

# EML4501 Mechanical Engineering Design 2

Fall 2021 Syllabus

M, W, F: 9:35-10:35am, 1:55-2:45pm, & 4:05-4:55pm (Online)

Updated 8/28/2021

*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, Ph.D.

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## Catalog Description

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 Materials and Fees

Course Fee: \$49

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

Students who successfully complete this course demonstrate the following outcomes in the context of mechanical engineering design theory and application:

Outcome	Coverage*
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	High
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and	High



welfare, as well as global, cultural, social, environmental, and economic factors.	
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.	High
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 Computer**

Students must have their own computer whose specifications meet or exceed the capabilities required by the College ( <https://www.eng.ufl.edu/students/resources/computer-requirements/> ) and MAE Department ( <https://mae.ufl.edu/academics/prospective/undergraduate/computer-requirements/> ).

### **Required Textbooks and Software**

1. Engineering Capstone Design, M. J. Traum, S. R. Niemi, et al., University of Florida, 2020  
Free OER Download: <https://merge.mae.ufl.edu/outreach/textbook/> [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: <http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?doc=&topic=me>
4. Multimedia Engineering Dynamics, Kurt Gramoll, University of Oklahoma Engineering Media Lab, 2019  
Free OER Access: <http://www.ecourses.ou.edu/cgi-bin/ebook.cgi?topic=dy>
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 2021 and SolidWorks PDM  
*Available through UF. Installation instructions will be provided the first week of class.*

## Recommended Materials

1. Introduction to Mechanics of Materials, 2nd Ed, Madhukar Vable, Expanding Educational Horizons, 2009  
Free OER Download: <http://madhuvable.org/wp-content/uploads/2016/04/Entire%20Book%202018.pdf>
2. 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, 30<sup>th</sup> Edition (or later), ISBN-13: 978-0831130916
6. Roark's Formulas for Stress and Strain, 7<sup>th</sup> Edition, W. C. Young, R. G. Budynas, McGraw-Hill, 2002  
ISBN 007072542X
7. Good to Great: Why Some Companies Make the Leap and Others Don't, J. Collins, Harper Business, 2001  
ISBN: 9780066620992

## 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.

<b>Assignment/Assessment</b>	<b>Type</b>	<b>Points</b>	<b>%</b>
Entry Resume + Resume Worded Score	Individual	0	0.0
Entry Skill Set Inventory Survey	Individual	0	0.0
Reverse Engineering Report	Individual	100	20.0
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	55	11.0
Concept Design Report Peer Review	Individual	0	var.
IP Disclosure	Group	10	2.0
IP Movie Screening Commentary	Individual	15	3.0
Preliminary Design Report	Group	70	14.0
Preliminary Design Report Peer Review	Individual	0	var.
90-Second Final Presentation Pitch Video	Group	20	4.0
Poster Session Synchronous Interaction	Individual	0	0.0
Exit Resume + Resume Worded Score	Individual	0	0.0
<b>Final Design Poster Presentation</b>	Group	40	8.0
<i>Final Design Poster</i>	Group	0	0.0
<b>Final Oral Presentation</b>	Group	50	10.0
<i>Project Abstract</i>	Group	0	0.0
<i>Final Oral Presentation Slides</i>	Group	0	0.0
<b>Final Design Report</b>	Group	80	16.0
<i>Design Review 1 Feedback Resolution</i>	Group	0	0.0
<i>Design Review 2 Feedback Resolution</i>	Group	0	0.0
Final Design Report Peer Evaluation	Individual	0	var.
Exit Skill Set Inventory Survey	Individual	0	0.0
<b>TOTAL</b>		<b>500</b>	<b>100.0</b>

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

### *Explanation of Peer Evaluation:*

Although working in groups, **each student will receive an individualized grade commensurate to their effort invested in the project.** With each group report submission, all group members will submit peer feedback reflecting on their own contributions and the contributions their group members.

Peer evaluations are an important part of your, and your teammates', growth as engineers. Be honest when evaluating your teammates' performance on assignments. Giving overly positive peer evaluations will hurt your own grade! Moreover, evaluations submitted with every group member having perfect scores will be discarded as attempted grade inflation (see honor code section of the syllabus).

### **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:

<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

### *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 course 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, **you** 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 (<https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/>) and require appropriate documentation and advance communication with the instructor.

### **COVID-19 Protocols**

1. You are requested and expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
2. If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email [covid@shcc.ufl.edu](mailto:covid@shcc.ufl.edu)) to be evaluated for testing and to receive further instructions about returning to campus.

3. If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.

4. UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the [UF Health Screen, Test & Protect website](#) for more information.

5. Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

### **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.

### **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 un-mute 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 and Dr. Sean R. Niemi hold copyright to all their respective 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, group feedback/emails, and/or low participation tracked in Canvas/PDM, will 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 is often 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 an assignment grading dispute, the issue must first be addressed with the Instructional Fellow or Learning Assistant who did the grading. If individuals/groups can show where grading errors occurred, Teaching Team members will correct grades accordingly. Only after communication with a Fellow or Learning Assistant fails to resolve a grading dispute may the individual/group bring the dispute to an instructor.

### **Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center [(352) 392-8565, <https://disability.ufl.edu/students/get-started/>] 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 <http://gatorevals.aa.ufl.edu/students/> . 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 <http://ufl.bluera.com/ufl/> . Summaries of course evaluation results are available to students at <http://gatorevals.aa.ufl.edu/public-results/> .

### **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 ( <http://sccr.dso.ufl.edu/process/student-conduct-code/> ) 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](mailto:rbielling@eng.ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### **Software Use**

All faculty, staff, and students of the University of Florida 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.

### **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>

### **Campus Resources**

See appended pages.

### **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 [umatter@ufl.edu](mailto: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:** <http://www.counseling.ufl.edu/cwc>, 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](#), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto: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/>.

#### **COVID-19**

- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email [covid@shcc.ufl.edu](mailto:covid@shcc.ufl.edu)) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the UF Health Screen, Test & Protect website for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.
- Consistent with UF policy: "If a student is absent from classes or examinations because of illness, they should contact their instructors."
- If you contract Covid-19 during the semester, the instructor pledges to help you to the extent possible, to help you learn and manage your assignments. Letting the instructor know is step one.



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.shtml>.

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

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

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

**Student Complaints Campus:** [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

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

Module	Meeting #	Week #	Date	Day	Delivery Mode	Location	Instructor	Synchronous Content	Asynchronous Content	Suggested Readings	Deliverable Anticipated	Assessment / Assignment Due
#1: Course Intro	1	1	8/23/2021	M	In-Person	McCarly Hall A - 1142	Niemi/Tramm	Course Introduction The Design Process	1. Review of Syllabus & Expectations 2. R. Dam & T. Siang, "Design Thinking - A Quick Overview," Interaction Design Foundation, 2018 3. REEC Case Study - RC Car Shock Absorber	1. M. J. Tramm, et al., "Implementing an Effective Large-Enrollment Engineering Capstone Design-and-Build Program," Proc. ASEE SE Section Conf., Auburn, AL, USA, March 8-10, 2020.	1. Entry Resume + Resume Worded Score 2. Skill Set Inventory for Group Generation	
#2: Prerequisite Review	2	1	8/25/2021	W	In-Person	McCarly Hall A - 1142	Tramm	Introducing the Reverse Engineering Report (RER) Thermodynamics [EML3100] Review	1. Thermodynamics [EML3100] Review 2. Hammer Commercial: "The Big Race"	1. C. C. Ngo & K. C. Granoll, <i>Multimedia Engineering Fluid Mechanics</i> , U. Oklahoma Eng. Media Lab, 2019 <a href="http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-ff">http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-ff</a>	3. Reverse Engineering Report (RER)	
#2: Prerequisite Review	3	1	8/27/2021	F	In-Person	McCarly Hall A - 1142	Niemi	Fluid Mechanics [EGN 3553C] Review	1. Fluid Mechanics [EGN 3553C] Review 2. M. Clayton, "Project Management in Under 5: What is a Gantt Chart?"	1. K. Granoll & M. Howe, <i>Multimedia Engineering Thermodynamics</i> , U. Oklahoma Eng. Media Lab, 2019 <a href="http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-th">http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-th</a> 2. <i>Excel in Mechanical Engineering - Thermodynamics</i> ( <a href="https://www.ou.edu/ExcelInME/thermo.htm">https://www.ou.edu/ExcelInME/thermo.htm</a> ) 1. K. Granoll, <i>Multimedia Engineering Dynamics</i> , U. Oklahoma Eng. Media Lab, 2019 <a href="http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-dy">http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-dy</a>	4. Fluids Review Quiz 5. Thermodynamics Review Quiz	1. Entry Resume + Resume Worded Score
#2: Prerequisite Review	4	2	8/30/2021	M	In-Person	McCarly Hall A - 1142	Tramm	Dynamics [EGM440] Review	1. Dynamics [EGM440] Review 2. R. F. Dam & T. Y Siang, "What is Design Thinking and Why It Is So Popular?," Interaction Design Foundation, 2020	1. K. Granoll, <i>Multimedia Engineering Mechanics of Materials</i> , U. Oklahoma Eng. Media Lab, 2019 <a href="http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-me">http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-me</a> 2. A Heat Transfer Textbook, 9th ed. J. H. Lienhard IV & J. H. Lienhard V, Plurajon Press, Cambridge, MA, 2020	6. Dynamics Review Quiz 7. Mechanical Design Review Quiz	
#2: Prerequisite Review	5	2	9/1/2021	W	In-Person	McCarly Hall A - 1142	Niemi	Design & Manufacturing [EML232L] Review	1. DME [EML232L] Review 2. SolidWorks & PDM Onboarding	1. K. Granoll, <i>Multimedia Engineering Mechanics of Materials</i> , U. Oklahoma Eng. Media Lab, 2019 <a href="http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-me">http://www.ecourses.ou.edu/cgi-bin/obook.cgi?doc=ktopic-me</a> 2. M. J. Tramm, S. R. Niemi, et al., <i>Engineering Capstone Design</i> , Ch 14 RC Car Shock Absorber - A Case Study, OER Textbook, University of Florida, 2020		
#2: Prerequisite Review	6	2	9/3/2021	F	In-Person	McCarly Hall A - 1142	Niemi	Mechanical Design [EML3005] Review	1. Mech 1 [EML3005] Review 2. Adam Grant TED Talk - Secret Weapons for Best Teams	1. 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.		2. Skill Set Inventory for Group Generation 4. Fluids Review Quiz 5. Thermodynamics Review Quiz
			9/6/2021	M				No Class Meeting Labor Day				
#3: Tolerance & Dimensioning	7	3	9/8/2021	W	In-Person	MAE-C-010	Tramm	Open Lab Hours	1. Vector Math Underpinning Tolerance Loops 2. Distributing Tolerances 3. Science of Small Distances	1. E. T. Fortin, <i>Dimensions for Interchangeable Manufacture</i> , Ch 8: Length Fits, Industrial Press, Inc. New York, NY, 1967 2. Association for the Development of Computer-Aided Tolerancing Systems (ADCATS) Database - Publications <a href="http://adcats.cts.bva.edu/reportsandpublications.php?publication">http://adcats.cts.bva.edu/reportsandpublications.php?publication</a>		
#3: Tolerance & Dimensioning	8	3	9/10/2021	F	In-Person	McCarly Hall A - 1142	Niemi	Tolerance Loops: Functional Surfaces	1. Literature Review & Patent Search			6. Dynamics Review Quiz 7. Mechanical Design Review Quiz
#3: Tolerance & Dimensioning	9	4	9/13/2021	M	In-Person	McCarly Hall A - 1142	Niemi	Tolerance Loops: Worked Examples	1. ANSI, "An Introduction to Standards: Why, where and how are they developed?"	1. Boothroyd & Dewhurst, <i>Product Design for Manufacture &amp; Assembly</i> , 3rd Ed., Ch 3: Product Design for Manual Assembly, CRC Press, 2011		
#4: Insertion & Handoff Time	10	4	9/15/2021	W	In-Person	MAE-C-010	Tramm	Open Lab Hours	1. Boothroyd & Dewhurst Estimation Technique 2. S. Meze, "Kano model, product design and startups: a powerful combination," 2017.	1. M. J. Tramm, S. L. Karackattu, "The Pencil-Top Fidget: Reinventing Shop (Metal Drilling and Tapping) in High School Science Classrooms," Proc. 126th ASHE Conf., Tampa, FL, USA, June 16-19, 2019.		
#4: Insertion & Handoff Time	11	4	9/17/2021	F	In-Person	McCarly Hall A - 1142	Tramm	Time Manual Assembly Activity	1. Pencil-Top Focus Toy Assembly Time Example	1. Tramm et al (2020) Capstone Design Text, Ch1-Customer Needs		
#5: Creative Ideation	12	5	9/20/2021	M	In-Person	McCarly Hall A - 1142	Tramm	Major Project Customer Guest Lecture (Jonathan Scheffe: UF Renewable Energy Conversion Lab)	1. Kano Model for Analyzing Customer Needs 2. J. Robert - ASME FutureME, "Project Success Defining the Problem"	1. C. Olsen-Lindia, "Kano Model - Ways to use it and NOT use it," IBM Design, Medium.com, 2017	8. Concept Design Report (CDR)	
#5: Creative Ideation	13	5	9/22/2021	W	In-Person	MAE-C-010	Tramm	Open Lab Hours	1. Right Sizing the Subsystem Number	1. Tramm et al (2020) Capstone Design Text, Ch2-Researching the Problem		
#5: Creative Ideation	14	5	9/24/2021	F	In-Person	McCarly Hall A - 1142	Tramm	Customer Needs to Quantitative Metrics Galileo's Alternative Uses Test Activity	1. Tim Harford TED Talk: A Powerful Way to Unleash Your Natural Creativity	1. Tramm et al (2020) Capstone Design Text, Ch3a-Quantifying Customer Needs		3. Reverse Engineering Report (RER)
			9/27/2021	M				No Class Meeting Showcase Week				
			9/29/2021	W				No Class Meeting Showcase Week				
			10/1/2021	F				No Class Meeting Showcase Week				
#5: Creative Ideation	18	7	10/4/2021	M	In-Person	McCarly Hall A - 1142	Tramm	How to Select Subsystems	1. M. Odlin, "The Dick Fosbury Flop: How to Think Outside the Box & Innovate New Ideas," <a href="http://myosolin.com">myosolin.com</a> , 2017 2. Function Analysis Method for Designers' Thinking 1. Adam Grant TED Talk - Original Thinkers 2. Eliminating Impossible Concepts	1. J. Dimosov, "2021 Ford F-150 Hybrid's Big Draw: The 7.2-kW Pro Onboard Generator," <i>Torque News</i> , Feb. 6, 2021.		
#5: Creative Ideation	19	7	10/6/2021	W	In-Person	MAE-C-010	Tramm	Open Lab Hours		1. L. Thompson, "What to do with your problem team member," Kellogg School of Management, Northwestern University, November, 2014		
			10/8/2021	F				No Class Meeting Home Coming				
#5: Creative Ideation	20	8	10/11/2021	M	In-Person	McCarly Hall A - 1142	Tramm	Assumption Removal Activity	1. Carrying out a Concept Down-Selection Matrix [Needs Help] 2. Subsystem Synthesis and Discord	1. M. F. Ashby, <i>Material Selection in Mechanical Design</i> , 4th Ed., Ch 3: Engineering Materials & Their Properties, Butterworth-Heinemann, 2011	12. Preliminary Design Report (PDR)	
#6: Down Selection to Preliminary Design	21	8	10/13/2021	W	In-Person	MAE-C-010	Tramm	Open Lab Hours	1. Jim Collins, "Good to Great: The Hedgehog Concept" 2. Ruffo-Cald, "What Makes You Think You're a Creative?"	1. M. F. Ashby, <i>Material Selection in Mechanical Design</i> , 4th Ed., Ch 4: Material Property Charts, Butterworth-Heinemann, 2011		
#6: Down Selection to Preliminary Design	22	8	10/15/2021	F	In-Person	McCarly Hall A - 1142	Tramm	Major Project Customer Guest Lecture (Jonathan Scheffe: UF Renewable Energy Conversion Lab)	1. Material Selection - Intro to Ashby Charts 2. Hedgehog Concept	1. M. F. Ashby, <i>Material Selection in Mechanical Design</i> , 4th Ed., Ch 5: Materials Selection - The Basics, Butterworth-Heinemann, 2011	9. Peer Evaluation for CDR	8. Concept Design Report (CDR)
			10/18/2021	M				No Class Meeting Breakfast Day				9. Peer Evaluation for CDR
#6: Down Selection to Preliminary Design	24	9	10/20/2021	W	In-Person	MAE-C-010	Tramm	Open Lab Hours		1. M. F. Ashby, <i>Material Selection in Mechanical Design</i> , 4th Ed., Ch 6: Case Studies: Materials Selection, Butterworth-Heinemann, 2011		
#7: Intellectual Property	25	9	10/22/2021	F	Online	Virtual Classroom	Tramm	IP Movie Screening	1. Intellectual Property: Trade Secrets (Needs Video) 2. Intellectual Property: Patents	1. L. Lessig - <i>Free Culture: How Big Media Uses Technology and the Law to Lock Down Culture and Control Creativity</i> , The Penguin Press, New York, NY, 2004	11. IP Movie Screening Commentary	
#7: Intellectual Property	26	10	10/25/2021	M	Online	Virtual Classroom	Tramm	IP Movie Screening	1. Intellectual Property: Trademark 2. Intellectual Property: Copyright	1. University of Florida Intellectual Property Policy 2. Nicole Pease: <i>You to play Happy Birthday Like Beethoven, Chopin, Brahms, Bach and Mozart Culture Remix Fair Use Example</i>	10. IP Disclosure	11. IP Movie Screening Commentary
#7: Intellectual Property	27	10	10/27/2021	W	Online	MAE-C-010	Tramm	Open Lab Hours	1. Performing a Trade Study 2. Normalizing Concept Evaluations	1. L. Lessig - TED Talk, <i>Laws that Choke Creativity</i> 2. USPTO: Trade Secrets		
#7: Intellectual Property	28	10	10/29/2021	F	Online	Virtual Classroom	Tramm	Intellectual Property: Risk Crowley	1. Bill Of Materials 2. Purchase Orders	1. L. Lessig - TED Talk, Re-examining the Remix	20. Final Design Poster Presentation	
#8: Finalizing Design	29	11	11/1/2021	M	In-Person	McCarly Hall A - 1142	Tramm	Guest Lecture - Giving an Elevator Pitch (Guest Speaker: Julia Sander, UF MAE HR)	1. Estimating Manufacturing Costs 2. Design Review Expectations	1. J. Rampton, "What Should You Do When Team Members Aren't Pulling Their Weight?" <i>Entrepreneur.com</i> , January 19, 2021.	14. 90-Second Pitch Video	
#8: Finalizing Design	30	11	11/3/2021	W	In-Person	MAE-C-010	Tramm	Open Lab Hours	1. Design for Manufacturing 2. Design for Manual Assembly			
#8: Finalizing Design	31	11	11/5/2021	F	In-Person	McCarly Hall A - 1142	Tramm	Moskov's Hammer, Birmingham Screwdriver, & Death by McMaster-Carr: Selecting OTS vs. Custom Parts	1. Detail Design: Design, Analysis, Prototype Cycle			10. IP Disclosure
#9: Design Review 1	32	12	11/8/2021	M	Online	Virtual Conference Room	Niemi/Tramm	Design Review 1		1. D. G. Ullman, "Improving Team Communication with Design Technology Readiness Levels," 2020	17. Final Poster Presentation 18. Final Poster 20. Final Project Abstract 23. Design Review 1 Feedback Resolution	
#9: Design Review 1	33	12	11/10/2021	W	Online	Virtual Conference Room	Niemi/Tramm	Design Review 1		1. D. G. Ullman, "Improving Team Communication with Design Technology Readiness Levels," 2020		
#9: Design Review 1	34	12	11/12/2021	F	Online	Virtual Conference Room	Niemi/Tramm	Design Review 1		1. D. G. Ullman, "7 Questions Companies Should Ask Before Using a New Technology," <i>Machine Design</i> , 2020	13. Peer Evaluation for PDR	12. Preliminary Design Report (PDR) 14. 90-Second Pitch Video
#9: Design Review 2	35	13	11/15/2021	M	Online	Virtual Conference Room	Niemi/Tramm	Design Review 2			16. Exit Resume + Resume Worded Score 19. Final Oral Presentation 21. Oral Presentation Slides 22. Final Design Report (FDR) 24. Design Review 2 Feedback Resolution	13. Peer Evaluation for PDR
#9: Design Review 2	36	13	11/17/2021	W	Online	Virtual Conference Room	Niemi/Tramm	Design Review 2				
#9: Design Review 2	37	13	11/19/2021	F	Online	Virtual Conference Room	Niemi/Tramm	Design Review 2			16. Exit Resume + Resume Worded Score 20. Final Project Abstract	
			11/22/2021	M				Refresh Day No Class Meeting				18. Final Poster
			11/24/2021	W				Thanksgiving Holiday No Class Meeting				
			11/26/2021	F				Thanksgiving Holiday No Class Meeting				
#10: Product Evaluation & Presentation	39	15	11/29/2021	M	In-Person	McCarly Hall A - 1142	Tramm	Technology Readiness Levels (Guest Speaker: Shawn Martin, US DoD)	1. Presentation Expectations	1. L. E. Rogers, et al., "Transitioning Oral Presentations Online in Large-Enrollment Capstone Design Courses Increases Panelist Participation," <i>Advances in Engineering Education</i> , 2020.	15. Poster Session Synchronous Interaction	
#10: Product Evaluation & Presentation	40	15	12/1/2021	W	In-Person	McCarly Hall A - 1142	Niemi	Poster & Slide Presentation Skills				
#11: Final Deliverables	41	15	12/3/2021	F	Online	Virtual Symposium	Niemi/Tramm	Final Poster Design Presentations				15. Poster Session Synchronous Interaction 17. Final Poster Presentation 21. Oral Presentation Slides
#11: Final Deliverables	42	16	12/6/2021	M	Online	Virtual Conference Room	Niemi/Tramm	Final Oral Design Presentations			26. Exit Skill Set Inventory Survey	19. Final Oral Presentation
#11: Final Deliverables	43	16	12/8/2021	W	Online	Virtual Conference Room	Niemi/Tramm	Final Oral Design Presentations				
#11: Final Deliverables	44	16	12/9/2021	T	Online	Virtual Conference Room	Niemi/Tramm	Final Oral Design Presentations				19. Final Oral Presentation
#11: Final Deliverables	45	16	12/10/2021	F	Online	Virtual Conference Room	Niemi/Tramm	Final Oral Design Presentations			22. Final Design Report (FDR) 23. Design Review 1 Feedback Resolution 24. Design Review 2 Feedback Resolution 25. Peer Evaluation for FDR (by 12/13/2021) 26. Exit Skill Set Inventory Survey	