# EML4501 Mechanical Engineering Design 2 [100% Online]

2021 Summer Syllabus Tu: 11am-1:45pm & Th 11:00am-12:15pm

# Updated 5/9/2021

Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course website and announced in class.

# **Teaching Team**

- **Instructors:** Matthew J. Traum Zoom Office Hours: Tuesdays 12:15-1:45pm (during open lab hours) or by appointment Email: mtraum@ufl.edu
- Lead LA & Jenna Ajello Course PM: Email: jajello@ufl.edu

Teaching

Noel Thomas **Technician:** Email: noel.thomas@ufl.edu

> Francesca Lopez Email: flopez2@ufl.edu

Coverage<sup>\*</sup> High

High

High

High

Learning Devangi Gaikwad Email: devangi.gaikwad@ufl.edu **Assistants:** 

> Brooke Towns Email: brooketowns@ufl.edu

# **Catalog Description**

**Course Materials and Fees** 

Course Fee: \$49

Outcome

mathematics.

economic factors.

Integrated design and presentation of a mechanical system. Credits: 3 Prerequisites: EGN 3353C, EML 2322L, and EML 3005 & EGM 3401 with minimum grade of C Corequisites: EML 4321 & EML 4507 [Corequisites Are Not Enforced, but Subject Matter Mastery is Assumed]

**Course Objectives & Relation to Program Outcomes (ABET)** 

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and

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

3. An ability to communicate effectively with a range of audiences. 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,

Students who successfully complete this course demonstrate the following

outcomes in the context of mechanical engineering design theory and application:



# AFORDABLE Fall 2020 CNULERSITY OF FLORIDE 4FORDABLE Spring 2021

CNILERSITY OF FLORIDE

environmental, and societal contexts.

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

\*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

#### **Required Textbooks and Software**

- 1. Engineering Capstone Design, M. J. Traum, S. R. Niemi, et al., University of Florida, 2020 Free OER Download: <u>https://merge.mae.ufl.edu/outreach/textbook/</u> [Chapters posted when assigned]
- 2. Multimedia Engineering Fluid Mechanics, C. C. Ngo and K. C. Gramol, University of Oklahoma Engineering Media Lab, 2019

Free OER Access: http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?doc=&topic=fl

3. Multimedia Engineering Mechanics of Materials, Kurt Gramoll, University of Oklahoma Engineering Media Lab, 2019

Free OER Access: <u>http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?doc=&topic=me</u>

- 4. Multimedia Engineering Dynamics, Kurt Gramoll, University of Oklahoma Engineering Media Lab, 2019 Free OER Access: <u>http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?topic=dy</u>
- 5. Multimedia Engineering Thermodynamics, Kurt Gramoll and Meirong Huang, University of Oklahoma Engineering Media Lab, 2019

Free OER Access: http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?doc=&topic=th

6. A Heat Transfer Textbook, 5th ed, J. H. Lienhard IV & J. H. Lienhard V, Phlogiston Press, Cambridge, MA, 2020. ISBN: 9780486837352

Free OER Access: https://ahtt.mit.edu/

7. SolidWorks 2020 and SolidWorks PDM Available through UF

#### **Recommended Materials**

- 1. Introduction to Mechanics of Materials, 2nd Ed, Madhukar Vable, Expanding Educational Horizons, 2009 Free OER Download: <u>http://madhuvable.org/wp-content/uploads/2016/04/Entire%20Book%202018.pdf</u>
- Shigley's Mechanical Engineering Design, 10th Ed., R. G. Budynas and K. J. Nisbett, McGraw-Hill, 2015 ISBN: 9780073398204
- 3. Materials Selection in Mechanical Design, 5th Ed., Michael F. Ashby, Butterworth-Heinemann, 2016 ISBN: 0081005997
- 4. Dimensioning for Interchangeable Manufacture, Earlwood T. Fortini, Industrial Press, 1967 ASIN: B0006BQNRC
- 5. Machinery's Handbook, E. Oberg, 30th Edition (or later), ISBN-13: 978-0831130916

## **Evaluation of Grades**

This course is graded. Grades are earned based on the following individual and group deliverables. Further descriptions will be given when assignments and assessments are announced in class. Additional resources supporting these assignments will be posted on the course Learning Management System as needed.

Assignment/Assessment	Туре	Points	%
Participation	Individual	20	4.0
Entry Resume	Individual	1	0.2
Entry ResumeWorded Score	Individual	1	0.2
Entry Skill Set Inventory Survey	Individual	1	0.2
Reverse Engineering Report	Individual	100	20.0
Teaching Team Quiz (Honorlock Practice)	Individual	1	0.2
Fluids Review Quiz	Individual	15	3.0
Thermodynamics Review Quiz	Individual	15	3.0
Dynamics Review Quiz	Individual	15	3.0
Mechanical Design Review Quiz	Individual	15	3.0
Concept Design Report	Group	40	8.0
Concept Design Report Peer Review	Individual	0	var.
IP Disclosure	Group	7	1.4
IP Movie Screening Commentary	Individual	10	2.0
Preliminary Design Report	Group	60	12.0
Preliminary Design Report Peer Review	Individual	0	var.
90-Second Final Presentation Pitch Video	Group	6	1.2
Final Design Poster Abstract	Group	2	0.4
Exit Resume	Individual	1	0.2
Exit ResumeWorded Score	Individual	1	0.2
Final Design Poster	Group	20	4.0
Final Design Poster Presentation	Group	20	4.0
Poster Session Synchronous Interaction	Individual	10	2.0
Final Oral Presentation Slides	Group	10	2.0
Final Oral Presentation	Group	50	10.0
Design Review 1 Feedback Resolution	Group	4	0.8
Design Review 2 Feedback Resolution	Group	4	0.8
Final Design Report	Group	70	14.0
Final Design Report Peer Evaluation	Individual	0	var.
Exit Skill Set Inventory Survey	Individual	1	0.2
	TOTAL	500	100.0

Any changes will be posted on the CANVAS page and announced in class

# Explanation of Peer Evaluation:

All group members will submit feedback reflecting on their own contributions and the contributions their group members to major team deliverables. Evaluations submitted with every group member having perfect scores will be discarded as attempted grade inflation (see honor code section of the syllabus). Peer reviews resulting in a team member's score being above the class average add 10% to that individual's score on the group deliverable. Peer reviews resulting in a team member's score being in a team member's score being within one standard deviation of the class

average add 5% to that individual's score on the group deliverable. Peer reviews resulting in a team member's score being within two standard deviations of the class average have no impact on that individual's score on the group deliverable. Peer reviews resulting in a team member's score being more than two standard deviations below the class average subtract 10% from that individual's score on the group deliverable.

## **Grading Policy**

	A: 93-100	A-: 90-92.99
B+: 87-89.99	B: 83-87.99	B-: 80-82.99
C+: 77-79.99	C: 73-76.99	C-: 70-72.99
D+: 67-69.99	D: 63-66.99	D-: 60-62.99
E: 0-59.99		

More information on UF grading policy may be found at: <u>https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/</u>

#### Grade Definitions

- A : Student demonstrated course mastery in all regards and with distinction.
- A- : Student performed outstandingly in all regards and is exceptional.
- B+ : Student performed with excellence in the course.
- B : Student showed high command of course content.
- B- : Student has done a commendable job with course content.
- C+ : Student demonstrated ample grasp of course content.
- C : Student demonstrated adequate grasp of course content.
- C- : Student demonstrated fair grasp of course content.
- D+ : Student met fair curse expectations.
- D : Student attained below average expectations.
- D- : Student met minimal expectations to pass.
- E : Student failed to meet minimal expectations to pass.

#### **Attendance**

While attendance is not strictly monitored, it is extremely important to attend class regularly. If you miss a class, <u>you</u> are responsible for acquiring notes or other resources covered. The teaching team will endeavor to make all course materials available through the Learning Management System. However, some experiences cannot be replicated asynchronously. Students are held responsible for knowledge of all scheduling and policy announcements made in class. Excused absences must be consistent with university policies in the undergraduate catalog (<u>https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/</u>) and require appropriate documentation and advance communication with the instructor.

# **Online Course Recording & Copyright Policy**

Class sessions may be audio-visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who unmute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited. Unless stated otherwise, Dr. Matthew J. Traum holds copyright to all course material.

#### Policies on Clear Communication, "Ghosting", Sources of Truth, and Assignment Grade Disputes

1. Once students are assigned into groups, all Emails to the EML4501 Teaching Team related to group business must clearly identify the group's number. Each time any member of a group fails to identify the group by number in a communication to the Teaching Team, the group loses 1 point.

2. Individuals who fail to support their group or "ghost" the course, as demonstrated by peer evaluation scores two standard deviations below the class average and/or low participation tracked in Canvas/PDM, earn a failing grade in EML4501 regardless of points accumulated in the class.

3. Online platforms, notably GroupMe, provide venues for course discussion that exclude the instructor and EML4501 Teaching Team. Discussion platforms beyond UF-sanctioned Learning Management Systems will not be monitored or curated by the instructor. Thus, information propagated through these platforms can be incorrect. It is each student's responsibility to verify information obtained from these external discussion services with reputable reference sources or UF-affiliated subject matter experts. Erroneous information obtained from external discussion platforms used in EML4501 will be marked incorrect on graded assignments and assessments.

4. If an individual or group has as assignment grading dispute, the issue must first be addressed with the Learning Assistant who did the grading. If individuals/groups can show where grading errors occurred, Teaching Team members are happy to correct grades accordingly. Only after communication with a Learning Assistant fails to resolve a grading dispute may the individual/group bring the dispute to the instructor.

#### **Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center [(352) 392-8565, <u>https://disability.ufl.edu/students/get-started/</u>] by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure 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 <u>http://gatorevals.aa.ufl.edu/students/</u>. Students will be notified when the evaluation period opens, and they can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <u>http://ufl.bluera.com/ufl/</u>. Summaries of course evaluation results are available to students at <u>http://gatorevals.aa.ufl.edu/public-results/</u>.

#### **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 (<u>http://sccr.dso.ufl.edu/process/student-conduct-code/</u>) 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.

#### **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
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.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: <u>https://registrar.ufl.edu/ferpa.html</u>

#### **Campus Health, Wellness, and Academic Resources**

See appended page.

#### Schedule of Topics, Assignments, & Assessments

See appended schedule.

# "Treat a person as they should be, and they will become what they could be."

--R. W. Emerson

## 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 <u>umatter@ufl.edu</u> 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:** <u>http://www.counseling.ufl.edu/cwc</u>, 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 <u>Office of Title IX Compliance</u>, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, <u>title-ix@ufl.edu</u>

#### Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <u>http://www.police.ufl.edu/</u>.

#### Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <u>https://lss.at.ufl.edu/help.shtml</u>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

**Library Support**, <u>http://cms.uflib.ufl.edu/ask</u>. 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. <u>https://teachingcenter.ufl.edu/</u>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <u>https://writing.ufl.edu/writing-studio/</u>.

Student Complaints Campus: <u>https://www.dso.ufl.edu/documents/UF\_Complaints\_policy.pdf</u>.

On-Line Students Complaints: http://www.distance.ufl.edu/student-complaint-process.

Updated 5/8/2021

			1	1 1		<u> </u>	1 · · ·		<b>N N 11</b>	
Module	Meeting	Week #	Date	Day	Location	Synchronous	Content	Suggested Reading	Deliverable Assigned	Assessment / Assignment Due
#1: Course Intro	1	1	5/11/2021 (11:00am-12:15pm)	Tu	Virtual Classroom	Course Introduction The Design Process	I. Review of Syllabus & Expectations     Z. R. Dam & T. Siang, "Design Thinking: A Quick Overview," Interaction Design Foundation, 2018     3. Hummer Commercial: "The Big Race"	M. J. Traum, et al., "Implementing an Effective Large-Earollment Engineering Capstone Design-and-Build Program," Proc. ASEE SE Section Conf. Auhurn, AL, USA, March 8-10, 2020.	1. Entry Resume     2. Entry ResumeWorded Score     3. Skill Set Inventory for Group Generation     4. Reverse Engineering Report (RER)	
#2: Prerequisite Review	2	1	5/11/2021 (12:15-1:45pm)	Tu	Virtual Classroom	Introducing the Reverse Engineering Report (RER) Fluid Mechanics [EGN 3353C] Review	1. LaTeX Communication Tutorial 2. Fluid Mechanics [EGN 3353C] Review	C. C. Ngo & K. C. Gramoll, <u>Multimedia Engineering Fluid Mechanics</u> , U. Oklahoma Eng, Media Lab, 2019 http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?doc=&topic=fl	<ol> <li>Teaching Team Quiz</li> <li>Fluids Review Quiz</li> <li>Thermodynamics Review Ouiz</li> </ol>	
#2: Prerequisite Review	3	1	5/13/2021 (11:00am-12:15pm)	Th	Virtual Classroom	Thermodynamics [EML3100] Review	<ol> <li>Adam Grant TED Talk - Secret Weapon for Best Teams</li> <li>Thermodynamics [EML3100] Review</li> </ol>	K. Gramoll & M. Huang, Multimedia Engineering Thermodynamics, U. Oklahoma Eng. Media Lab, 2019 http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?doc=&topic=th		
#2: Prerequisite Review	4	2	5/18/2021 (11:00am-12:15pm)	Tu	Virtual Classroom	Dynamics [EGM3401] Review Heat Transfer Fin Analysis for RER	<ol> <li>M. Clayton, "Project Management in Under 5: What is a Gantt Chart?"</li> <li>2. Dynamics [EGM3401] Review</li> </ol>	<ol> <li>K. Granoll, <u>Multimedia Ingineering Damming</u>. U. Okhhoma Eng. Media Lab, 2019 Intp://www.cournes.ou.edu/cgi/bin/cbook_og/?http://wj.edu     2. A Hear Transfer Textbook, Stie ed., J. H. Leinshurd IV &amp; J. H. Leinshurd V. Philogiston Press, Cambridge, MA, 2020     </li> </ol>	8. Dynamics Review Quiz 9. Mechanical Design Review Quiz	1. Entry Resume     2. Entry ResumeWorded Score     3. Skill Stet Inventory Survey     5. Teaching Team Quiz
#2: Prerequisite Review	5	2	5/18/2021 (12:15-1:45pm)	Tu	Virtual Classroom	Design & Manufacturing [EML2322L] Review	1. SolidWorks & PDM Onboarding 2. DML [EML2322L] Review	K. Gramol, <u>Multimedia Engineering Mechanics of Materials</u> , U. Oklahoma Eng. Media Lab, 2019 http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?doc=&topic=me		6. Fluids Review Quiz 7. Thermodynamics Review Quiz
#2: Prerequisite Review	6	2	5/20/2021 (11:00am-12:15pm)	Th	Virtual Classroom	Mechanical Design [EML3005] Review	1. Mech 1 [EML3005] Review     2. R. F. Dam & T. Y Siang, "What is Design Thinking and Why Is It So Popular?," Interaction Design Foundation     2020	S. R. Niemi, et al, "Industry Product Data Management (PDM) Tool Integration into Undergraduate Engineering Design Courses," Proc. ASEE SE Section Conf., Auburn, AL, USA, March 8-10, 2020.		
#3 Tolerance & Dimensioning	7	3	5/25/2021 (11:00am-12:15nm)	Tu	Virtual Classroom	Tolerance Loops: Functional Surfaces	1. Vector Math Underpinning Tolerance Loops 2. Science of Small Distances	E. T. Fortini, Dimensions for Interchangeable Manufacture, Ch 8: Length Fits, Industrial Press, Inc. New York, NY, 1967		8. Dynamics Review Quiz 9. Mechanical Design Review Quiz
#3 Tolerance & Dimensioning	8	3	5/25/2021 (12:15-1:45pm)	Tu	Virtual Laboratory	Open Lab Hours	Distributing Tolerances	Association for the Development of Computer-Aided Tolerancing Systems (ADCATS) Database - Publications http://adcatset.sov.ucd/weportsmate/bilications.html		
#3 Tolerance &	9	3	5/27/2021	Th	Virtual Classroom	Product Functionality Example	1. Literature Review & Patent Search	M. J. Traum, S. L. Karackattu, "The Pencil-Top Fidget: Reinventing Shop (Metal Drilling and Tapping) in High School Science		
#4 Insertion &	10	4	(11:00am-12:15pm) 6/1/2021	Tu	Virtual Classroom	Time Menual Assembly Astivity	Z. Pencil-Top Focus Toy Product Example     ANCL "An Interduction to Standardo Why where and here an they developed?"	Classrooms," Proc. 126th ASEE Cont., 1ampa, FL, USA, June 16-19, 2019. Boothroyd & Dewhurst, Product Design for Manufacture & Assembly,	10. Concert Device Report (CDR)	
Handling Time #4 Insertion &	11	4	(11:00am-12:15pm) 6/1/2021	Tu	Virtual Laboratory	Open Lab Hours	Avist, An introduction to standards, with, where and now are used we respect.     Boothroyd & Dewhurst Estimation Technique	3rd Ed., Ch 3: Product Design for Manual Assembly, CRC Press, 2011       Amys FEA Course Resources       Ansys Academic Support Resources	10. Concept Design Report (CDR)	
Handling I me			(12:15-1:45pm)		Memorial Day		<ol> <li>S. Mesz, "Kano model, product design and startups: a powerful combination," 2017.</li> </ol>	https://www.ansys.com/academic/free-student-products/support-resources		
		4		Th	(Observed)					
#5 Creative Ideation	12	5	6/8/2021 (11:00am-12:15pm)	Tu	Virtual Classroom	Major Project Customer Guest Lecture [Jonathan Scheffe: UF Renewable Energy Conversion Lab]	I. Kano Model for Analyzing Customer Needs     2. J. Robert - ASME FutureME, "Project Success Defining the Problem"	C. Olsen-Landis, "Kano Model - Ways to use it and NOT use it," IBM Design, Medium.com, 2017		4. Reverse Engineering Report (RER)
#5 Creative Ideation	13	5	6/8/2021 (12:15-1:45pm)	Tu	Virtual Laboratory	Open Lab Hours	<ol> <li>Adam Grant TED Talk - Original Thinkers</li> <li>Function Analysis Method for Divergent Thinking</li> </ol>	Traum et al (2020) Capstone Design Text, Ch1-Customer Needs		
#5 Creative Ideation	14	5	6/10/2021 (11:00am-12:15nm)	Th	Virtual Classroom	Customer Needs to Quantitative Metrics Guilford's Alternative Uses Test Activity	1. Tim Harford TED Talk: A Powerful Way to Unleash Your Natural Creativity 2. Eliminating Impossible Concepts	Traum et al (2020) Capstone Design Text, Ch2-Researching the Problem		
#5 Creative Ideation	15	6	6/15/2021 (11:00am-12:15pm)	Tu	Virtual Classroom	How to Select Subsystems	<ol> <li>M. Oshin, "The Dick Fosbury Flop: How to Think Outside the Box &amp; Innovate New Ideas," mayooshin.com, 2017</li> <li>Rivist String the Subsystem Number</li> </ol>	Traum et al (2020) Capstone Design Text, Ch3a-Quantifying Customer Needs	14. Preliminary Design Report (PDR)	
#5 Creative	16	6	6/15/2021	Tu	Virtual Laboratory	Open Lab Hours	1. Jim Collins, "Good to Great Ch5 - Hedgehog Concept"	M. F. Ashby, Material Selection in Mechanical Design, 4th Ed., Ch 3: Engineering Materials & Their Properties, Butterworth-		
#5 Creative	17	6	6/17/2021 (11:00mm 12:15mm)	Th	Virtual Classroom	STEMTank	2. Kano Cale, what wakes I ou think Tou te clearive:	TRURCHABLE 2011	11	
Summer Break		N/A	6/22/2021	Tu				m Andy, watcher selection in weekender besign, wir zu, er s. watchers selection. The basics, batter worth Hememann, zo	**	
Summer Break		N/A	6/24/2021	Th						
#6 Down-Selection to Preliminary Design	18	7	6/29/2021 (11:00am-12:15pm)	Tu	Virtual Classroom	Material Selection for a Microbioreactor [Brandon Tran]	1. Material Selection - Intro to Ashby Charts 2. Hedgehog Concept	M. F. Ashby, Material Selection in Mechanical Design, 4th Ed., Ch 6: Case Studies: Materials Selection, Butterworth-Heinemann, 2011	<ol> <li>Peer Evaluation for CDR</li> <li>IP Disclosure</li> </ol>	10. Concept Design Report (CDR)
#6 Down-Selection to Preliminary Design	19	7	6/29/2021 (12:15-1:45pm)	Tu	Virtual Laboratory	Open Lab Hours	1. Performing a Trade Study 2. Normalizing Concept Valuations	M. F. Ashby, Material Selection in Mechanical Design, 4th Ed., Ch 4: Material Property Charts, Butterworth-Heinemann, 2011		
#6 Down-Selection to Preliminary Design	20	7	7/1/2021 (11:00am-12:15pm)	Th	Virtual Classroom	Assumption Removal Activity	1. Carrying out a Concept Down-Selection Matrix 2. Subsystem Synergy and Discord	J. Dinsmore, "2021 Ford F-150 Hybrid's Big Draw: The 7.2-kW Pro Onboard Generator," Torque News, Feb. 6, 2021.	11. Peer Evaluation for CDR	
#7 Intellectual Property	21	8	7/6/2021 (11:00am-12:15pm)	Tu	Virtual Classroom	IP Movie Screening	1. Intellectual Property: Trade Secrets 2. Intellectual Property: Patents	L. Lessig. Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity, The Penguin Press, New York, NY, 2004	13. IP Movie Screening Commentary	
#7 Intellectual	22	8	7/6/2021 (12-15-1-45mm)	Tu	Virtual Laboratory	IP Movie Screening	1. Intellectual Property: Trademark 2. Intellectual Property: Convision	University of Florida Intellectual Property Policy	¥X	
Topiny		8	(12.13-1.45pm)	Th	Independence Day		2. menecula reperty, copyright			
#7 Intellectual Property	23	9	7/13/2021 (11:00am-12:15pm)	Tu	Virtual Classroom	Intellectual Property: Rick Crowley	1. Bill Of Materials 2. Purchase Orders	1. L. Lessig - TED Talk, Re-examining the Remix     2. Nicole Pesce: How to play 'Hanoy Birldday' Like Beethoven. Chorin. Brahms. Bach and Mozart: Culture Remix Fair Use Example	20. Final Design Poster 21. Final Design Poster Presentation	12. IP Disclosure
#7 Intellectual	24	9	7/13/2021	Tu	Virtual Laboratory	Open Lab Hours	1. Design for Manufacturing	1. L. Lessig - TED Talk, Laws that Choke Creativity	22. Poster Session Synchronous Interaction	13. IP Movie Screening Commentary
Property #8 Finalizing	25	0	(12:15-1:45pm) 7/15/2021	Th	Virtual Classon	Maslow's Hammer, Birmingham Screwdriver, & Death by	2. Design for Manual Assembly 1. Estimating Manufacturing Costs	2. USPTO: Trade Secrets		
Design	25	9	(11:00am-12:15pm)	In	v inuai Classroom	McMaster-Carr: Selecting OTS vs. Custom Parts	2. Design Review Expectations			
#9 Design Review 1	26	10	7/20/2021 (11:00am-12:15pm)	Tu	Virtual Conference Room	Design Review 1A		D. G. Ullman, "Improving Team Communication with Design Technology Readiness Levels," 2020	<ol> <li>Peer Evaluation for PDR</li> <li>90-Second Pitch Video</li> <li>17. Final Design Poster Abstract</li> <li>18. Exit Resume</li> <li>19. Exit ResumeWorded Score</li> </ol>	14. Preliminary Design Report (PDR)
#9 Design Review 1	27	10	7/20/2021 (12:15-1:45pm)	Tu	Virtual Conference Room	Design Review 1B		D. G. Ullman, "7 Questions Companies Should Ask Before Using a New Technology," Machine Design, 2020	<ol> <li>23. Final Design Oral Presentation Slides</li> <li>24. Final Design Oral Presentation</li> <li>25. Design Review Feedback Resolution</li> <li>26. Final Design Report (FDR)</li> </ol>	
#10 Product Evaluation	28	10	7/22/2021 (11:00am-12:15pm)	Th	Virtual Classroom	Technology Readiness Levels [Guest Speaker: Shawn Martin, US DoD]	Detail Design: Design, Analyze, Prototype Cycle		15. Peer Evaluation for PDR	
#9 Design Review 2	29	11	7/27/2021 (11:00am-12:15nm)	Tu	Virtual Conference Room	Design Review 2				<ol> <li>90-Second Pitch Video</li> <li>Final Design Poster Abstract</li> </ol>
#11 Final Deliverables	30	11	7/27/2021 (12:15-1:45pm)	Tu	Virtual Classroom	Faculty & Course Evaluations Presentation Skills [Sean Niemi]		L. E. Rogers, et al, "Transitioning Oral Presentations Online in Large- Errollment Capiton Design Course. Increases Panelini Participation," Advances in Engineering Balaxiano, 2020.		18. Exit Resume 19. Exit ResumeWorled Score 20. Final Design Poster 23. Final Design Oral Presentation Slides
#11 Final Deliverables	31	11	7/29/2021 (11:00am-12:15pm)	Th	Virtual Symposium	Final Poster Design Presentations				21. Final Design Poster Presentation 22. Poster Session Synchronous Interaction
#11 Final Deliverables	32	12	8/3/2021 (11:00am-12:15nm)	Tu	Virtual Conference Room	Final Oral Design Presentations			28. Exit Skill Set Inventory Survey	24. Final Design Oral Presentation
#11 Final Deliverables	33	12	8/3/2021	Tu	Virtual	Final Oral Design Presentations				24. Final Design Oral Presentation
#11 Final Deliverables	34	12	(12:15-1:45pm) 8/5/2021 (11:00am-12:15pm)	Th	Virtual Conference Room	Final Oral Design Presentations			27. Peer Evaluation for FDR	<ol> <li>Design Review Feedback Resolution</li> <li>Final Design Report (FDR)</li> <li>Exit Skill Set Inventory Survey</li> <li>Pour Fundmoting for EDD (doi: 10.00000000000000000000000000000000000</li></ol>