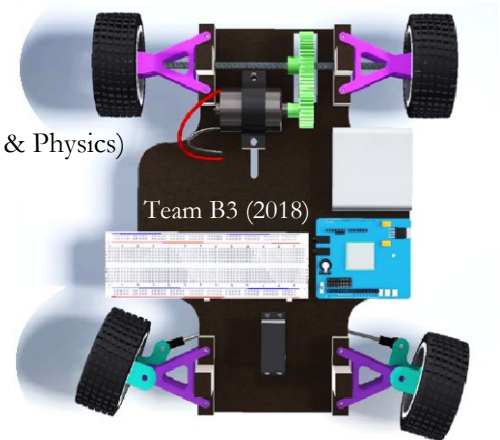


EGR 192 - Introduction to Engineering II
Elizabethtown College
Spring 2024

Meetings: M, W 2:00-3:20 (Section A)
M, W 3:30-4:50 (Section B)
T, H 2:00-3:20 (Section C)

Instructors: Jean Batista Abreu (Associate Professor of Engineering & Physics)
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Scheduled Office Hours: M 12-1:30; Tu 9-10:30; W and Th 2:30 – 4:00
Or by appointment.



Required Textbook: None

Reference Textbook: Pugh, Stuart. Total Design: Integrated Methods for Successful Product Engineering. Addison-Wesley Pub. Co., 1991.

Course Description:

Collaborative problem solving through the application of the engineering design process in a semester-long project. This course focuses on project management, problem definition, product design specifications, conceptual design, decision making, fabrication, testing and redesign. Emphasis on data analysis using software and development of effective oral and written communication. *Prerequisite(s): EGR 191 and EGR 191L or permission by instructor.

Course Outcomes:

Upon Completion of this course, each student should be able to:

1. Apply project management techniques to complete collaborative project. (ABET 2, 5)
2. Construct engineering drawings using computer-aided design software. (ABET 2)
3. Design, build and test a device to meet performance specifications. (ABET 2, 5)
4. Analyze data, interpret results and draw meaningful conclusions (ABET 1, 6)
5. Discuss the global, economic, environmental and societal impact of engineering design. (ABET 4)
6. Apply learning strategies to acquire knowledge for design purposes (ABET 7)
7. Create LinkedIn account and resume. (ABET 7)
8. Create a professional development plan. (ABET 7)
9. Plan, create, and deliver an oral presentation about design process and results. (ABET 3)

ABET Outcomes Addressed:

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 an apply new knowledge as needed, using appropriate learning strategies.

Course Policies:

Course Grade

The following assignments will be considered when calculating course grades.

Final grades will be rounded the following scale:	Individual Assignments	20 %	to 3 significant digits with
	Team Assignments	35 %	
	Presentations	10 %	
	Final Product and Report	35 %	

A	93.0	–	100.	Outstanding
A –	90.0	–	92.9	
B +	87.0	–	89.9	
B	83.0	–	86.9	Good
B –	80.0	–	82.9	
C +	77.0	–	79.9	
C	73.0	–	76.9	Acceptable
C –	70.0	–	72.9	
D	60.0	–	69.9	Poor
F	0	–	59.9	Failing

Participation

Students are expected to regularly attend class, arrive on time, and stay engaged by asking and answering questions and actively following lessons and in-class discussions. Students are expected to complete assigned exercises during class and out of class.

If you must miss a class for a scheduled athletic event, you need to give at least one week's advanced notice to your professors and your team; otherwise, the absence will not be excused, and the corresponding assignment

will not be accepted. Presentation days are critical, and you will need to have a conversation with your professors and coaches if an unavoidable conflict arises on one of these dates.

Group assignments should represent the efforts of the entire group equally. CATME scores will be used to adjust the final course grade by up to $\pm 10\%$.

Assignments

Assignments will be due as listed on the course Canvas page. These assignments are graded and should represent your own work - copying another student's work is considered unethical and will result in a failing grade (no exceptions). You are encouraged to speak to your instructors for guidance, but the work submitted is to be your work, not someone else's. Late homework submissions (for any reason) will not be accepted; however, the lowest individual assignment score will be dropped by the end of the term.

Project (Preliminary and Final Designs)

Students will work in small teams to design, draw, and fabricate an electromechanical system. Students will also provide written and oral presentations of their design and fabrication processes. Each member of the group will evaluate the efforts and contributions of their group members, which will affect a student's project grade.

Academic Integrity

Elizabethtown College is a community engaged in a living and learning experience, the foundation of which is mutual trust and respect; therefore, we will strive to behave toward one another with civility and respect. All work should represent each student's individual efforts, except group projects, which should reflect the combined efforts of all members of the group. Students are encouraged to discuss with other students and the instructor; however, submitted assignments should represent the student's individual work. Any information obtained from any source should be properly referenced. Referencing properly is an essential aspect of your project reports.

This includes AI. In this course, students shall give credit to AI tools whenever used, even if only to generate ideas rather than usable text or illustrations. When using AI tools on assignments, add an appendix showing (a) the entire exchange, highlighting the most relevant sections; (b) a description of precisely which AI tools were used (e.g. ChatGPT private subscription version or DALL-E free version), (c) an explanation of how the AI tools were used (e.g. to generate ideas, turns of phrase, elements of text, long stretches of text, lines of argument, pieces of evidence, maps of the conceptual territory, illustrations of key concepts, etc.); (d) an account of why AI tools were used (e.g. to save time, to surmount writer's block, to stimulate thinking, to handle mounting stress, to clarify prose, to translate text, to experiment for fun, etc.). Students shall not use AI tools during in-class examinations, or assignments unless explicitly permitted and instructed. Overall, AI tools should be used wisely and reflectively with an aim to deepen understanding of subject matter.

Students are to act in accordance with the Pledge of Integrity as stated in the student handbook on all course assignments. See the Elizabethtown College "[Standards of Academic Integrity](#)". Dishonest practice can result in failure of the course and possibly expulsion from the College.

Statements on Disability Services, Religious Observances, and COVID-Related Expectations

See [this link](#). Students with accommodations must meet with instructors to discuss a plan no later than the end of the second week of class.

School Closure

If the School is closed or goes virtual during regularly scheduled class time, a virtual learning experience, independent reading, or extra session will be provided to make up for any missed content.

NSPE Code of Ethics Cannons with guidelines and examples (edited by Elizabethtown College students)

Hold paramount the safety, health, and welfare of the public. For example:

- Take training and assignments seriously and approach tasks as learning opportunities.
- In an internship, take your job seriously and be responsible.
- Do not try to do something you don't know how to do (For example, don't use the mill machine if you don't know how to work it).

Perform services only in the areas of their competence.

- Consult someone of higher competence if you are unsure of how to do something (Don't just try to "wing it", figure out how to do it correctly.)
- Ask for assistance from a more qualified colleague when they are faced with a problem that is beyond their level of capability in a certain area.
- Consult someone with the necessary knowledge if you are unsure of how to operate certain equipment.

Issue Public Statements only in an objective and truthful manner.

- Be objective and do not let emotion or opinion affect you.
- All information should be presented, even if it is not favorable (do not hide anything).
- Do not embellish or exaggerate skills you do not have on a resume or in social media.
- When writing a report, all statements should be factually true. Log hours and report outcomes faithfully.

Act for each employer or client as faithful agents or trustees.

- Put your project teammates or employer's interests before your own.
- While working as an intern, keep projects/duties/information confidential if employer requests confidentiality.
- While working in a group, make sure that you do your fair share of work or more.
- Always talk to group members before making decisions for the group.

Avoid deceptive acts.

- Do not plagiarize, cite all sources.
- Do not falsify data.
- Do not cheat on an exam or homework.
- Report to the proper authorities anyone believed to be guilty of unethical or illegal practices.

Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession.

- Be willing to own up to your mistakes.
- Complete all assignments using integrity while following the student code of conduct.
- Care about your work and take responsibility for your actions and decisions.
- Conduct themselves in a manner that represents Elizabethtown College or whatever institution at which they are employed in a positive light.

Tentative Schedule¹

<i>Week</i>	<i>Date</i>	<i>Topic/Activity</i>	<i>Instructor</i>
1	01/17-18	Course Intro, CATME Survey, Intro Project	JBA
2	01/22-23	Team Contract – IDEATE Conceptual design with Greenway	KDG
	01/24-25	Q&A Team Contract, Concept Map, How Vehicles Work	JBA
3	01/29-30	Motors: Power, Efficiency, Gearing	KDG
	01/31-02/01	Engineering Design Process, PS draft, Define PDS	JBA
Benchmark 1: Preliminary Design – Team Formation			
4	02/05-06	Quantitative Data Analysis Using Last Year’s Data	KDG
	02/07-08	Qualitative Data Analysis - Problem Identification and Ideation	JBA
5	02/12-13	PS Refinement, Detailed Design	KDG
	02/14-15	Pugh Matrices	JBA
Benchmark 2: Design Concept Selected			
6	02/19-20	Budgeting, Reusability, Ordering Process, Auction	KDG
	02/21-22	Gantt Chart	JBA
7	02/26-27	Work Day, CAD, Fabrication Plan	KDG
	02/28-29	Presentation on Presentations, Work Day, CAD	JBA
8	03/04-08	Spring Break	-
9	03/11-12	Work Day, Complete CAD and Presentation	KDG
	03/13-14	Preliminary Design Presentations	JBA
Benchmark 3: Full Set of Preliminary Drawings and Fabrication Plan Complete			
10	03/18-19	Work Day, Circuit and Programming, Address Feedback	KDG
	03/20-21	Work Day, Circuit and Programming, Address Feedback	JBA
Benchmark 4: Design Complete, Drawings Updated			
11	03/25-26	Work Day, Fabrication	KDG
	03/27-28	Work Day, Fabrication	JBA
Benchmark 5: Fabrication, Circuit and Programming Complete and Properly Functioning			
12	04/01-02	Work Day, Testing , Data Collection	KDG
	04/03-04	Work Day, Testing , Data Collection	JBA
Benchmark 6: Testing Complete, Car Ready for Competition			
13	04/08-09	Redesign	KDG
	04/10-11	Redesign	JBA
14	04/15-16	Professional Development – Strengths Finder and Resumes	KDG
	04/17-18	Professional Development Plan	JBA
Benchmark 7: Redesign complete			
15	04/22-23	04/22 – Class (Section A and B)	KDG
		04/23 – SCAD (Race)	Both
	04/24-25	04/24– Friday Schedule	-
		04/25 – Class (Section C)	JBA
16	04/29-30	Final Presentations	Both
Benchmark 8: Course Complete			

Fine Print

The above information represents the intent of the course and is subject to change at the discretion of the instructors.

¹ This schedule may be subject to change.