



COURSE SYLLABUS

CREDITS: 6-8/year (may count for math credits; inquire with your high school)

CONTACT HOURS: 540/1080 hours (35% lecture, 65% machine shop)

DATE OF LAST REVISION: Aug. 20, 2008

COURSE DESCRIPTION:

Modern Machining Technology is a high school vocational technical program that teaches students machining, CNC machining, computer aided machining (CAM), manufacturing, quality and basic mechanics. Our program is offered to high school junior and senior boys and girls and is a 2 year program that will prepare students for a career after high school or for advancement in a college related programs such as manufacturing, mechanical, production or quality engineering. Modern Machining Technology is available to any and all students. Every student has a right to learn what they desire in an environment that encourages them to discover their capabilities.

MAJOR COURSE LEARNING OBJECTIVES:

Upon successful completion of this program, students will be able to:

1. Demonstrate personal, occupational and environmental safety in a manufacturing environment on a daily basis.
2. Read and interpret mechanical blueprints, including an interpretation of Geometric Dimensioning & Tolerancing.
3. Successfully machine parts to blueprints/engineering specifications.
4. Successfully choose the most productive and precise type of manufacture available to them to produce parts.
5. Demonstrate proper selection and use of tools, machinery and measuring devices used in manufacturing.
6. Have a technical and academic advantage over students without a career and technical educational.
7. Possess the knowledge and continually practice an exceptional work ethic that keeps them employed and in demand for what ever career they choose.
8. Think and make successful decisions on their own in regards to career and life choices.
9. Overcome the fear of failure to try new things.
10. Be ready for a career and/or post secondary education before they graduate high school.

LECTURE/SHOP TOPICS – FIRST YEAR PROGRAM:

BLUE PRINT READING
BPR-CH2 DRAW MISSING VIEW
BPR-CH3 LINE USAGE/IDENTIFY SURFACES IN DIFFERENT VIEWS
BPR-CH4 TITLE BLOCKS
BPR-CH5 WORKING DRAWINGS/NUMBER OF VIEWS
BPR-CH6 HOLES
BPR-CH7 THREADS Pg 80-89
BPR-CH8- CONTOURS Pg92-101
BPR-CH9 SECTION VIEW DRAW MISSING VIEW Pg109-115
BPR-CH9B SECTION VIEW QUESTIONS Pg 116-127
BPR-CH10 ANGLES Pg134-143
BPR-CH11 MACHINING DETAILS Pg150-155
BPR-CH11 MACHINING DETAILS Pg156-165
BPR-GD&T PG 187-201 **
SHOP MATH
TALKING LIKE A MACHINIST 1 (.xxx decimal nomenclature)
DECIMALS & FRACTIONS
DIAMETER/RADIUS WORKSHEET
MULTIPLY/DIVIDE DECIMALS & ROUNDING
CALCULATING RPM AND FEED RATES
SCREW THREADS/3 WIRE CALCULATION
CALCULATING BAR STOCK
POSITIVE & NEGATIVE NUMBERS
ANGLE PUZZLES #1 W/GEOMETRY HAND OUT
ANGLE PUZZLES #2
DEGREES/MIN/SEC TO DECIMAL DEGREES CONVERSION
PERCENTAGES – CALCULATING INTEREST RATES
EXPONENTS
NUMBERS IN PARENTHESES

MACHINING/MANUFACTURING
SAFETY VIDEOS/FIRST AID TRAINING-GORY VIDEOS FOR EYE AND HAND INJURY, HAND AND POWER TOOL SAFETY, MACHINE SHOP SAFETY, FIRST AID
MACHINING VIDEOS – MODERN MARVELS-MACHINE TOOLS
GAUGING-READING MICROMETERS .XXX
MF-Ch4 MEASUREMENT
MF-Ch13 LATHE & LATHE VIDEO 26 min/PARTS/RULES, GRIND LATHE BITS 3 EA.
MF-CH17 THE MILL
MF-CH6 HAND TOOLS
DRILL/TAP CHART EXERCISE
MF-CH5 LAYOUT WORK, LAYOUT & CUT T-SLOT CLEANER
MF-CH12 SAWING & CUT OFF MACHINES
MF-Ch14 CUTTING TAPERS & THREADS ON LATHE **
MF-CH10 DRILLS & DRILLING MACHINES, GRIND DRILL BIT
MF-CH20 BAND MACHINING, VIDEO, WELDING BLADES
GAGE READING – VERNIER SCALES
MF-CH 18 MILLING MACHINE OPERATIONS
GAUGING-READING DIAL CALIPERS
GAUGING-READING MICROMETER REVIEW .XXX
MF-CH7 FASTENERS
GAUGING-READING DIAL INDICATORS
GAUGING-READING DEPTH MICROMETERS
MF-Ch11 OFFHAND GRINDING
CARBIDE INSERT CODE READING WORKSHEET
MF-CH19 PRECISION GRINDING
GRINDING WHEEL IDENTIFICATION DECODING
GENERAL SHOP SKILLS – FOLD BAND SAW BLADE, WELD BANDSAW BLADE, TRAM MILL HEAD, INDICATE TAILSTOCK, INDICATE 4 JAW CHUCK
MF-Ch10 DRILLS & DRILLING MACHINES, VIDEO, GRINDING DRILL BIT
MF-CH 15 OTHER LATHE OPERATIONS
MF-CH16 BROACHING OPERATIONS **

* MF is for “Machining Fundamentals” the text we use in class

CAREER BUILDING
DRUGS & DRUG SCREENING
SEXUAL HARASSMENT & DISCRIMINATION
25 POINTS EXTRA FOR GETTING DRIVER'S LICENSE
SUBMITTING REAL APPLICATION – 25 POINTS
MACH.TECH.RESUME
MACH.TECH. APPLICATION
MACH.TECH. COVER LETTER
MACH.TECH. FOLLOW UP LETTER
MACH.TECH. DECLINE LETTER
25 POINTS EXTRA CREDIT FOR GETTING A JOB
ESSAY- GAME PLAN FOR LIFE AFTER HIGH SCHOOL
JOB SHADOWING
FIELD TRIPS (3 minimum per year)

SHOP PROJECTS**
1ST QUARTER
THREADED JOURNAL –LATHE
MILL PRACTICE PART – STEPPED BLOCK
CENTER PUNCH
CLAMP ON VISE STOP
BALL PEEN HAMMER
HSS BIT TOOL HOLDER FOR LATHE
2ND QUARTER
SPRING LOADED TAP GUIDE
CIRCUIT BOARDS – MASTERCAM
BORING EXERCISE – LATHE
HACK SAW
INDICATOR BASE
CHRISTMAS ORNAMENT/TAG - MASTERCAM
BATTLE TOPS

3RD QUARTER
CARBIDE SCRIBER PEN
SM or LG TAP WRENCH
QC TOOL HOLDER FOR LATHES
TAP DRIVER
DIE HOLDER
HARDENED CENTER FOR TURNING
FACEPLATES FOR ELECTRONICS
SKILLS USA
4TH QUARTER
ZACH'S TAP WRENCH
MINI MACHINIST'S VISE
FLY CUTTER or FLY CUTTER SET W/BASE
SLITTING SAW ARBOR
DIGITAL CLOCK & BASE

** To keep the program up to date and exciting for the students, the projects will change each year with the exception of the GD&T projects and beginner/practice parts for first year students. Projects are selected based on skill level and time.

LECTURE/SHOP TOPICS – SECOND YEAR PROGRAM:

BLUE PRINT READING
BPR-GD&T PG 187-201
BPR-GD&T REVIEW Pg 190-201
BPR-CALCULATING BONUS TOLERANCES/MMC, LMC, RFS
GD&T PROJECT NO1 BIG RING
GD&T PROJECT NO2 CONCENTRICITY OD-OD JOURNAL
GD&T PROJECT NO3 CONCENTRICITY ID-OD ADAPTER WITH BORE
GD&T PROJECT NO4 CONCENTRICITY/RUN OUT MULTI ID/OD
GD&T PROJECT NO5 PARALLEL/POSITION/ANGULARITY MILL BLOCK
GD&T PROJECT NO6 PARALLEL/POSITION/ANGULARITY MILL PLATE

** 2nd year machining/inspection project, students submit an inspection report

SHOP MATH
TALKING LIKE A MACHINIST 2 (.xxxx decimal nomenclature)
COST ESTIMATION WITH BAR STOCK CALCS
METRIC CONVERSION MM/INCH
DIVIDING/INDEXING HEAD CALCULATIONS
CALCULATING AREAS IN SQUARE INCHES – NO1, NO2
TRIGONOMETRY-IDENTIFYING TRIANGLE SIDES
TRIGONOMETRY #1 SIMPLE TRIG
TRIGONOMETRY-IDENTIFYING TRIANGLE SIDES REVIEW
GAGE BLOCK STACK UP CALCULATIONS
5in SINE BAR CALCULATIONS
TRIGONOMETRY-AND CALCULATING TAPERS
REARRANGING EQUATIONS/FRACTIONS
TRIGONOMETRY-WITH REARRANGING
TRIGONOMETRY-#3 PRACTICE
TRIGONOMETRY-CIRCULAR BOLT HOLE PATTERN
TRIGONOMETRY-TANGENT POINTS

STRENGTH OF MATERIALS
VIDEO – MODERN MARVELS – METALS
MF-CH 24 METAL CHARACTERISTICS
MF-CH 25 HEAT TREATMENT OF METALS
SofM-MATERIAL PROPERTIES RESEARCH
SofM-TENSILE CALCULATIONS
SofM-SHEAR CALCULATIONS
SofM-BOLT CALCULATIONS, SHEAR & TENSILE
SofM-FORD TRUCK BED BOLT CALCULATION
SofM-THERMAL EXPANSION & STRESS
SofM-TORQUE CALCULATION







MACHINING/MANUFACTURING
SAFETY VIDEOS/FIRST AID TRAINING-GORY VIDEOS FOR EYE AND HAND INJURY, HAND AND POWER TOOL SAFETY, MACHINE SHOP SAFETY, FIRST AID
MACHINING VIDEOS – MODERN MARVELS-MACHINE TOOLS
GAUGING-READING MICROMETERS .XXXX
TECHNICAL WRITING – MACHINE MANUALS
MF-CH8 JIGS & FIXTURES CH9 CUTTING FLUIDS CH16 BROACHING CH26 METAL FINISHING
GAUGING-READING MICROMETER REVIEW .XXXX
MACHINERY'S HANDBOOK RESEARCH
GAUGING-MEASURING ANGULARITY ON SINE BAR
SURFACE PLATE MEASURING-TFT CASTING
PART SKETCH/PRINT CREATION
PROCESS ROUTING EXERCISE

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G-CODE PROGRAMMING (manual input without the use of Mastercam)
MF-Ch 21 COMPUTER NUMERICAL CONTROL
RECTANGULAR/ABSOLUTE PLOTTING
INCREMENTAL PLOTTING
POLAR COORDINATE PLOTTING
PROGRAM #1 SIMPLE CONTOUR –MILL, G0,G1,G2,G3,IJ
PROGRAM #2 .375 OFFSET CONTOUR-MILL, G0,G1,G2,G3,IJ
PROGRAM #3 1.00 BORE INTERPOLATION-MILL, G0,G1,G2,G3,IJ
PROGRAM #3B HOLE PATTERN DRILL-MILL, G81,G98
PROGRAM #4 DRILLING 100 HOLES-MILL, G91,G83,G98,'L'
PROGRAM #5 COMBO-CONTOUR/DRILL/BORE &TRIG
PROGRAM #6 TURNING ODs, G0,G1,G2,G3,IJ
PROGRAM #7 TURNING ODs #2,G0,G1,G2,G3,IJ,G42,G73, G71
PROGRAM #8 CUTTER COMP-MILL, G42/G42

CAREER BUILDING
DRUGS & DRUG SCREENING
SEXUAL HARASSMENT & DISCRIMINATION
25 POINTS EXTRA CREDIT FOR GETTING DRIVER'S LICENSE
REAL APPLICATION - EXTRA CREDIT 25 POINTS
MACH.TECH.RESUME
MACH.TECH. APPLICATION
MACH.TECH. 3 LETTERS/RESUMES FOR JOBS
25 POINTS EXTRA CREDIT FOR JOB APPLICATION
25 POINTS EXTRA CREDIT FOR GETTING A JOB
ESSAY- STUDENT CAREER INTERVIEW WITH PARENT
JOB SHADOWING
SCHOOL TO WORK INTERNSHIP
FIELD TRIPS (3 minimum per year)

STATISTICAL MATHEMATICS 'SPC'
POWERBALL HISTOGRAM
TEEN STATISTICS, APPLYING NATIONAL AVERAGES/PERCENTAGES TO OUR CLASS SIZE
AVERAGES AND FREQUENCIES, MODE & MEAN
TFT BAFFLE CAPABILITY EVALUATION (100 PARTS FOR DATA)

SHOP PROJECTS**
1ST QUARTER
PROGRAM #1 SIMPLE CONTOUR –MILL, G0,G1,G2,G3,IJ
PROGRAM #2 .375 OFFSET CONTOUR-MILL, G0,G1,G2,G3,IJ
PROGRAM #3 1.00 BORE INTERPOLATION-MILL, G0,G1,G2,G3,IJ
PROGRAM #3B HOLE PATTERN DRILL-MILL, G81,G98
PROGRAM #4 DRILLING 100 HOLES-MILL, G91,G83,G98,'L'
PROGRAM #5 COMBO-CONTOUR/DRILL/BORE &TRIG
PROGRAM #6 TURNING ODs, G0,G1,G2,G3,IJ
PROGRAM #7 TURNING ODs #2,G0,G1,G2,G3,IJ,G42,G73, G71
PROGRAM #8 CUTTER COMP-MILL, G42/G42
2ND QUARTER
GD&T PART No.1 
GD&T PART No.2 
GD&T PART No.3 
GD&T PART No.4 
GD&T PART No.5 
GD&T PART No.6 

3RD QUARTER
TOOL KIT -
INDICATOR SWIVEL
T-BASE FOR CALIPERS
OAK BOX FOR KIT – MASTERCAM
5" SINE BAR
SKILLSUSA
<i>NIMS ALTERNATIVE PROJECTS</i>
SCHOOL TO WORK INTERNSHIP
4TH QUARTER
LG or SM V-BLOCK SET
5C COLLET BLOCK SET
DIGITAL CLOCK & BASE (ELECTRONICS LAB)
<i>NIMS ALTERNATIVE PROJECTS – TESTING!</i>
SCHOOL TO WORK INTERNSHIP

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