MTT - MACHINE TOOL TECHNOLOGY

MTT 105 Machine Tool Math Applications (3-0-3)
Offered Fall and Summer Semesters
This course is a study of shop math relevant to the machine tool trade. The following topics will be covered: fractions, decimal and metric systems, tolerances, clearance, interference, percents, area and volume, ratios and proportions, angles and lines, triangles, polygons, circles and tangents, Pythagorean theorem, trigonometry, right triangles, sine bars and sine plates and other geometric formulas.

MTT 120 Machine Tool Print Reading (3-0-3)
Offered Fall and Summer Semesters
This course is designed to develop the basic skills and terminology required for visualization and interpretation of common prints used in the machine tool trades. The course is an introduction in the identification of lines, basic sketching, dimensioning of parts, geometric tolerancing and visualizing three-dimensional shapes from two-dimensional drawings.

MTT 121 Machine Tool Theory I (1-6-3)
Offered Fall Semester
This course covers the principles involved in the production of precision metal parts. This course includes the operation of the milling machine and lathe. A rigid introduction to the basic handling of machinist hand tool, precision measuring instruments. Safety will be stressed.

MTT 122 Machine Tool Practice I (0-12-4)
Offered Fall Semester
This course covers practical experiences using the principles in Machine Tool Theory I. This course builds proficiency in the use of the lathe and milling machine operations and the basic knowledge of the surface grinder. Also, this course gives further experience with precision measuring instruments, lathe accessories for basic internal and external lathe operations and setups.

MTT 124 Machine Tool Practice II (0-12-4)
Offered Spring Semester
Prerequisite: MTT 122
This course covers the practical application of the principles in Machine Tool Theory II. Further instruction in the operation of the surface grinder, milling machine, lathe to produce advanced projects, as well as operation of the cylindrical grinder for external grinding operations and internal grinding will be offered. Safety and good housekeeping will be stressed at all times.

MTT 126 Machine Tool Practice III (0-12-4)
Offered Summer Semester
Prerequisite: MTT 122
This course covers the practical application of the principles in Machine Tool Theory II. Advanced work with basic machine tools in producing industrial-style projects will be accomplished in the development of accuracy, speed, safety, workmanship and skill.

MTT 141 Metals and Heat Treatment (3-0-3)
Offered Spring Semester
This course is a study of the properties, characteristics and heat treatment procedures of metals. This course covers the selection of steel by its color-codes and gives an understanding of heat treatment terminology, procedures and testing. Also, the elementary principles concerning metals, their production, composition and individual properties and uses will be covered.

MTT 145 Machining of Metals (3-0-3)
Offered Summer Semester
This course covers theoretical and practical training in the physical properties of metals, their required stock removal/speeds/feeds/and depths of cut and finish requirements. The course builds increased proficiency in operating the engine lathe and surface grinder, milling machine and the cylindrical grinder. Also covers speeds, feeds and tooling for numerical controlled machines.

MTT 211 Die Theory (3-0-3)
Offered Fall Semester
This course is a study of die components as they relate to the complete die. Essential facts of cutting and forming operations are explained and related to the manner in which the dies must function in order to achieve the desired results.

MTT 222 Tool and Diemaking Practice I (0-12-4)
Offered Fall Semester
Prerequisite: MTT 126
This course covers the manufacture of a simple cutting die or tools. Instruction will include machining and constructing jigs and fixtures or cutting dies in simulated industrial situations. Students will utilize the skills previously developed in the use of all tool room equipment and machines.

MTT 224 Tool and Diemaking Practice II (0-12-4)
Offered Spring Semester
Prerequisite: MTT 126
This course covers the construction of a compound and/or progressive die or tools. The course includes instruction in constructing more complex tooling with minimum assistance. Dies such as cutting, blanking and piercing and/or advanced tooling will be emphasized.

MTT 241 Jigs and Fixtures I (0-6-2)
Offered Spring Semester
Prerequisite: MTT 254
This course includes the theory necessary to design working prints of simple jigs and fixtures. Students will be instructed on the theory involved in designing jigs and fixtures as well as actual design or working drawings of drill jigs and milling fixtures.

MTT 243 Advanced Dimensional Metrology for Machinists (1-6-3)
Offered Fall Semester
Prerequisites: MTT 120, MTT 121, MAT 170
This course is a study of higher levels of measurement, measuring instruments and measuring techniques. The course consists of a theoretical and practical study incorporating the metric system, geometric dimensioning/tolerancing, sine bars/plates for compound angles and more.

MTT 245 Rapid Prototype Setup and Operations (1-6-3)
Offered Spring Semester
This course is an introduction to the set-up, operation, prototyping of parts, maintenance and safety of rapid prototyping equipment.

MTT 250 Principles of CNC (2-3-3)
Offered Spring Semester
Prerequisites: MAT 170, MTT 120, MTT 121, MTT 122
Co-requisite: MTT 251
This course is an introduction to the coding used in CNC programming. The course covers G-codes, M-codes, T-codes, S-codes and coordinate systems feature and RS-232. The course also covers program planning and simple programming for CNC machining centers and CNC turning centers.

MTT 251 CNC Operations (1-6-3)
Offered Spring Semester
Co-requisite: MTT 250
This course is a study of CNC machine controls, setting tools and machine limits and capabilities.

MTT 252 CNC Setup and Operations (1-9-4)
Offered Fall Semester
Prerequisite: MTT 251
This course covers CNC setup and operations. Instruction is primarily applied to milling and drilling operations. Instruction will be given in writing a sequence of operations, the alignment of fixtures, proper loading of the workpiece, the reading and interpretation of sequence of action codes and how to verify the program. The course includes topics on how to measure parts and recognize problems.

MTT 253 CNC Programming and Operations (0-9-3)
Offered Fall Semester
Prerequisite: MTT 252
This course is a study of the planning, programming, selecting tooling, determining speeds and feeds, setting up, operating and testing of CNC programs on CNC machines. It is intended to teach skills and knowledge sufficient to recognize problems.

MTT 254 CNC Programming I (1-6-3)
Offered Spring Semester
Prerequisite: MTT 120, MTT 121
This course is a study of CNC programming, including machine language and computer-assisted programming. Topics covered in the course are milling and drilling operations, lathe operations and feeds and speeds. Also covered is post-processing. The operational software used is Master CAM.

MTT 255 CNC Programming II (1-6-3)
Offered Fall Semester
Prerequisite: MTT 254
This course includes CNC programming with simulated production conditions. Topics included in the course are multi-axis surface milling operations, drilling operations, lathe operations including the programming of live tooling and part creation in solids. The operational software used is Master CAM.

MTT 258 Machine Tool CAM (2-3-3)
Offered Spring Semester
This course is a study of computer-assisted manufacturing graphics systems needed to create CNC programs. Topics covered in the course are solid modeling, 2D and 3D machining and CNC lathe programming. Post-processing is also covered. The operational software used is CAM Works.

MTT 260 Advanced Multi-Axis Programming and Operations I (0-12-4)
Offered Spring Semester
Prerequisite: MTT 253, MTT 255
This course is a study of programming advanced CNC multi-axis machines, setting of tools, machine limits, capabilities and safety. Programming will be done with advanced CAD/CAM software to create and/or import wireframe surface part models for programming.

MTT 261 Advanced Multi-Axis Programming and Operations II (0-12-4)
Offered Summer Semester
Prerequisite: MTT 252, MTT 255
This course is a study of advanced CNC multi-axis machine programming, advanced contouring and simultaneous multi-axis machining of 3D parts. Programming will be done with advanced CAD/CAM software to create and/or import the solid part model for programming.

MTT 299 Research in Advanced CNC (0-9-3)
Offered Fall, Spring, and Summer Semesters
Prerequisites: Instructor Permission (students also must have completed MTT 260 and have a GPA of 3.0 or higher)
This course provides an opportunity for students to investigate a faculty-approved topic in the Computer Numerical Control (CNC) discipline using the application of practical research methods. This course provides students with the opportunity to go beyond program course offerings by researching a topic in more depth than programs have time for. Essentially, this course is an independent study in which the student works one-on-one or in small groups to investigate a problem or issue in the discipline.