

Computer Aided Graphics and Design

EML 2023 - Section 26623

Spring 2026

Since this class will be asynchronously delivered (except for exams), communication through Announcements will be heavily used.

Instructor:

Dr. Andrés Rubiano

Preferred communication over Canvas Messages, not email.

For all grades-related communications, and help with homework and quiz work, please contact the TAs directly through a Canvas message. Please type "*CAD Student:*" before your subject in the subject line.

For all other personal and emergency-related communications with me, please attend office hours. Overall class progress will only be discussed towards the end of the semester (when there's progress to discuss).

Office Hours: Wednesday 11:00 AM – 12:00 PM & Friday 12:00 PM – 1:00 PM (Starting Jan. 9th, Ending Apr. 22nd)

Zoom Link:

Please sign up for an appointment, at least 4 hours in advance, using this link: <https://calendly.com/dr-rubiano/office-hours>

You can sign up for more than one 5-minute slot if you foresee a longer meeting.

Teaching Assistants:

Callum Wilford - callumwilford@ufl.edu - Zoom Link:

Office Hours: Tu, Th: 7:30-8:30pm

Nicholas Sardinia - nicholassardinia@ufl.edu - Zoom Link:

Office Hours: M, W: 7:30-8:30pm

Course Description

Sketching, descriptive geometry, computer graphics, computer aided drafting and design projects. 3 Credits.

The Southern Association of Colleges and Schools Commission on Colleges provides the federal definition of the credit hour as the equivalent to one hour of in-person instruction and at least two to three hours of out-of-class work per week in a 15-week semester. Source: citt.ufl.edu

Since this is a summer course and all topics are covered in 12 weeks (3/4ths of the time of a regular semester), you will need to dedicate roughly 12 hours of work a week (4/3rds of 9 hours) for this 3 credit course.

Prerequisites

Basic computer knowledge: saving files, renaming files, copying or moving files, differentiating between a zip file and a folder, unzipping zip files, downloading files, opening image files, understanding paths in windows explorer, changing the default program to open a certain file type, uploading files to Canvas, uploading files to OneDrive or other cloud service, taking a screenshot of your Windows screen, using the snipping tool, etc.

Course Objectives

To understand and be able to use computer-aided design software to present a clear and understandable design concept in an engineering setting.

To model solids, learn about engineering drawing conventions, geometric dimensioning and tolerance specification, and assemble components into a clear and working assembly. The course is divided into three main modules: building parts, creating drawings, and putting together assemblies. All homework assignments, quizzes, and exams are essential to developing these skills.

First Day Instructions: from your EML 2023 Canvas Course, go to Files, Installation Instructions folder, and follow the instructions in all four PDF files to install and properly set up Acrobat Reader, OBS, SolidWorks, and UF Templates. These must be properly set up during the first day of class. Failure to do so will result in exam issues or mistakes. You will not get a chance to make up for grades that have been affected by not setting up your software properly.

Class Structure:

At least a day before the date listed on the schedule (below), you are to:

- study the one 8-12-minute lecture main video.

- recreate the part, drawing, or assembly used in the video lecture, while recording your work with OBS. Set aside at least an hour to do this. **Important:** Some sketches in the recorded lectures have not been “fully-defined” intentionally for you to identify them and fix them. This is part of the re-creation goals (otherwise this activity would be pointless). All sketches should be fully defined for all parts that you create for this course.
- record your work while completing the lecture's assigned exercise(s). All sketches should be fully defined.

Course Assignments:

Homework:

- At least a day before every lecture day, you must watch the condensed lecture video, replicate the work shown in it, and record your work with OBS.
- Complete the assigned lecture exercises. Lecture exercises are to be recorded from start to finish. This work can be randomly requested during a quiz or exam.

Organize and label your work neatly. There is no required labelling scheme, but use consistent names that help you find your work. For example: if you have 3 main folders (Homework, Quizzes, and Exams) create a folder for each assignment (let's say *Lecture 16* inside the HW folder), and within it, save and label each file in a way that is easy to find: *Lecture 16 - Exercise 3 - Part*, *Lecture 16 - Exercise 3 - Drawing*, *Lecture 16 - Exercise 3 - Assembly*, *Lecture 16 - Exercise 3 - Pack and Go.zip*, *Lecture 16 - Exercise 3 - Recording*.

Quizzes:

Pop quizzes will be published at 6 AM and remain open for 24 hours. Why not scheduled quizzes? Studying and memorizing information right before a scheduled quiz does not result in overall retention of engineering knowledge or successful development of critical thinking skills.

There are two types of quizzes: *quick quizzes* and *regular quizzes*.

- Quick quizzes will ask for you to upload a file that you must have created beforehand, as part of any of the assigned exercises or the completion of a video-lecture part. These quizzes will take 5 minutes or less to complete. Be very organized with how you store and label all the files for this course.
- Regular quizzes will consist of a problem statement. The allotted time will depend on the complexity of the quiz. For these quizzes, you will need provide a submission for the actual quiz, as well as the recording of your work:

- Quiz submissions will be the part file or a *Pack and Go* zip file of a part drawing or assembly that the quiz asks for, or fill in the blank questions with information found in your SolidWorks file; usually distance, mass, volume, or surface area properties.
- Additionally, starting before you open the quiz on Canvas and until after you submit the quiz, you will record your work with OBS.

Quiz time will appear limited and quiz problems, challenging, if assigned exercises are not completed.

If when taking a quiz, you initially submit a solution that had errors, make sure to go back and work on it again to have a quiz solution file without any mistakes. You can use TAs office hours to check your work and make sure you have made the best use of the quizzes.

Quizzes will not show up in To-Do Lists or in the Calendar. It is your responsibility to check the quizzes tab daily. This is intentional to keep you from postponing your other daily responsibilities.

Exams:

Four exams will cover the entirety of the material covered in class. The first exam will cover the creation of parts. The second exam will cover the creation of part drawings and includes creating a part (cumulative). The third and fourth exams will cover assemblies, animation, and mechanical mates (cumulative).

The exams will be taken online, and they will begin at 7:00 PM and end at 8:15PM. You will record yourself and your on-screen work, while working on the exam, and submit your recording to the *Recording* assignment. You will need a working webcam and OBS set up (installation and set up instructions found in the Files tab). The recording assignment will have a blank textbox, in case you want to include any important comments.

If you have conflicts with other classes, please let me know before May 16th, 2024. No dates will be moved if the conflicts are not reported before May 16th.

If you don't submit any exam questions on time, a grade will be assigned based on the recording of your work, and you will receive a grade penalty for not submitting on time.

CSWA Exam:

You will have the chance to take the Certified SolidWorks Associate (CSWA) certification exam between Aug. 4th and Aug. 12th. This exam doesn't count towards the course grade in any way. You can find more about the exam here: <https://www.solidworks.com/certifications/mechanical-design-cswa-mechanical-design>.

Grade Percentages: Homework (0%, but they are necessary to perform well during quizzes), Quizzes (0%, but they are necessary to develop critical thinking skills for exams), Exam 1 (30%), Exam 2 (20%), Exam 3 (25%), Exam 4 (25%). CSWA Exam (0%)

Make-up Policy: Missed exams will result in a zero grade, except in cases of personal or family emergencies, and will be handled on a case by case basis. In cases of emergency, the missed grade will be replaced by the grade of the following exam due to the cumulative nature of the course. Send Dr. Rubiano a Canvas message after you receive the grade that will replace the zero you initially obtained.

Grade Changes: Corrections of grades should be submitted to the TA as a Canvas message within 5 business days of the grade posting in writing with a concise statement of why you believe there has been an error. Otherwise, the grade will remain unchanged. Use a proper subject line and include supporting documentation.

File Nomenclature: Last Name, First Name – Exercise Name - Details

Examples:

Rubiano, Andres – Quiz 08 – Part

Sardinia, Nicholas – Quiz 06 – Recording

Gonzalez, Andrew – Lecture 13 – Exercise 2

Gonzalez, Andrew – Lecture 13 – Exercise 3 Recording

Gonzalez, Andrew – Lecture 06 – Exercise 1 Drawing

Sardinia, Nicholas – Lecture 05 – Lecture Video Part

Gonzalez, Andrew – Quiz 14 – Pack and Go

Rubiano, Andres – Quiz 16 – Animation Video

Course Content and Schedule:

Date		Day	Content	Lecture	Lecture Links	Important Notes
Jan	12	M	Syllabus	-	-	Follow the <i>First Day Instructions</i> section on the syllabus.

Jan	14	W	Isometric and Orthogonal Views in SolidWorks SolidWorks Interface and Basics	1 & 2	https://youtu.be/Y4gsOdYpiVQ https://youtu.be/bchu5JNc3YA	Nothing to replicate before class. No need to record your work.
Jan	16	F	Extrusion Feature and Sketches	3	https://youtu.be/OwZMn3kqU2s	Create a part for each of the two Lecture 03 exercises in your Exercises folder.
Jan	19	M	Holiday			
Jan	21	W	Reference Geometry	4	https://youtu.be/rcEnT14cZEg	Create a part for each of the two Lecture 04 exercises in your Exercises folder.
Jan	23	F	Relations, Trimming, and Offsetting	5	https://youtu.be/j6r2bLoxhS0	Create a part for each of the three Lecture 05 exercises in your Exercises folder.
Jan	26	M	Mirroring Sketch and Features	6	https://youtu.be/ofj8KCvjTl8	Create a part for each of the two Lecture 06 exercises in your Exercises folder.
Jan	28	W	Revolve and Arrays	7	https://youtu.be/A-iWmxzJrlQ	Add the fillets that were not added in the video. Create a part for each of the three Lecture 07 exercises in your Exercises folder.
Jan	30	F	2D and 3D Sweeps	8	https://youtu.be/WZjkVcYyOoA	For the second lecture part, add the fillets to the path, before sweeping it. Create a part for each of the two Lecture 08 exercises in your Exercises folder.

Feb	2	M	Helix Sweep	9	https://youtu.be/gUzh9vTvwEQ	
Feb	4	W	Loft and Shell	10	https://youtu.be/rzhLnY7JbRw	Watch this short video, related to springs: https://youtu.be/BKW1RNH4qc4
Feb	6	F	Exam 1			Solution to Extension Spring Part: https://youtu.be/HqIkC6_N1NA?
Feb	9	M	Import Pictures, Autotrace, and Combine Features	11	https://youtu.be/XCdU01M7t-k	No need to replicate the examples in the lecture.
Feb	1	W	Equation Driven Curve & Parametric Equations	12	https://youtu.be/3ToFwSf916k	
Feb	13	F	Toolbox Add-In for Machine Components	13	https://youtu.be/d0Cl7tyYLz8	C:\Program Files\SOLIDWORKS Corp\SOLIDWORKS\Toolbox\data utilities\slidsetdocprop.exe
Feb	16	M	Drawings Basics in SolidWorks Missing & Redundant Dimensions	14	https://youtu.be/9qJS2hRL1Sg	Replicate, removing redundant dimensions* and adding missing ones, the following part drawings: Lecture 03 - Basics Exercise 2 Lecture 03 - Basics Exercise 1 Lecture 04 - Reference Geometry 2 Lecture 06 - Mirror Exercise 1 *Redundant dimensions are those that are not needed to build the part; those that are repeated (or can be calculated) somewhere else in the drawing.

Feb	18	W	Auxiliary and Section Views	15	https://youtu.be/wskNxGZGqc4	Replicate, removing redundant dimensions and adding missing ones, the following part drawings: Lecture 04 - Reference Geometry 1 Lecture 06 - Mirror Exercise 2 Lecture 09 - Springs Exercise 2
Feb	20	F	Helper Views for Part Drawings	16	https://youtu.be/tAWlPVKcqi	Lecture 07 - Exercise 1 Lecture 07 - Exercise 2 Lecture 10 - Exercise 1
Feb	23	M	Geometric Dimensioning and Tolerancing		Open the txt file labelled <i>Crane Links</i> in the Files folder, and watch those lectures.	Replicate all the remaining part drawings given to you as exercises so far, since lecture 3.
Feb	25	W	Exam 2	-	-	-
Feb	27	F	Assemblies, Mates, and Exploded Views	17	https://youtu.be/iYnt8jxwllM	Nothing to replicate before class.
Mar	2	M	Editing Assemblies, Drawings, Motion and BOM	18	https://youtu.be/kUnMhjPQ2H0	Use the Lecture 17 - Music Lid -Parts to replicate the steps of Lecture 17 and 18 (you will need to create the body of the music box). Assemble the scissor jack from last class.
Mar	4	W	Fasteners and Threaded Holes	19	https://youtu.be/Dvc8k7VnnWw	

Mar	7	F	Animation	20	https://youtu.be/QgQ40z_Zl4k	Nothing to replicate before class.
Mar	9	M	Advance Mates - Gears	21	https://youtu.be/7szznDaQgSk	
Mar	11	W	Gears Activity	-	Gears Activity Published	
Mar	14	F	Exam 3	-	-	-
Mar	16	M	Spring Break			
Mar	18	W	Spring Break			
Mar	21	F	Spring Break			
Mar	23	M	Advance Mates - Screws	22	https://youtu.be/wCsk2t3momA	

Mar	25	W	Screws Activity		No Video Lecture	Complete the claw mechanism.
Mar	28	F	Springs Deformation	23	https://youtu.be/hiXWxmQTiAU	Complete the claw mechanism restricting its motion and adding threads. Look up how to use the Threads feature, and add matching threads to the lead screw and the orange component. Add a screw mate so that when the lead screw rotates, the claw mechanism opens and closes.
Mar	30	M	"Deformation" Exercise		No Video Lecture	Finish the Follower assembly with a fully functional deforming spring.
April	1	W	Advance Mates - Cams	24	https://youtu.be/jbcH0OGs0uM	Complete the bow and arrow assembly with a "stretchable" string. The string should move backwards as the arrow moves backwards. Create the 4 cams shown in the lecture video, and create 4 separate assemblies, one with each cam (pear, cardioid, off-centered circle, and equation driven curve).
April	4	F	GD&T Activity & Optional Exam		Open the txt file labelled <i>Crane Links</i> in the Files folder, and watch those lectures.	Replicate the GDT Exercise & Take Optional Exam (won't hurt your grade)
April	6	M	Additional Practice Content		Alternate resources to prepare for Exam 4.	All material will be posted on this date.
April	8	W	Additional Practice Content		Alternate resources to prepare for Exam 4.	
April	10	F	Additional Practice Content		Alternate resources to prepare for Exam 4.	

April	13	M	Additional Practice Content		Alternate resources to prepare for Exam 4.	
April	15	W	Additional Practice Content		Alternate resources to prepare for Exam 4.	
April	17		Exam 4	-	-	-
April	20		Grades Finalization Begins			
April	22					

Required Textbooks and Software

SolidWorks 2025, Open Broadcaster Software (OBS), Adobe Acrobat Reader.

Attendance Policy and Class Expectations

Make-up quizzes and exams are only offered to students who have missed taking them on time due to personal or medical emergencies. Proof of such emergencies is required in every case. When contacting me for a make-up, include your availability to take a make-up as a when2meet.com link.

Technical Issues:

In the event of a technical issue (e.g. SolidWorks or OBS freezing or crashing), try to document as best you can what the issue is. Since you are recording everything you do when working on SolidWorks, the OBS recording can be used to support claims of technical issues. If a simple screenshot of an error makes more sense, take a screenshot when the error occurs. If on the other hand, OBS is the one crashing, try to record your screen with your phone to document that OBS is frozen or giving you an error, preventing you from recording your screen.

Other Course Information

Grading Scale: The final grade will be calculated by the following table.

Table 1. Grading Table. %GE = Percent Grade Earned.

Percentage Range	Grade Point
93.33% GE 100.00 A	4.00
90.00% GE 93.33 A-	3.67
86.67% GE 90.00 B+	3.33
83.33% GE 86.67 B	3.00
80.00% GE 83.33 B-	2.67
76.67% GE 80.00 C+	2.33
73.33% GE 76.67 C	2.00
70.00% GE 73.33 C-	1.67
66.67% GE 70.00 D+	1.33
63.33% GE 66.67 D	1.00
60.00% GE 63.33 D-	0.67
00.00% GE 60.00 E	0.00

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Low
2) 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	Medium
3) an ability to communicate effectively with a range of audiences	High
4) 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	Low

5) 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	Low
6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	
7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Medium

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/Links to an external site.Links to an external site..> It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/Links to an external site.Links to an external site..> Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/Links to an external site.Links to an external site..> Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/Links to an external site.Links to an external site..>

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and

delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>)[Links to an external site.](#)[Links to an external site.](#) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu

- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>[Links to an external site.](#)[Links to an external site.](#)

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <https://counseling.ufl.edu>[Links to an external site.](#)[Links to an external site.](#), and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**[Links to an external site.](#)[Links to an external site.](#), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or [http://www.police.ufl.edu/Links to an external site.](http://www.police.ufl.edu/Links%20to%20an%20external%20site..)

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. [https://lss.at.ufl.edu/help.shtmlLinks to an external site.](https://lss.at.ufl.edu/help.shtmlLinks%20to%20an%20external%20site..)

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; [https://career.ufl.eduLinks to an external site.](https://career.ufl.eduLinks%20to%20an%20external%20site..)

Library Support, [http://cms.uflib.ufl.edu/askLinks to an external site.](http://cms.uflib.ufl.edu/askLinks%20to%20an%20external%20site..) Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. [https://teachingcenter.ufl.edu/Links to an external site.](https://teachingcenter.ufl.edu/Links%20to%20an%20external%20site..)

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. [https://writing.ufl.edu/writing-studio/Links to an external site.](https://writing.ufl.edu/writing-studio/Links%20to%20an%20external%20site..)

Student Complaints Campus: [https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/Links to an external site.](https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/Links%20to%20an%20external%20site..); [https://care.dso.ufl.eduLinks to an external site.](https://care.dso.ufl.eduLinks%20to%20an%20external%20site..)

On-Line Students Complaints: [https://distance.ufl.edu/state-authorization-status/#student-complaintLinks to an external site.](https://distance.ufl.edu/state-authorization-status/#student-complaintLinks%20to%20an%20external%20site..)