



PRECISION MACHINING SYLLABUS

COURSE INFORMATION 2020-2021

- AM Session: 7:55 AM – 10:25 AM, PM Session: 11:10 AM – 1:40 PM, Monday - Friday
- Credits: 3.0 high school credits per year
- CTE Dual Credit: Everett Community College, MFG T 104 Machine Operator 1 (20 credits)

INSTRUCTOR INFORMATION

Instructor Name: Dan Cardiff

Office Hours: 6:40 AM - 2:10 PM

Office Location: Building 2, Room 207

Phone: 425-348-2236

Email: cardiffdp@mukilteo.wednet.edu

The best way to contact me is email. Please state your name and students name when leaving a message. I will be happy to answer back with a message or phone call.

COURSE DESCRIPTION

PRECISION MACHINING prepares individuals to apply technical knowledge and skills in all aspects of shaping metal parts. Instruction involves making computations relating to work dimensions, tooling and feeds and speeds of machining. Emphasis is placed upon bench work and the operation of lathes, power saws, milling machines, grinders, drills and computer operated equipment (CNC). Instruction also includes the use of precision measuring instruments such as layout tools, micrometers and gauges; methods of machining and heat treatment of various metals; blueprint reading; and the layout of machine parts. Instruction prepares students to operate all types of hand and computer-controlled machines.

Instruction is split between academic theory and practical applications. In this pursuit, students are assigned projects, which become more and more advanced as skills are mastered. These skills will be tested with written, virtual, and real-world quizzes, tests, exams, and projects. This course is heavily reliant upon mathematics and spatial orientation. It is critical that the student learn to envision 3D environments and related material science concerning work holding, machine processing, material removal, inter-part relationships, and fits and tolerances to be successful. The students will progress from hand tool through conventional power machinery and computer operated machine tools throughout the course. Students will work independently and in joint teams on projects. In this vein, the student gains experience with teamwork in a dynamic environment. By assuming the roles of team members as well as team leaders, roles related to real world manufacturing environments emphasized and encouraged.

Students will have the opportunity to participate in field trips to local manufacturers and machine shops. There will be guest lecturers as well as job coaching and interviewing experiences.

Student supplies and requirements

Students must provide the following:

- 3 ring binder
- Pencils
- Paper
- USB storage drive 2GB or higher
- Scientific Calculator

Safety and Attire

Closed toe shoes are a safety requirement and pants are recommended. Students will be issued a locker and may choose to keep these items on site. Safety glasses and hearing protection will be provided. Loose fitting clothing is not permitted in the shop and long sleeve shirts should not be worn.

LEARNING OBJECTIVES

- Think Critically
- Reason Quantitatively and Symbolically
- Communicate Effectively
- Apply Information Tools and Resources
- Develop Cultural Awareness

COURSE EXPECTATIONS

After completing this course, students will be able to:

- Describe and follow shop safety and shop maintenance protocols.
- Demonstrate professionalism, etiquette and pride in the machining trade.
- Identify machining tools [including hand tools] and describe what they are used for.
- Demonstrate the use of the following safety equipment and materials:
 - PPE (personal protective equipment)
 - Tool guards and safety shields
- Identify basic materials that are commonly used in aerospace and describe the types and forms.
- Interpret basic drawings, including lines, dimensioning and tolerances.
- Define 5S, lean manufacturing and Just in Time (JIT)
- Develop a basic project plan, including material prep with saws, drills and mills.
- Utilize basic and precision measuring tools to calculate measurements and tolerances.
- Demonstrate the following machining skills:
 - Hole finishing
 - Sawing material with excess
 - Surface finish, deburr
 - Tramming heads
 - Dialing vises
 - Loading material
 - Make accurate cuts and square a block
 - Reading dials
 - Backlash
 - Demonstrate climb vs. conventional cutting
 - Adhere to print tolerances
 - Proper tool selection
 - Turning and facing
 - Proper speeds and feeds
 - Use of measuring tools

COURSE MATERIALS

- Textbook: Precision Machining Technology Second Edition
- Computer: Fusion 360, Amatrul E learning suite
- Shop: Manual and CNC lathes and mills, Band saw, grinders

ASSIGNMENTS AND GRADING

Grading Policy: Students will be evaluated and graded in three areas:

- Knowledge - Written work and exams – Generally 25%
- Skill - Performance on various shop skills – Generally 25%
- Performance – Effort, conduct, and miscellaneous – Generally 50%

It is reasonable and possible for EVERYONE to earn EXCELLENT evaluations. The only way to do poorly in this class is to not try. Those who try will do well.

Knowledge Standards:

This is the computer work, book work, and paperwork. In the classroom, we look at the foundation knowledge of manufacturing technology. Students who can think things out will do far better than those who simply memorize the material and “parrot” it back. Getting an “A” grade on a classroom test means nothing if you can’t perform it in the shop. Failure to perform what you learn will tend to lower your quarter and semester grades.

Many students have developed the bad habit of forgetting the material as soon as they are tested on it. Then they are indignant if expected to know the stuff later. This course is preparing you for work in the manufacturing industry. You are not taught temporary information and skills just to pass a test. You are taught permanent skills that will make you a better and higher-paid employee later.

Skill Standards:

Your skill evaluations will be compared to industrial level standards. Various projects and skills will have a weighted value based on the length of time required for a skilled person to complete the project or assignment. The most important factor is having quality work turned in on time. Industry does not accept less than good quality parts completed on time: This is expected at Sno-Isle as well. Industry does not grade parts on a variable scale. A part is 100% acceptable (all dimensions and surfaces within tolerance) or it is rejected. (Would you like to fly in a plane built with out-of-tolerance parts?)

Performance Standards: Performance standards will be based on the Professional Standards of Sno Isle TECH. Every Student will be given a copy of the Professional Standards and will be expected to hold themselves to them. At Sno Isle we are teaching you to succeed in a professional work environment and that is the standards that you will be held to.

Want an A in the class? Excel in all the above PLUS:

- Always be working on something constructive (never sit around with “nothing to do”)
- Be available to assist others who are struggling
- Go “above and beyond” with shop cleanup and organization, and everything

HOW DO YOU BECOME SUCCESSFUL?

Learn all you can, develop good work habits, develop good problem-solving skills, learn how to work alone or in a team. You should practice good attendance habits, develop a reputation for being trustworthy, and do everything you can to prove you are reliable.

Late Work: Any assignment turned in late will only receive 75% partial credit.

Make-up work: An equal amount of days of the excused absence will be given as an extension for students who missed the opportunity to turn work in on time. Students who do not turn in their assignments within that time forfeit their make-up extension and the assignment will then be classified as late.

Grading communication: Students and parents can review grades on-line through the Qmlativ Grading System for Mukilteo School District. Access information will be provided at the beginning of the school year.

PROFESSIONAL CONDUCT

As a student in the Precision Machining class, you are expected to actively pursue a journey that will lead you toward being a responsible, mature member of our society. It is expected that you will strive to conduct your life in a way that brings honor to yourself, your family, your community, and your school.

Here is a partial list, not necessarily in order of importance, of things that will help carry you upward on this journey:

- Always be polite and courteous to others
- Always deal respectfully to those who have a position of authority over you.
- Follow rules. If a rule is bad, try to get it changed; if unsuccessful, learn to react gracefully.
- When there is a problem to solve, have a habit of helping in the solution, not in making the problem worse.
- When talking about others, if you can't say something nice, or at least neutral, don't say anything at all.
- When there is work to do, get it done; use your time well. When you do this, you will be making a difference and will advance higher and faster.
- Keep your priorities in order.
- Always work at being honest with yourself and with others. Conduct all your dealings "on top of the table". It is a huge advantage to be trusted.
- Always work at doing what is honorable. If you realize you have done something dishonorable, own it, repair it, and continue moving upward.
- Live your life in such a way that when you enter a room, the people there will be glad that you arrived.

CLASSROOM AND SHOP RULES: SAFE CONDUCT

- Always act in an adult manner while in the shop. This includes:
- No horseplay (I have known people who died in shops due to horseplay.)
- Use only machines and tools for which you have had proper training and authorization. Be gentle with the machines and tools. When you are done at a workstation, clean it up. Always clean tools or parts when removing them from a machine.
- If you use a tool, put it away when you are done, even if you found it somewhere else.

CLASSROOM AND SHOP RULES: PROFESSIONAL CONDUCT

- Don't mess with things that aren't yours. Hiding someone's stuff is theft, not a joke. Any theft or vandalism can get you "instantly" terminated from Sno-Isle.
- Language must be respectful and dignified. Crude language will not be tolerated. If you make a mess, clean it up.
- Keep your valuables secure. Sno-Isle is not responsible for your valuables.
- Never work on a part without a drawing in your possession, such as with an assignment or a "blue sheet." Making unauthorized parts can get you suspended or expelled.

SNO-ISLE ATTENDANCE POLICY

- **Absence** for family or personal reason (including illness) needs a parent/guardian note or phone call (Attendance Line: 425-348-2222.) No note = unexcused absence = a “zero” grade for the day.
- For a **prearranged absence**, fill out the blue Pre-arranged Absence form, have it signed by a parent/guardian and the Precision Machining instructor, and submit it to the office.
- For **authorized activities** at your sending school, complete the green School-Related Activity form, have it signed at your high school and submit it to the office. It will not be counted as a Sno-Isle absence.

PRECISION MACHINING CLASS ATTENDANCE POLICY

- If your school sends a bus, you are expected to be here. If you are not here, you're absent.
- If absent, YOU need to text (preferred) or call Tom at 425-238-3919 sometime that day.
- If you have prearranged the absence, you don't need to call.
- Absence with no call/not prearranged = a “zero” grade for the day.

Mukilteo School District does not discriminate in any programs or activities on the basis of sex, race, creed, religion, color, national origin, age, veteran or military status, sexual orientation, gender expression or identity, disability, or the use of trained dog guide or service animal and provides equal access to the Boy Scouts and other designated youth groups. The following employees have been designated to handle questions and complaints of alleged discrimination: Civil Rights Coordinator and Title IX Coordinator Bruce Hobert (425-356-1319), hobertbl@mukilteo.wednet.edu, Section 504 Coordinator Lisa Pitsch (425-356-1277), pitschla@mukilteo.wednet.edu, and the ADA/Access Coordinator Karen Mooseker (425-356-1330), moosekerkw@mukilteo.wednet.edu. Address: 9401 Sharon Drive in Everett, WA. Inquiries regarding ADA/Access issues at Sno-Isle TECH Skills Center should be directed to Wes Allen, Director (425-348-2220) allenwr@mukilteo.wednet.edu. Address: 9001 Airport Road in Everett, WA 98204