

**INSY 7730 / 7736**  
**Product Design, Development and Test**

Auburn University  
Department of Industrial & Systems Engineering  
Fall 2020 Wednesday 4:00-6:00 pm On-line  
<https://auburn.zoom.us/j/7607175453>

**Bulletin Description:** (3 hrs). Lec. 3, No prerequisites beyond graduate standing. This class teaches modern tools and methods for product design, development, and test of highly complex and large as well as simple systems and processes including technical specification, reliability, maintainability, manufacturability, testability, marketing, costs, etc.

**Objectives / Educational outcomes:**

As the economy rapidly evolves, to remain competitive, companies must respond to increasing customer expectations by providing better and more innovative products and services and/or produce and distribute those products and services with more effective systems. To thrive in their careers, engineers need to develop skills in addition to the fundamental technical skills of engineering. Engineers and product designers must understand the needs of their customers (internal and external), be creative and adaptive in their problem-solving, and be willing to honestly assess, test, and improve their designs in response to customer and stakeholder feedback. Success in the marketplace depends on more than just a good idea. This class will focus on the process of identifying potential solutions to customer "pain points" by consulting with clients to clearly define their problems, systematically evaluating potential solutions, considering the creation of new solutions, and determining means to test and evaluate those potential solutions. Developing a fully functioning, "final product" is not the goal of this class. This class will focus on the systematic application of design principles necessary for this process and explore via case-studies and projects how to systematically solve problems. The scope and scale of problems discussed will range considerably and students will be expected to apply class concepts in both familiar and unfamiliar settings.

Concepts that will be stressed include:

Ethics, entrepreneurial mindset, "deliberate creativity", strategic/design thinking, customer development, iterative design (testing while building), confronting failure and setbacks, intellectual property (IP), pitching/presenting ideas.

The creative process and the process of solving problems is deliberate and iterative, it is not simply "random" or a "flash of brilliance". *The journey* from "stroke of genius" to final product will be the focus of this class.

This class will be project and homework based, there will not be exams.

**Faculty:** Richard Sesek, PhD, 3341 Shelby [sesek@auburn.edu](mailto:sesek@auburn.edu) John Evans, PhD, 3301 Shelby [evansjl@auburn.edu](mailto:evansjl@auburn.edu)  
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**TAs:** Dan O'Leary, MEM, 3322 Shelby [djo0008@auburn.edu](mailto:djo0008@auburn.edu) Robert Sesek, MS, 3322 Shelby [rms0082@auburn.edu](mailto:rms0082@auburn.edu)

## Course Syllabus

**Credit Hours:** 3

**Texts:**           **Entrepreneurship: The Practice and Mindset 2<sup>nd</sup> Edition**  
Neck, Neck, and Murray ISBN-13: 978-1544354620  
**Product Design and Development 7<sup>th</sup> Edition**  
Ulrich, Eppinger, and Yang ISBN-13: 978-1260134445

We will provide additional readings and reference materials via Canvas.

**Office Hours:** Dr. Sesek: T/H 12:00-1:00 or by appointment.

**Office hours link:** <https://auburn.zoom.us/j/7607175453>

### **Methodology:**

This course will consist of lectures, homework, projects, and case studies. A case study is a record of an issue that has been faced by engineers and managers, together with surrounding facts, opinions, and prejudices upon which decisions depend. These cases are presented to students for considered analyses, open discussion, and final discussion as to the type of action to be taken. When available, results, or proposals are compared to the solution that was actually adopted by the company that had the problem.

### **Evaluation of Student Performance:**

<b>Home Work Assignments</b> (Individual)	<b>25 %</b>
<b>Team Mini-Projects</b> (Small Groups)	<b>20 %</b>
<b>Individual Business Model Canvas Proposal</b>	<b>5 %</b>
<b>Team Project Milestones</b>	<b>10 %</b>
<b>Consulting Reviews/Feedback</b> (constructive feedback to peers and UG 3520 teams)	<b>10 %</b>
<b>Final Project Presentation</b>	<b>10 %</b>
<b>Final Project Report</b> (total all components)	<b>15 %</b>
<b>Participation</b> (assessed by Canvas activity)	<b>5 %</b>
<b>Total Points</b>	<b>100 %</b>

\*note: extra credit or "do-over" assignments may be offered at the instructors' discretion.

**Attendance:** Classes will be a mix of live on-line (at scheduled times) and pre-recorded lectures. You will also be required to virtually attend or watch additional leadership lectures (Tuesdays and Thursdays). In addition, we provide many optional lecture opportunities from a variety of sources. Your participation/viewing of these materials is an important part of the class. It is your decision whether or not to attend/view class lives, but you are encouraged to do so when available. You are responsible for all materials covered in class. Please see the student Handbook ([www.auburn.edu/tigercub/](http://www.auburn.edu/tigercub/)) for information on Tiger Cub Absence Excuses. Since this class can be taken asynchronously, absences should not be an issue. However, if are ill for an extended period and cannot participate or watch the videos (due to Covid-19 or other reasons), please contact us and follow Auburn University protocol for illnesses. Students are advised to "attend" (view) all classes and related supplemental materials. Several handouts and publications will be distributed to students during the course. All class materials (including handouts) will also be posted on Canvas. Announcements concerning the class may be sent to your

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university email account and or posted on Canvas. Please make sure you keep up with these announcements.

### Grade Ranges (Class may be "curved", but below grades are assured)

≥ 90%	A
≥ 80-90%	B
≥ 70-80%	C
≥ 60-70%	D
< 60%	F*

**\*academic misconduct can result in an "F" regardless of %**

### Curves

Students earning the grades above are "guaranteed" the stated grades (provided there is no academic misconduct, aka cheating). Grades *may* be curved, but this is not guaranteed.

Some Assignments are *Individual* and some are *Team-Based*. Team members will receive the same base grade on presentations and reports.

Assignment due dates will be announced with each assignment. You will have to work decisively, particularly when as a team. We will be working at the "speed of business." Your projects will often require "satisficing" rather than optimization. **Since this class is presented in an accelerated format, the importance of each class is multiplied. You must participate and remain up to date if you wish to do well.**

### **Accommodations:**

Students who need accommodations are asked to arrange a virtual meeting during the first week of classes. Provide a copy of the Accommodation Memo and an Instructor Verification Form to the meeting. If the student does not have the necessary paperwork, an appointment with The Program for Students with Disabilities should be made, 1244 Haley Center, (334) 844-2096. We understand that there is a pandemic and we will do everything we can to facilitate your learning. Please let us know what works best for you.

### **Course Contingency Statement:**

If normal class and/or lab activities are disrupted due to illness, emergency, or crisis situation (such as the on-going Covid-19 pandemic), the syllabus and other course plans and assignments may be modified to allow completion of the course. If this occurs, an addendum to your syllabus and/or course assignments will replace the original materials. **Note: This course is co-instructed by Drs. Evans and Sesek with support from Dan O'Leary and Robert Sesek all of whom are capable of teaching this course independently, if necessary. In the unlikely event that all are unable to instruct this course, due to Covid-19 illness or other reasons, other Thomas Walter Center faculty will be asked to deliver and evaluate course materials. These faculty include Drs. Payton, Umphress, and Hopkins, all of whom are capable of instructing this course. The instructor will provide additional accommodations beyond the normal excused absence policy for any student requiring extended medical care, and will support anyone needing to take an incomplete in the course as a result.**

### **Class Policies:**

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Students are responsible for all material covered as part of this class (including both graded and ungraded assignments posted on Canvas). The work (homework, design projects, reports, and presentations) submitted for grading should represent your individual effort. However, studying and working with your peers (on outside class assignments) is not only acceptable, but greatly encouraged. Study groups can provide an extremely valuable resource to students, and you are encouraged to form one.

Submitting work copied from others is considered academic misconduct. Plagiarism of ideas or work as well as giving or receiving unauthorized information on examinations is considered academic misconduct. All **academic misconduct will be dealt with severely** and may result in a course grade of "F." Refer to University Regulations and the student handbook can be found at ([www.auburn.edu/student\\_info/student\\_policies/](http://www.auburn.edu/student_info/student_policies/)) for complete information on your rights and responsibilities as a student.

Homework assignments and reports must be typed and presented in a professional manner. Unless otherwise stated (i.e., team homework project, or mini-projects), homework assignments are to be completed on an individual basis. Homework assignments may require presentation to the class or submission of a presentation video (a subset may be selected for class discussion – you must be prepared to present/discuss your work). Homework assignments will be used to verify assigned readings (e.g., brief summaries of key points, takeaways, and actions intended by students). Semester project reports require a written report and a final presentation to the class. Late work will receive a penalty of up to 10% per day. Work from unexcused absences cannot normally be made up. However, *at the instructor's discretion*, some work may be made up with penalty. You are responsible for ALL materials posted to Canvas (assignments and lecture notes). These materials may include: papers, videos, lectures, HW problems/explanations, classmate presentations, and reference materials. Some optional/supplemental materials may also be posted to Canvas. These optional materials are meant to supplement and enhance classroom materials and, some cases, may be used to present extra credit or make up opportunities.

**Meetings:** Class meets Wednesday from 4:00 pm to 6:30 pm "in" Zoom (<https://auburn.zoom.us/j/7607175453>). **Class will meet on all dates** listed on this **schedule**. In addition, there will be some leadership lectures that occur outside of class time. These will be recorded and posted to Canvas. If presentation order changes significantly, a revised schedule will be provided (posted online). Grading, however, will be as described on this syllabus.

Expect that **all material** and all topics from the course outline **will be covered**. **You will be responsible for all material** presented in class, in the text, in homework assignments, and in handouts.

**Academic Honesty:** All students are required to comply with the Auburn University Student Academic Honesty Code.

Violations include, but are not limited to:

**Cheating** on an examination/quiz/homework/project, such as copying from another's paper, using unauthorized notes, calculators, etc., or **giving or receiving**

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**unauthorized aid**, such as trading examinations (or taking online exams with or for others), whispering answers, passing notes, or using electronic devices to transmit or receive information (**such as copying the word, powerpoint, or excel spreadsheet assignment of another student**). Note: there are no scheduled exams or quizzes in this class. We will make it clear (e.g., Canvas discussion boards) what materials can be shared with your peers (i.e., the references you found valuable, but not your individual write-ups or assessments/work regarding those references).

**Plagiarism.** This is using someone else's work without giving credit. It is, for example, using ideas, phrases, papers, laboratory reports, computer programs, data - copied directly or paraphrased - that you did not arrive at on your own. Sources include published works such as book, movies, Websites, and unpublished works such as other students' papers or material from a research service. In brief, representing someone else's work as your own is academically dishonest. *The risk of plagiarism can be avoided in written work by clearly indicating, either in footnotes or in the paper itself, the source of any major or unique idea or wording that you did not arrive at on your own. Sources must be given regardless of whether the material is quoted directly or paraphrased.*

**Unauthorized collaboration.** This is working with or receiving help from others on graded assignments without the specific approval of the instructor. *If in doubt, seek permission from the instructor before working with others.* Students are encouraged to learn from one another: form study groups, discuss assignments, BUT each assignment must be individual work unless specifically stated and turned in as a group assignment.

- Copying another student's assignment and putting your name on it is plagiarism.
- You are encouraged to talk to one another about your assignments, however, all assignments must be done by the student whose name is on it unless you are specifically assigned to a "team" assignment.

**Multiple submission.** This means using the same work to fulfill the academic requirements in more than one course. *Prior permission of the instructors is essential.*

The **ISE Department has specific policies on academics, calculators, etc.** with which you are required to comply. **You are responsible to comply with these policies.** They can found at:

[http://www.eng.auburn.edu/files/acad\\_depts/insy/documents/course-policies.pdf](http://www.eng.auburn.edu/files/acad_depts/insy/documents/course-policies.pdf)

Violation of ISE Department Guidelines, Auburn University Code of Conduct, Graduate Outreach Program Proctor Guidelines, or any other rules governing the fair and consistent delivery of this class are considered academic dishonesty and/or student conduct violations.

**Project.** The project will entail the proposal of a product, system, or method along with supporting research (e.g., market analysis, technological feasibility, etc.). Projects can range significantly from new start-up proposals, to internal solutions for an existing company/facility, or even a non-profit organization. The course is designed to illustrate the steps from idea conception to implementation. Ideally, a minimally viable product or "wire-frame" conceptualization can be produced. However, this is NOT the focus of this class. This class is about the process of

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innovation and we fully expect that many ideas, while “good” may fail or be impractical for a variety of reasons. Determining that the project will not be pursued does mean that the project is “bad.” In fact, if your analysis of the concept (market, feasibility, etc.) indicates that the product/system will likely fail, then you have made the correct decision by stopping the project. Many ideas fail and they should. Other “good” ideas can sometimes fail too, however, because implementation was poor.

**Project Cooperation:** We will create Canvas discussion boards to facilitate sharing resources that you may discover and find particularly useful (e.g., videos, pictures, reports, inventions, etc.). While we want to stimulate collaboration and cooperation, the projects and homework assignments themselves are to be **written independently** (unless otherwise stated for the assignment). You may share resources (e.g., references such as technical documents, useful videos, “good” examples, etc.). However, you should not share your direct work. All reports/homework are subject to analysis using “Turn-it-IN”, “Plag-Scan”, or a similar plagiarism software to determine if work has been copied (either from your classmates or the original sources). Cheating, especially plagiarism, will not be tolerated. *Plagiarism will be punished severely* and cases will be referred to the graduate school for academic misconduct prosecution.

## Schedule

Week	Date	Day Time	Instructor(s)	Topic	Assignment
1	8/19	W 4-6:30	Evans	Course Overview, Introduction: Trends and Opportunities	
2	8/26	W 12-1	Bishop	Autonomous Vehicles	
2	8/26	W 4-6:30	Evans	Trends and Opportunities (continued)	Yes
3	9/2	W 4-6:30	Sesek	Entrepreneurial Mindset	
4	9/9	W 4-6:30	Sesek	Entrepreneurial Mindset (continued)	Yes
5	9/16	W 4-6:30	Evans	Creativity	
6	9/23	W 4-6:30	Evans	Creativity	Yes
6	9/24	H 3:30-5:15	Jeff DeGraff	Creativity and Innovation	
7	9/30	W 4-6:30	O’Leary	Business Model Generation	
8	10/7	W 4-6:30	O’Leary	Business Model Generation (continued)	
9	10/14	W 4-6:30	Sesek	Customer Discovery	
10	10/20	T 3:30-5:15	Thompson	Marketing	
10	10/21	W 4-6:30	Sesek	Customer Discovery (continued)	Yes
11	10/28	W 4-6:30	Evans	Lean Startup	
12	11/4	W	Evans	Lean Startup (continued)	Yes

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		4-6:30			
13	11/11	W 4-6:30	Sesek	Pitch Deck	
14	11/18	W 4-6:30	All	Team Presentations	
15	11/25	W 4-6:30		Thanksgiving Break	
16	12/2- 12/7	W		Finals Week (NO FINAL)	

All video lectures will be posted on Canvas.

**All material** from the text and all topics on this schedule **will be covered**. **You will be responsible for all material** presented in class, in the text, in homework assignments, and in handouts.

PLEASE NOTE: schedule will be finalized ASAP. We are coordinating with guest speakers to finalize the schedule. **We will, however, meet each scheduled class day. Therefore, plan to be attend virtually (when available) all scheduled class periods.**

Comprehensive project, homework, or mini-project activity time will be partially integrated into class time using breakout sessions.

**Important! Please Note:** The **schedule is subject to change** based on availability of guest lecturers and the classroom driven, interactive nature of this course. All topics will be covered, but order may vary. Current events related to the scope of this class will be integrated into the course and may alter the order in which materials are presented. Plan on "attending"/viewing all scheduled class sessions!

### **Policies Regarding Mask/PPE Compliance**

While this class will be conducted remotely, we are including a policy statement on Covid for informational purposes.

In response to COVID-19, and in alignment with Auburn University's Presidential directives, and local, state, and national health official guidelines face coverings are required at all times while on campus, except when alone in a private office. This includes the classroom, laboratory, studio, creative space, or any type of in-person instructional activity, and public spaces. "A "face covering" is defined as a "covering that fully covers a person's nose and mouth, including without limitation, cloth face mask, surgical mask, towels, scarves, and bandanas. Costume and decorative masks that do not provide equivalent protection will not be allowed.

If a student has a medical exception to the face covering requirement, please contact the Office of Accessibility to obtain appropriate documentation. This documentation will need to be presented to the instructor before attending a class meeting.

Anyone who is not wearing a face covering will be asked to put one on or leave the class immediately. Individuals may also be asked to leave class if they remove their face covering during the class, or have to be asked multiple times to wear it correctly (i.e., effectively covering both nose and mouth).

Failure to comply with a request to leave class for not correctly wearing a face covering is a serious health issue, and may result in any or all of the following:

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- Immediate cancellation of the entire class period or activity. All students will then be required to cover the material for that class or activity on their own.
- Submission of a complaint to Student Conduct concerning the incident and the individual's refusal to wear, or correctly wear, the required face covering.
- **A final semester grade of an F for the course for the person refusing to wear, or correctly wear, the required face covering.**

Additional Personal Protective Equipment (PPE) may be required for some courses and labs, and using it properly will be treated with the same severity as the requirement to wear a face covering.