emphasis is placed on the interaction of menus to develop a shape file in a graphics CAM system and to develop tool path geometry and part geometry and the transfer of machine code from CAM Graphics to the CNC turning or milling center. The course will also offer practice for job planning using CAM software, including machine selection, tool selection, operational sequence, speed, feed, and cutting depth for a multi-axis CNC program.

AMT-3468 Machining Milling I

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: AMT-3437 (or concurrent enrollment). Course is graded A-E.

This course covers terminology, set-up, operation and daily care of conventional milling machines. Theory and practical skill development exercises will focus on the use of conventional metal working milling machines and attachments. Accident prevention practices and procedures will be stressed throughout the course. Concepts and mathematical calculations for machining of prismatic (cube-like) features and part geometry will be covered. Process planning, documentation and Geometric Dimensioning, and Tolerancing (GD&T) characteristics for milling work, cutters and insert (geometry and grade) selection, as well as cutting parameters, will be addressed.

AMT-3469 Machining Milling II

3 credit hours, 7 contact hours (1 hours lecture and 6 hours lab). Prerequisite: AMT-3468 (or concurrent enrollment). Course is graded A-E.

Continuation of Machining-Milling I. This course covers terminology, set-up, operation and daily care of conventional milling machines. Theory and practical skill development exercises will focus on the use of conventional metal working milling machines and attachments. Accident prevention practices and procedures will be stressed throughout the course. Concepts and mathematical calculations for machining of prismatic (cube-like) features and part geometry will be covered. Process planning, documentation and Geometric Dimensioning, and Tolerancing (GD&T) characteristics for milling work, cutters and insert (geometry and grade) selection, as well as cutting parameters, will be addressed.

AMT-3475 CNC Milling I

3 credit hours, 5 contact hours (2 hours lecture and 3 hours lab). Prerequisite: AMT-3469. Course is graded A-E.

This course covers the set-up, operation and daily care of CNC milling machines. Theory and practical skill development exercises will focus on the use of CNC metal working milling machines and attachments. Accident prevention practices and procedures will be stressed throughout the course. Concepts and mathematical calculations for machining of prismatic (cube-like) features and part geometry will be covered. Other activities will include finding solutions of related problems, preparation of weekly laboratory reports and a variety of maintenance tasks necessary for the upkeep and operation of a machine.

**COTC Course Description Listing – Advanced Manufacturing Technology Courses
2009-2010 Academic Year****AMT-3476 CNC Milling II**

3 credit hours, 7 contact hours (1 hours lecture and 6 hours lab). Prerequisite: AMT-3475. Course is graded A-E.

Continuation of CNC-Milling I. This course covers the manual programming, setup, and safe operation of computer numerical controlled (CNC) milling machines. Topics include machine safety, programming formats, control functions, program editing, program loading, machine setup, part production, process control, practical application and inspection. The course will also offer practice in the manufacturing of simple parts using CNC milling machines. Emphasis is placed on programming and production of complex parts with CNC milling machines.

AMT-3490 Cooperative Education Machining

2 credit hours, 24 contact hours (1 credit hour awarded per 12 hours per week cooperative education). Prerequisite: AMT-3437, AMT-3434, AMT-3435, AMT-3438, AMT-3439 and ETA-3071. Course is graded S/U.

This flexible course offering is composed of a paid or unpaid cooperative work experience coordinated by the student's advisor. The work experience must be related to the student's academic program. This course is graded on a Satisfactory/Unsatisfactory basis.

AMT 3491 Cooperative Education CNC

2 credit hours, 24 contact hours (1 credit hour awarded per 12 hours per week cooperative education). Prerequisite: (AMT-3490, AMT-3492, or AMT-3494), DDT-3754 and AMT-3448. Course is graded S/U.

This flexible course offering is composed of a paid or unpaid cooperative work experience coordinated by the student's advisor. The work experience must be related to the student's academic program. This course is graded on a Satisfactory/Unsatisfactory basis.

AMT-3492 Field Experience Machining

2 credit hours, 24 contact hours (1 credit hour awarded per 12 hours per week field experience). Prerequisite: AMT-3437, AMT-3434, AMT-3435, AMT-3438, AMT-3439 and ETA-3071. Course is graded S/U.

This flexible course offering is composed of a paid or unpaid field experience work coordinated by the student's advisor. The work experience must be related to the student's academic program. This course is graded on a Satisfactory/Unsatisfactory basis.

AMT-3493 Field Experience CNC

2 credit hours, 24 contact hours (1 credit hour awarded per 12 hours per week field experience). Prerequisite: (AMT-3490, AMT-3492, or AMT-3494), DDT-3754 and AMT-3448. Course is graded S/U.

This flexible course offering is composed of a paid or unpaid field experience work coordinated by the student's advisor. The work experience must be related to the student's academic program. This course is graded on a Satisfactory/Unsatisfactory basis.

AMT-3494 Practicum Machining

2 credit hours, 24 contact hours (1 credit hour awarded per 12 hours per week practicum work experience). Prerequisite: AMT-3437, AMT-3434, AMT-3435, AMT-3438, AMT-3439 and ETA-3071. Course is graded S/U.

This flexible course offering is composed of an unpaid practicum work experience coordinated by the student's advisor. The work experience must be related to the student's academic program. This course is graded on a Satisfactory/Unsatisfactory basis.

AMT-3495 Practicum CNC

2 credit hours, 24 contact hours (1 credit hour awarded per 12 hours per week practicum work experience). Prerequisite: (AMT-3490, AMT-3492, or AMT-3494), DDT-3754 and AMT-3448. Course is graded S/U.

This flexible course offering is composed of an unpaid practicum work experience coordinated by the student's advisor. The work experience must be related to the student's academic program. This course is graded on a Satisfactory/Unsatisfactory basis.