



## EML 2023 | Computer Aided Graphics and Design

Class Number: 10608

### Instructor Information

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Larry Howard

### Teaching Assistants

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**Name:** Rishi Patel

**Email:** patel.rishi@ufl.edu

**Office Hours:** Zoom

**Class Number:** 10608

### Course Details

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**Catalog Description:** Sketching, descriptive geometry, computer graphics, computer aided drafting and design projects.

**Credit Hours:** 3

**Course Fees:** \$126.17

### Additional Course Description

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The primary goal of this online class is to enable students to utilize On-Line-Instruction-Tutorial tools to learn the basics of 3D Computer Aided Design and Drafting (CADD) using SolidWorks 3D CAD software. There are no prerequisites to this course although a knowledge of windows, and the use of folders to store files and working knowledge of the Canvas Learning Management System (LMS) is advised; it is an Introduction to 3D CADD using as a template a 3-unit, 13-week curriculum. Although the lecture videos and supporting slides will provide all the knowledge you need for the class we do recommend this textbook as a good reference: SolidWorks 2024 for Designers, Tickoo, CADCIM Technologies Publishers. Versions from previous dates will work as well and most versions are available on Amazon.com. As this class is 100% online, or asynchronous, it will include

PowerPoint lectures on specific topics aided by video tutorials demonstrating live screen navigation. Each module will include homework video lectures on the relevant subjects, assignments, and quizzes. Students will have access to an experienced CADD instructor by text, email or Zoom during the duration of the class and should plan on an average of 9 hours per week on lectures, quizzes, homework and exams. As the on-line class is taught through Canvas, no courseware will reside on the students' computer.

This course includes a vendor certification exam called *Certified SolidWorks Associate* (CSWA) and will count as 10% of the students final grade.

## Required Materials

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**The instructor has stated that there are no items required or recommended for this section.**

## Recommended Materials

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### **SolidWorks 2024 for Designers, 22nd Edition**

**ISBN:** 164057199X

**Authors:** Prof. Sham Tickoo Purdue Univ. and CAD/CIM Technologies

**Publisher:** CAD/CIM Technologies

Earlier versions are acceptable as well as they are more affordable.

## A Note on Materials

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See professor for details.

## Course Goals and Objectives

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1. Understand the conventions and notations used in an engineering drawing.
2. Recognize standard views including principal, isometric, auxiliary, detailed, partial, and sectional views.
3. Read an engineering drawing to visualize and understand the design documented in it.
4. Create Solid Model as a combination of standard features available in all Solid modeling software including Extrude, Revolve, Loft, Sweep, and Shell.

5. Create constrained 2D sketches for these features using dimensions and relations that will regenerate (or update) in the desired manner when a dimension is changed.
6. Use variables to define geometric parameters.
7. Modify solid models using standard modifying features such as Fillet (or Round), Chamfer, and Draft.
8. Use reference geometry such as planes, axes, and points to aid in the construction of solid models.
9. Analyze and fix errors or deficiencies in a solid model including simplifying feature tree.
10. Create assemblies and part models using model-based (parametric) definitions (i.e., updating one dimension leads to other features updating rather than breaking the assembly/model).
11. Create solid models and 3D assemblies with multiple configurations
12. Create 3D assemblies of parts using geometric constraints (or mate relations) between parts.
13. Create an engineering drawing using a solid or assembly model in CAD software.
14. Create drawings that contain orthographic projections, auxiliary projections, section views, detail views, and partial views of a part or assembly.
15. Create fully dimensioned part drawings suitable for manufacturing.
16. Understand, recognize, and apply welding callouts when creating a part/assembly drawing.
17. Apply and recognize traditional tolerancing as well as geometric dimensioning and tolerancing (G D & T).
18. Apply tolerances for a desired clearance or interference fits.
19. Understand thread notes, nomenclature, and selection process for threaded fasteners.
20. Understand the use of Coordinate Measurement Machine (CMM) to inspect a manufactured part to determine if a part meets the specified tolerances.
21. Prepare an STL file of a solid or assembly model for fabrication on a Rapid Prototyping machine.

## **Expectations and Student Learning Outcomes**

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### **Relation to Program Outcomes (ABET):**

This describes the relation of the course to program outcomes.

<b>Outcome</b>	<b>Coverage</b>
<ul style="list-style-type: none"><li>• An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</li></ul>	Low
<ul style="list-style-type: none"><li>• An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors</li></ul>	Medium
<ul style="list-style-type: none"><li>• An ability to communicate effectively with a range of audiences.</li></ul>	High
<ul style="list-style-type: none"><li>• An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts</li></ul>	Low

<b>Outcome</b>	<b>Coverage</b>
<ul style="list-style-type: none"> <li>An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.</li> </ul>	Low
<ul style="list-style-type: none"> <li>An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</li> </ul>	No
<ul style="list-style-type: none"> <li>An ability to acquire and apply new knowledge as needed, using appropriate learning strategies</li> </ul>	Medium

## Methods of Evaluation

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### *Evaluation of Grades*

#### How grades are evaluated

<b>Assignment Category</b>	<b>Percentage of the Grade</b>
Lettered homework assignments (A through SP)	75%
Regular Quizzes	5%
GDT Quiz	5%
Unit SP (Special Project)	5%
CSWA Exam	10%

## Grading Scale

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### Letter grade and percentage

Letter Grade	Percentage Value
A	94 - 100%
A -	90 - 93.9%
B +	87 - 89.9%
B	83 - 86.9%
B -	80 - 82.9%
C +	77 - 79.9%
C	73 - 76.9%
C -	70 - 72.9%
D +	67 - 69.9%
D	63 - 66.9%
D -	60 - 62.9%
E	59.9% and below

Final grades will be rounded up or down to the nearest tenth: < 5 rounded down; > or = 5 rounded up. E.g., 93.94 is 93.9; 93.95 is 94.

## Course Schedule

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Week	Topics
1	Course Orientation Syllabus Review Intro to SolidWorks Orthographic Projection Unit A Assignment - Modeling Parts Quizzes
2	Unit B Homework - Modeling Parts Quizzes
3	Unit C Assignment - Modeling Parts Unit D Assignment - Modeling Parts Quizzes

4	Unit E Assignment - Modeling Parts Unit F Assignment - Modeling Parts Quizzes
5	Unit G Assignment - Modeling Parts Unit H Assignment - Modeling Parts Unit I Assignment - Modeling Parts Quizzes
6	Unit J Assignment - Modeling Parts Unit KC Assignment - Rapid Prototyping (3D Printing) Unit K Assignment - Assemblies Quizzes June 19th - Juneteenth Holiday - no class today
7	Unit L Assignment - Drawings Summer Break
8	Prepare for the Certified SolidWorks (CSWA) Exam Quizzes
9	Prepare for the Certified SolidWorks (CSWA) Exam Quizzes July 3rd - Independence Day Holiday
10	Prepare for the Certified SolidWorks (CSWA) Exam July 15nd - CSWA Exam Unit M - Rapid Prototyping (3D Printing) Quizzes
11	Unit N - Geometric Dimensioning & Tolerancing (GD&T) Quizzes
12	Unit SP - Special Project Quizzes

## Schedule of Assignments

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Due Dates	Assignments	Type of Assignment	Points
5/20/26	Syllabus Quiz	Quiz	10
5/20/26	Orthographics Quiz	Quiz	12

<b>Due Dates</b>	<b>Assignments</b>	<b>Type of Assignment</b>	<b>Points</b>
5/25/26	Unit A: U-Block	Model a Part	77
5/25/26	Unit A: Shaft Sleeve	Model a Part	15.4
5/25/26	Unit A: SolidWorks User Interface (GUI) Quiz	Quiz	10
5/25/26	Unit A: Show the downloaded eml 2023 Templates and the Homework Folders	Quiz	10
5/29/26	Unit B - Slotted Block Homework Assignment	Model a Part	15.4
5/29/26	Unit B - Elliptical Cam Homework Assignment	Model a Part	15.4
5/29/26	Unit B: Sketch Tools 1 Quiz	Quiz	10
6/2/26	Unit C - Lever Arm Homework Assignment	Model a Part	22
6/2/26	Unit C: Sketch Tools 2 Quiz	Quiz	10
6/8/26	Unit D: Plate Homework Assignment	Model a Part	23.1
6/8/26	Unit D: Kit Kadd Bar Homework Assignment	Model a Part	23.1
6/8/26	Unit D: Modify Sketch Entities Tools Quiz	Quiz	10
6/12/26	Unit E: End Bracket Homework Assignment	Model a Part	19.8

<b>Due Dates</b>	<b>Assignments</b>	<b>Type of Assignment</b>	<b>Points</b>
6/12/26	Unit E: Clevis Homework Assignment	Model a Part	27.5
6/12/26	Unit E: Extrude End Conditions Quiz	Quiz	11
6/15/26	Unit F: Stepped Stop Block	Model a Part	37.4
6/15/26	Unit F: Fly Wheel Plate Homework Assignment	Model a Part	31.9
6/19/26	Unit G: Angle Bearing Homework Assignment	Model a Part	31.9
6/19/26	Unit G: Patterns Quiz	Quiz	10
6/24/26	Unit H: Fixed Bearing Cup Homework Assignment	Model a Part	29.7
6/24/26	Unit H: Pump Housing Homework Assignment	Model a Part	42.9
6/24/26	Reference Geometry Quiz	Quiz	10
6/29/26	Unit I: Slotted Offset Screwdriver Homework Assignment	Model a Part	37.4
6/29/26	Unit I: Candlestick Holder w/Handle Homework Assignment	Model a Part	77
6/29/26	Unit I: Other Features 1 Quiz	Quiz	10
7/1/26	Unit J: Hammer Head Homework Assignment	Model a Part	32.1

<b>Due Dates</b>	<b>Assignments</b>	<b>Type of Assignment</b>	<b>Points</b>
7/1/26	Unit J: Lofted Arc Homework Assignment	Model a Part	29.7
7/1/26	Unit J: Other Features II Quiz	Quiz	10
7/3/26	Unit K: Mill Assembly from SolidWorks Tutorial	Create an Assembly	22
7/3/26	Unit K: Assemblies Quiz	Quiz	10
7/3/26	Unit K: U-Joint Assembly Homework Assignment	Create an Assembly	44
7/6/26	Unit KC: Key Chain 3D Print Homework Assignment	Model a Part/3D Print	36.3
7/8/26	Unit L: Mill Assembly Drawing Homework Assignment	Create a Drawing	59.4
7/8/26	Unit L: Drawings Quiz	Quiz	10
7/8/26	Unit L: Gasket Quiz	Create a Part in the Context of an Assembly	38.5
7/9/26	Unit CSWA: Graded Quiz - Install Tangix TesterPRO CSWA Software	QUIZ - Install Testing Software	10
7/10/26	Graded Quiz - CSWA Assemblies Sample 1	Create an Assembly	20

Due Dates	Assignments	Type of Assignment	Points
7/13/26	Unit CSWA: Graded Quiz - CSWA Parts Sample 1		
7/15/26	CSWA Exam	Exam	240
8/7/26	Unit M: Rapid Prototyping Gear Assembly Homework Assignment	Create an Assembly/3D Print	34.1
8/7/26	Unit SP:- Flange Coupling Assembly Homework Assignment	Create an Assembly	44
8/7/26	Unit SP:- Flange Coupling Drawing Homework Assignment	Create a Drawing	66
8/7/26	Unit N: GDT Regular Quiz - Fall 2024	Quiz	107
8/7/26	Unit N: Virtual and Resultant Conditions Quiz	Quiz	6
8/7/26	Unit N: GDT Drawing in SolidWorks	Create a Drawing	50

## Alignment of SLOs

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### SLOs

1. Draw 2D sketches with dimensions and geometric relations used to create features.
2. Create 3D solid models using various extrusion methods.
3. Create assemblies with appropriate mates from 3D solid models.
4. Create 2D Engineering Drawings using the models created in 2 and 3 above.

5. Pass the CSWA Exam

## **University Policies and Resources**

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Information about grading policies, support for students with disabilities, course evaluations, the Honor Code, and other course policies and campus resources can be found on the [Syllabus Policies page](#).

## **Attendance Policy**

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### **Excused and Unexcused Absences**

Students may only participate in classes if they are registered officially or approved to audit with evidence of having paid audit fees. The Office of the University Registrar provides official class rolls to instructors.

Students are responsible for satisfying all academic objectives as defined by the instructor. Absences count from the first-class meeting.

Acceptable reasons for absence from or failure to engage in class include illness; Title IX-related situations; serious accidents or emergencies affecting the student, their roommates, or their family; special curricular requirements (e.g., judging trips, field trips, professional conferences); military obligation; severe weather conditions that prevent class participation; religious holidays; participation in official university activities (e.g., music performances, athletic competition, debate); and court-imposed legal obligations (e.g., jury duty or subpoena). Other reasons (e.g., a job interview or club activity) may be deemed acceptable if approved by the instructor.

For all planned absences, a student in a situation that allows an excused absence from a class, or any required class activity must inform the instructor as early as possible prior to the class. For all unplanned absences because of accidents or emergency situations, students should contact their instructor as soon as conditions permit.

Students shall be permitted a reasonable amount of time to make up the material or activities covered during absence from class or inability to engage in class activities because of the reasons outlined above.

If a student does not participate in at least one of the first two class meetings of a course or laboratory in which they are registered, and they have not contacted the department to indicate their intent, the student can be dropped from the course. Students must not assume

that they will be dropped, however. The department will notify students if they have been dropped from a course or laboratory.

The university recognizes the right of the instructor to make attendance mandatory and require documentation for absences (except for religious holidays), missed work, or inability to fully engage in class. After due warning, an instructor can prohibit further attendance and subsequently assign a failing grade for excessive absences.

## **Religious Holidays Guidelines**

At the University of Florida, students and faculty work together to allow students the opportunity to observe the holy days of their faith. A student should inform the faculty member of the religious observances of their faith that will conflict with class attendance, with tests or examinations, or with other class activities prior to the class or occurrence of that test or activity. The faculty member is then obligated to accommodate that particular student's religious observances. Because students represent a myriad of cultures and many faiths, the University of Florida is not able to assure that scheduled academic activities do not conflict with the holy days of all religious groups. Accordingly, individual students should make their need for an excused absence known in advance of the scheduled activities.

The Florida Board of Education and state law govern university policy regarding observance of religious holidays.

### **Guidelines**

- Students, upon prior notification to their instructors, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith.
- Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence.
- Students shall not be penalized due to absence from class or other scheduled academic activity because of religious observances.

If a faculty member is informed of or is aware that a significant number of students are likely to be absent from class because of a religious observance, the faculty member should not schedule a major exam or other academic event at that time.

A student who is to be excused from class for a religious observance is not required to provide a second party certification of the reason for the absence. Furthermore, a student who believes that they have been unreasonably denied an education benefit due to religious beliefs or practices may seek redress through the student grievance procedure.

## **Absence due to Illness**

A student who is absent from class or any required class-related activity because of illness should contact their instructor, if feasible, as early as possible prior to the missed class or activity.

Students shall be permitted a reasonable amount of time to make up the material or activities covered during an excused absence.

Students should contact their college by the deadline to drop a course for medical reasons. Students can petition the Dean of Students Office to drop a course for medical reasons. The university's policy regarding medical excuse from classes is maintained by the Student Health Care Center.

## **Twelve-Day Rule**

Students who participate in university-sponsored athletic or scholarly activities are permitted to be absent 12 scholastic days per semester without penalty. A scholastic day is any day on which regular class work is scheduled as defined in the approved university calendar.[More Info](#)

The student or student's advisor must notify the instructor as early as possible prior to the anticipated absence to allow ample time for accommodations. Instructors must be flexible and not penalize students when re-scheduling during-term and final exams, class assignments, and other required activities and must follow the UF Attendance Policy herein and UF Examination Policies. As noted in the UF Examination Policies, during-term exams should be re-scheduled no later than before the end of the semester, while final exams no later than 90 days after the originally scheduled exam time. However, instructors are encouraged to re-schedule final and during-term exams, assignments, and other activities as soon as possible after the last day of the absence and must not penalize the student in any way.[More Info](#)

A group's schedule that requires absence of more than 12 scholastic days should be adjusted so that no student is absent from campus more than 12 scholastic days. Students who previously have been warned in writing by their instructor about the impact of absences on their individual class performance should not incur additional absences, even if they have not been absent 12 scholastic days. The student is responsible to maintain satisfactory academic performance and attendance.

## Course Policies and Resources

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### Class Norms

As with any 3 credit class, a student is expected to spend an average of 9 hours in this online class

Homework will be completed on the student's local Windows PC in SolidWorks

For each assignment the student will submit the following as called for in the assignment instructions:

- a screen shot
- the SolidWorks file(s)

Most quizzes are graded automatically.

No Midterm Exam or final exam

## Late and Make Up Work Policy

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### Assignments

Students are expected to complete all assignments on time. Refer to the course calendar for assignment dates & deadlines as it will determine all due dates.

#### **The lettered homework assignments (Unit A, Unit B, etc.):**

All lettered assignments will be open and available to be worked at least a week ahead.

Each lettered assignment has a specific due date specified in the course calendar and within the assignment itself.

You are to submit each assignment meeting or exceeding the expectations as called for in that assignment's Grading Criteria (Rubric).

Late homework is a term used for homework that is submitted for the first time after the assignment due date.

Important note about Assignments being late:

Any assignment turned in on or before the due date will receive 100% credit based upon the assessment.

The late period for an assignment starts the day after the due date for 7 days. The assignment will be closed 7 days after the due date. Any assignment turned in after the due date, but within the 7-day late period will be graded, but will receive a 1 letter grade deduction from the final grade.

Assignments are not able to be submitted after the late period and will not be graded. The student will receive a 0 for that assignment.

Any request for an exception to either the late period or after the late period expires falls within the university attendance policy and must be documented, in advance, by way of a message to the instructor in Canvas.

## Quizzes

### **Regular quizzes:**

- They will in most modules and grading is done automatically by Canvas. You'll have at least a week to take these. You will know your score right after you submit the quiz. You will have 2 chances to take the quizzes. When you submit the quiz the first time you will see your grade and Canvas will tell you 2 things: 1) your answers and, for those questions you missed, 2) you will see the right answers. If you receive 100% don't take it the second time. If you missed any questions, you may take the quiz a second time knowing the correct answers. Canvas will average your 2 scores, and that will be your final grade. There will be a GDT quiz which will be graded separately. The same late assignment rules apply to all quizzes.

## **Classroom Behavior**

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As we will not meet in a classroom here are some course guidelines:

1. Communicate with me through the Canvas Inbox and I will respond within 48 hours (excluding weekends).
2. Important Note: Only email sent through your Canvas Inbox will be answered.
3. Follow up any email with a text message if you feel you require a more immediate turnaround, no phone calls please.
4. All students: Please check the Announcements and your Canvas Inbox before asking me any questions as you may find your answer already posted.

5. Be mindful as you communicate online! You need to understand that your entire history of online communications remains accessible to anyone and everyone, probably forever. As a former executive in industry I received some sage advice from one of our corporate attorneys who told me, "assume everything you say or write online will show up on the front page of the Washington Post." That is the assumption I make whenever I communicate online or in writing. Therefore, you should assume everything you send to me in this class will end up in the hands of an interviewer when you apply for grad school, or possibly as a candidate being interviewed for a job. What impression will a future school or employer have when they look at your communications in this class because, as we witness in the news every day, bad news is sure to surface at the most inopportune time.

## **Technology in the Classroom**

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As this course is 100% online there will be no "Technology in the Classroom". The student must have access to a computer. Below are the minimum requirements needed. They ensure that you can participate using SolidWorks software and be able to view the internet-based videos.

- A laptop or Desktop with Microsoft Windows 10 (64 bit) or higher.
  - Apple iOS won't work with SolidWorks although you can use it for Canvas
  - a mouse with a mouse-wheel
  - sound card and speakers
  - you will be assigned a Canvas account which will require your Student ID to be used as the User ID and your student password
  - you must be able to navigate this 100% online course in Canvas
  - Internet Connection (preferably DSL or Cable)

[\*\*Click here for the University policy regarding computer requirements and using SolidWorks on "UF Apps"\*\*](#)

## **Rubrics**

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Each assignment will include a detailed Rubric, or grading criteria. Students will understand clearly the composition of their grade for each assignment as there are points assigned for each objective, including a deduction for late submission, in each assignment. A sample Rubric is shown here:

eml 2023 Unit F Stepped Stop Block Grading Criteria					
Criteria	Ratings				Pts
<p>Submit both the *.png file and the SolidWorks part file for Rev B of this model with the modifications per the homework assignment. threshold: 10.0 pts</p>	<p>10 pts Both files submitted with all modifications per the homework assignment</p>	<p>7 pts Both files submitted but was missing one of the modifications</p>	<p>6 pts Only one file submitted with all modifications per the homework assignment</p>	<p>0 pts One or both files submitted but was missing two or more of the modifications</p>	10 pts
<p>All sketches must be fully defined before creating the feature threshold: 3.0 pts</p>	<p>3 pts No minus signs (-) were present in the screen shot which means all sketches were fully defined</p>	<p>2 pts There were minus signs (-) present in at least one of the sketches.</p>	<p>0 pts There were minus signs (-) present in two or more of the sketches.</p>		3 pts
<p>Draw the 1st sketch on the correct plane so the student's Isometric View agrees with the one in the assignment handout. threshold: 1.0 pts</p>	<p>1 pts The 1st sketch was drawn on the correct plane</p>	<p>0 pts The 1st sketch was not drawn on the correct plane</p>			1 pts
<p>Rev B of the model should have the volume in mass properties called for in the handout within +/- 1% threshold: 1.0 pts</p>	<p>1 pts Rev B of the model should have the volume in mass properties called for in the handout +/- 1%.</p>	<p>0 pts Rev B of the model does not have the volume in mass properties called for in the handout +/- 1%</p>			1 pts
<p>Submit only the *.png file for Rev A showing the volume in mass properties threshold: 2.0 pts</p>	<p>2 pts Rev A *.png file was submitted and the volume was within +/- 1%</p>	<p>1 pts Rev A *.png file was submitted and the volume was not within +/- 1%</p>	<p>0 pts Rev A *.png file was not submitted</p>		2 pts
<p>Submit the Model with all the features necessary to create the 3D model per the homework assignment. threshold: 7.0 pts</p>	<p>7 pts Model submitted with all the necessary features per the homework assignment.</p>	<p>5 pts One of the features was missing.</p>	<p>0 pts Two or more of the features were missing.</p>		7 pts
<p>Use linear feature pattern for the teeth threshold: 5.0 pts</p>	<p>5 pts Used linear feature pattern for the teeth</p>	<p>2 pts Use linear sketch pattern instead for the teeth</p>	<p>0 pts Did not use a pattern for this model.</p>		5 pts
<p>Use a feature mirror for the tabs threshold: 5.0 pts</p>	<p>5 pts Used a feature mirror for the tabs</p>	<p>3 pts Use a sketch mirror for the tabs</p>	<p>0 pts Did not Use a mirror for the tabs</p>		5 pts
<p>Submit the assignment on time threshold: 3.0 pts</p>	<p>3.4 pts Assignment was submitted on time</p>	<p>0 pts Assignment was submitted late</p>			3.4 pts
Total Points: 37.4					

## CSWA Exam

If passed you receive a Certified SolidWorks Associate certificate)