



STANWOOD HIGH SCHOOL

TECHNICAL DESIGN CENTER

DESIGN ENGINEERING & ARCHITECTURE PROGRAM

CAD/CAM (TEC 480)

COURSE OUTLINE

INSTRUCTOR: Mr. R. Short

PHONE: (360) 629-1300 x5610

EMAIL: rshort@stanwood.wednet.edu

LOCATION: Rm 610

COURSE LENGTH: 2 Semesters

CREDITS: 1 CTE or 1 Math (3rd Year)

4 credits at EvCC available, if standards are met.

Possible .5 to 1 additional SHS credit available if holding a part-time job. See Mr. Short for details

COURSE DESCRIPTION:

This course will take an in-depth look at the manufacturing industry and the use of CAD/CAM (Computer Aided Manufacturing). Students will learn to design and manufacture parts using CNC milling machines. The emphasis is on design, programming, tooling, operation and safety in this arena. Students will also learn to use solid modeling software such as solid works to create their designs.

COURSE RATIONALE:

Throughout the country Engineers are in high demand. Most everything we touch or see has had an engineer involved in its design. Further the ability to apply math, science, and design concepts to complex problems is becoming increasingly important. This course will help students explore careers in engineering and manufacturing while at the same time providing them with the basic skills needed for post secondary training.

CONTENT OUTLINE:

Free Hand Sketching

Measurement

- Units
- Tooling
- Precision

Print Reading

- Read/ Interpret drawings
- Scale & line types
- Terms

Parametric Modeling (Solid Works)

- Basic Operation
- Modeling
- Documentation
- Assembly

Basic CNC Programming

- G & M Code
- Pockets
- Contours
- Tooling
- Feeds & Speeds

CAM Software Programming

- Set up
- Operations
- 3-D Surfaces
- Post Processing

CNC Machining

- Safety
- Set up
- Operation
- Secondary operations

Engineering for CAD/CAM

- Single Piece
- Assembly
- Mold Making
- Casting

Industry Exposure

- Careers in Design and Construction
- Career Planning
- Employability Skills
- What's Happening

Leadership Development

- Individual
- Group
- Community & Career
- TSA Opportunities

EQUIPMENT:

PC. Based Computer, dial calipers, micrometer, height gage, CNC Milling Machine, Band Saw, Drill Press

SOFTWARE:

Solid Works, MasterCAM, Visual Mill, Rhinoceros, Auto CAD, MS Office

Certifications Available:

SOLIDWORKS CERTIFIED ASSOCIATE

WASHINGTON STATE CTE MACHINIST TECHNICIAN

ASSESSMENT:

Student grades will be based on a weighted system as follows:

- 40% Projects**—throughout the year, students will complete a series of projects. These assignments are designed to develop and assess the student’s skill development. They will be graded based on the quality, accuracy, and skills demonstrated on the project.
- 25% Skills Competencies**—Students will complete a series of skills tests to measure their mastery of the skills used in the course.
- 25% Daily Work**—Students will complete shorter assignments throughout the year. These assignments are designed to help the student develop their skills in preparation for the larger projects. Included in this category will be weekly or periodic progress checks to see how you are progressing on your projects. Progress checks cannot be made up.
- 10% Leadership**—Students will be required to earn 50 leadership points from the Leadership Plan packet, per semester. In order to receive credit for this requirement, students must earn a minimum of 50 points per semester. Partial credit will not be given.

Final Portfolio— at the end of each semester, students will put together a portfolio that shows their skills and experience. Students need to keep all completed work for their portfolio.

For this course we will be using a four point grading scale as follows:

<u>Description</u>	<u>Score</u>	<u>Letter Grade</u>	<u>Percentage</u>
Mastered Competency or Exceeds Standard	4	A	100-92.5%
		A-	92.49-85%
		B+	84.99-77.5%
Proficient at Competency or Meets Standard	3	B	77.49-70.0%
		B-	69.99-62.5%
		C+	62.49-55%
Working towards standard	2	C	54.99-47.5%
		C-	47.49-40%
Does Not Meet Standard	1	F	39.99% or below
Competency/ Standard Unattained	0		

DEADLINES:

Each assignment or project will have a deadline attached to it, and must be completed and turned in by this date. For projects lasting more than 7 days, extra time will not be given for missed days. **Late work will be accepted after the deadline, but the grade will be reduced by 25%.** Students have the right to fix or improve complete assignments that were turned in on time. Late or incomplete work will not be allowed to be fixed or improved for credit.

ATTENDANCE:

We will follow the school policy on attendance. It is very important that students are in class every day and actively working or participating in class. They have limited time to complete their studies, so they need to make the most of it.

Tardiness—again we will follow the school policy on tardiness. Students coming late to class will receive 1 hour of detention on the third incident, then 1 hour for each tardy thereafter.

LAB EXPECTATIONS:

We will develop the expectations together in class, however here are some non-negotiable rules/expectations:

- Treat each other with respect.
- Leave your work area neat and clean.
- Treat the computers and equipment with care. You will be held responsible for any damage.
- Make full use of each period by starting your work at the bell and continuing until the end of the period.
- FOOD, DRINKS, and Gum are not allowed in the lab.

MATERIALS AND EQUIPMENT:

For the most part, all of the needed materials and equipment for this course will be provided by the program. Students will need to provide or purchase materials used in the construction of some of the models or prototypes in this course.

Students are asked to provide a pair of Headphones for use while viewing video tutorials.

Students will also be working with a variety of equipment including computers, laser engraver, CNC Mills, saws, and drills. It is expected that they follow all safety procedures including the use of eye protection, have a signed parent permission form, and ask for teacher approval before use of this equipment. Failure to do so may result in the student's removal from the class.

COMPUTER USE:

A majority of this course will require the use of a Windows based computer to operate the CAD software, MS office, and the Internet. SHS computer use guidelines are in effect in this lab. Further, students caught misusing the computers, using them without permission, changing settings, deleting others work, damaging the equipment, playing games or other inappropriate behavior with the computers will not be allowed further use of them and will face disciplinary action.

SOFTWARE:

As much as possible we try to use software that is used in industry. However, this can make it difficult for students to work on projects outside of school. To help with this, here are some resources to acquire the software used in this program:

Rhinoceros: You can download a free demo version at <http://www.rhino3d.com/download> This software is the full working software, however it will expire 90 days from installation. You can purchase this software at the education price of \$138 at <http://www.novedge.com/products/2572>

SolidWorks: Students can download and install SolidWorks for Free. This licence will last for 1 year. Go to www.solidworks.com/SDK, Choose the most current version and use SDK-ID: 93201NTP

AutoDesk: Students can register and receive free 3 year licenses of all the AutoDesk Products including AutoCad, Inventor and 3d Studio Max at: <http://www.autodesk.com/education/home>

ONLINE RESOURCES:

We will be using the schools Google Sites resources to help keep students and parents up to date on what is happening in the class. You can access the site for this course at:

<http://rshort.stanwood.wednet.edu>

On my page you will see a variety of resources including assignments, video tutorials, links for software downloads, and student work samples.

We will also be using the new Google Classroom which students will be able to log into at

<http://classroom.google.com>

ADDITIONAL TIME/ HELP:

In drafting it is often difficult to take work home to be completed as the equipment, materials, and software may not be available outside of the lab. In realization of this fact, there are opportunities for additional time to complete work and receive additional assistance. The lab will be most weeks on one evening until 7:00pm. Also, I am available before school every day and most afternoons. Students may also arrange additional time with me as needed.

If you have any questions please feel free to contact me at (360) 629-1300 x5610 or via email at rshort@stanwood.wednet.edu



STANWOOD HIGH SCHOOL

ENGINEERING & ARCHITECTURE DESIGN PROGRAM

Student Safety Consent Form

To the parent or guardian of:

_____ (Student Name—Please Print)

Your son / daughter is currently enrolled in the **Career and Technology Education Program** at **Stanwood High School** and will have the opportunity to use various tools and equipment. Appropriate instruction in their safe operation and close supervision will be maintained at all times. Although every precaution is taken to prevent accidents, a certain risk is involved due to the nature of the experience, age of the student, and the learning environment. I am asking you to impress upon your son / daughter, the importance of being careful and working safely. This will support the instruction given at school.

Thank you for your support,

Ross Short - Instructor

I hereby give my consent to allow my son / daughter to operate all of the hand, portable power tools, and stationary machinery in the shop necessary to carry out the requirements of the course provided he / she receives proper instruction, passes appropriate safety tests, and receives instructor verification.

I agree to the rules and expectations of my son / daughter's **Career and Technology Education at Stanwood High School** and also understand that violations of the shop/lab behavior expectations or safety rules are grounds for removal from this program.

Parent Name: (Print) _____ Date: _____

Signature: _____

Emergency Phone Numbers

Email: _____

(H) _____

(W) _____

To the student named above:

I have read all of the behavior expectations and safety rules established for me to work safely in the shop. I have notified **Mr. Short** of any questions regarding these rules and they have been answered prior to signing this form. I understand and agree to follow the safety rules and behavior expectations established for me to succeed in the **Career and Technical Education at Stanwood High School**. I also, understand that by not following the safety rules and behavior expectations established for my safety, I may be removed from the program.

Date _____ Student Signature: _____

Email: _____

EARN AN EXTRA CREDIT FOR YOUR TRANSCRIPT

How? Through Career Choices Work Credit

**180 Hours of Work Experience = .5 Credit
AT IT IS FREE!**

Requirements:

- Job covered under L&I (No 'Under the Table' Jobs)
- You must be at least 16 years Old (We can start on your birthday!)
- Must have Parent Permission
- Must Have taken or be currently taking a CTE Class

For more information contact:

- Geri Prater—Room 655; gprater@stanwood.wednet.edu
- Zach Ward—Room 332; zward@stanwood.wednet.edu

Fill out and return this form to sign up:

Student's Name: _____

Student's Cell Phone: _____

Student's Email: _____

Student's Employer: _____

Location of Employer: _____