

MAE 3153 Introduction to MAE Design - Spring 2023

Course Description:

Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. Deconstructing an interdisciplinary design into science, engineering science, and math problems that can be solved to produce a design solution.

Class Info:

Locations:

- Scott Parker Wentz Cafeteria--SPW 201
- Design & Manufacturing Lab--1724 Tyler St. (black bus route)

Class type: Lecture and studio

- Lecture: MW 10:30—11:20 am (SPW)
- Studio: F 10:30—11:20 am (SPW)
- Studio: T 3:30—4:20 pm (SPW and DML)

Instructors:

Dr. Dan Fisher dfisher@okstate.edu
Dr. Ron Delahoussaye delahoussaye@okstate.edu

Dr. Fisher's Office hours:

- T 10-11:30 am (GAB 312)
- T 4:30 – 5:30 pm (DML 104)
- **MS Teams** by appointment

Dr. Delahoussaye's Office hours:

- **TBD (In person and/or MS Teams**
by appointment)

Teaching Assistants:

Jacob jacobrow@okstate.edu
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- **MS Teams** by appointment

Required Materials/Devices:

- MAE 3153 *Working Genius* Coupon (**Purchase in Bookstore by Friday, Jan. 20**)
- iclicker
- Ullman, D. G. (2020). *The Mechanical Design Process*. (6th edition). [5th edition is acceptable too]
See also: <https://www.mechdesignprocess.com/mechanical-design-templates>
- Optional Reference: Ulrich, K. T., Eppinger, S. D, and Yang, M. C. (2019) *Product Design and Development*. (7th edition).

Communication Expectations:

- 1) MS TEAMS: Time critical—RSVP within 2-4 hours.
- 2) CANVAS ANNOUNCEMENTS: Class critical—CHECK 1 hour before each class.
- 3) EMAIL: Grade critical—RSVP within 8-12 hours

WorkLoad and Attendance Expectations:

Expected Weekly Time Commitment—12 hours per week on average

- 4 hours lecture and studio
- 1-2 hours team meetings
- 6-7 hours individual and team work on deliverables

Attendance Policy

- Team Meeting Attendance—Mandatory
- Class Meeting Attendance—Take your chances!

Monday & Wednesday Lectures:

- Meet in SPW
- Bring your iclicker device

Friday Studio

- Default meeting location SPW
- Special meeting locations—CHECK CANVAS ANNOUNCEMENTS!
- One team member must arrive early to configure tables/chairs for team
- One team member stay late to reconfigure tables/chairs for next class
- Bring your iclicker device
- Bring your laptop

Tuesday Studio

- Default meeting location DML
- Special meeting locations—CHECK CANVAS ANNOUNCEMENTS!
- One team member must arrive early to configure tables/chairs for team
- One team member stay late to reconfigure tables/chairs for next class
- Bring safety glasses
- Wear long pants, close toed shoes

Team Meetings:

- Time & location—as communicated by Team Lead in TEAMS
 - At least 4 hour notice
 - Each team must agree on 4 acceptable 1-hour time slots and 2 acceptable 2-hour time slots per week
- Frequency—as required by Team Lead or Instructor

Evaluation:

Your grade will be calculated based on the total number of points you earn during the semester and will include individual and team based points, where team based points are calculated as follows:

Team Based Points:

- Based on a single submittal by the Team
- Based on your individual 'teamwork' multiplier (0-2) assigned by your TA
- Points = (Team Points) x (multiplier)

Category	Maximum Category Points available (400 total)	Itemized Points
Team points	300	
• Project Design Deliverables		100
• Project Build and Performance Deliverables		100
• Teamwork Deliverables		100
Individual points	100	
• In-class assignments		50
• Homework assignments		50

Points to Letter Grade Conversion:

Earn at least...	To get a...
240	D
280	C
320	B
360	A

Team and Individual homework and project submittals:**Team submittals: MS TEAMS**

- Create separate folder for each submittal
- Drop all required files in folder by deadline

Individual submittals: CANVAS

- TAs will create a separate dropbox for each submittal
- Drop all required files in dropbox by deadline

Late Submittal & Make-up Policy

In class and individual submittals—No late or make up assignments accepted

Team Submittals: penalized for late submission:

- 1 hour late 5% penalty
- 6 hours late 10% penalty
- 24 hours late 25% penalty
- > 24 hours late receive 0 points on submittal

Design Teams:

Objectives:

- Learn and practice essential engineering team leadership skills.
- Learn and apply design, manufacturing and testing skills in a collaborative environment
- Win the design competition!

Size and Organization

- 10 to 12 members per team
- 3 technical sub-teams

Accountability

- Team meeting attendance
- Quality and timeliness of submittals and contributions
- Peer reviews

Learning Objectives:

Upon completion of this course, students should be able to:

1. Work effectively in a team environment.
2. Document project progress in the form of oral and written design reports.
3. Describe the design process.
4. Define design requirements by identifying customer needs.
5. Identify hazards and manage risk in design.
6. Design solutions to identified problems.
7. Develop design thinking by reflecting on reading material and class discussion.
8. Decompose larger problems into chunks manageable by team members fluent in specific technical domains.
9. Describe the importance and implications of decision making.
10. Apply objective decision making methods.

ABET Program Student Outcomes

ABET is the organization that accredits your engineering degree. They expect you to achieve formative level competency in the following areas:

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

Tentative Schedule (Coming Soon!)

WEEK OF	Individual Deliverables	Team Deliverables	Notes:
01-16-2023			
01-23-2023			
01-30-2023			
02-6-2023			
02-13-2023			
02-20-2023			
02-27-2023			
03-6-2023			
03-13-2023			<i>Spring Break!</i>
03-20-2023			
03-27-2023			
04-3-2023			
04-10-2023			
04-17-2023			
04-24-2023			Friday, 04-28 Design Expo & Competition!
05-01-2023			Friday 05-05 Final Design Report Due