Semester 1

Introduction to Machining / Basic Shop Math / Basic Blueprint Reading

Presents a foundation for study of manufacturing methods, processes, related equipment, and tools of industry, requiring student to understand shop safety practices, job planning, feeds and speeds, layout tools and procedures, hand tools and bench work, metal cutting saws, drilling machines, lathes, milling machines, jig bore and jig grinder, surface grinder, E.D.M, and abrasives. A study that stresses the relationship of engineering drawings (Blueprint Reading) as related to the manufacture of a working part. Communication of idea's or fact as related to the manufacturing environment, which includes the process of delivering those ideas in an understandable manner to your piers. Topics of study include lines, views, dimensioning, calculating cutting planes, fraction to decimal conversion, practical and applied basic shop math, constructing a sketch of a workable engineering drawing, freehand lettering, freehand sketching, auxiliary sections, symbols, and broken lines.

Semester 2

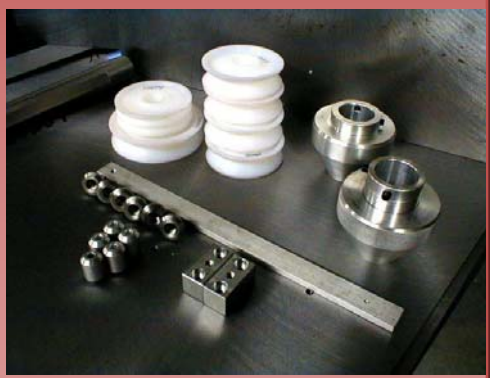
Intermediate Machining / Intermediate Applied shop math / Intermediate Blueprint

Provides skills in layout techniques and operations, including calculating bolt hole circles, location of surfaces related by non-right angle triangles, and points of tangency and other related applied shop mathematics. Included is all learning outcomes that are necessary to successfully layout drawing by understanding the proper views from an actual part. Continues with a foundation for study of manufacturing methods, processes, related machining equipment, and tools of industry, requiring the student to understand shop safety practices, job planning, feeds and speeds, precision measuring and layout tools and procedures, hand tools and bench work, metal cutting saws, drilling machines, lathes, milling machines, jig bore and jig grinder, surface grinder, E.D.M, and abrasives.

Semester 3

Introduction to CNC / Advanced Applied shop math / Advanced Blueprint

Fundamentals of computer application as aid to machining processes. Emphasis on engineering drawing analysis, using trigonometry and other forms of mathematics to determine programming points; ascertaining implied part dimensions; determinations of machining parameters; calculation of speeds; feeds and tool offset; establishment of work zero and tool home positions. Manual programming of computer numerical control (CNC) machines using G-codes; tooling and set-up of CNC lathes and milling machines for machining operations; verification of toolpaths by simulation; operating CNC machines to produce precision parts. Program upload/download, Proper collets and guide bushing setting and adjustment, Turing tools setting, Milling tools setting, ID tools setting, Stepping trough the program (proof running), First part cutting techniques.



Semester 4

CNC Operations
Shop Math / Blueprint Reading

This course is a study of CNC machine controls, setting tools, programming and operations of CNC equipment, and machine limits and capabilities. Fundamentals of work planes and the process of setting work planes. fixture offset, methods used to determine work offset shifts, why work offset shifts are used, input work offset shifts. Writing a CNC mill program using G53 and G54. The advantages of using canned cycles in CNC mill manual part programming. Codes and information required to program CNC mill canned cycles. Writing a simple CNC mill program using canned cycles, subprograms, the commands and rules for creating and processing subprograms. The advantages of using subprograms. Writing CNC mill programs using subprograms.

Semester 5

SPC-GD&T

SPC- Describe the purpose of SPC, importance of working in groups, quality tools used to solve problems determined by SPC, data collection process, basic statistical parameters, interpret variables and attribute control charts, Interpret process capability, measurements of central tendency and variability, descriptive Analysis of Data, Control Charts for Variables Data
and attributes.

GD&T - Introduces the student to the underlying concepts and practices of GD & T. The focus of the course is on understanding dimensions and tolerances on engineering drawings per the ASME Y14.5M-1994 standard.

(The student studies datums; geometric rules, types, and characteristics; and tolerance zones.Datums, Form, Flatness, Straightness, Circularity, Orientation, Perpendicularity, Parallelism, Angularity, Position, General Specifying positional tolerance, Applying RFS and MMC, Applying RMB and MMB, Boundary conditions, Boundary conditions, Zero positional tolerancing, Position, Location, Fixed and floating fasteners, Projected tolerance zones, multiple patterns of features, Composite positional, Multiple single–segment positional tolerancing, Nonparallel holes, Counterbored holes, Noncircular features at MMC, Symmetrical features at MMC, Position, Coaxiality, Concentricity and Symmetry, Runout, Profile.)

Semester 6

Manufacturing Practices and Procedures

Advanced manufacturing through study of the technologies, processes, performance objectives, and personnel employed in modern manufacturing. Includes examination of computer technologies, such as CNC, PLC, automation, and software. The student learns how to calculate critical performance objectives, as well as common physical plant layouts and the typical organization of manufacturing personnel and their responsibilities. The principles and methods of workplace organization. The student reviews the 5S tool used for organizing and maintaining the workplace: Sort, Straighten, Shine, Standardize, and Sustain. properties, elements, and types of ferrous materials commonly employed in metal manufacturing. The student learns the basics of steel manufacturing, the elements used to create steel and steel alloys, the main types of ferrous materials and their properties, and the common tests used to measure metal properties.