Syllabus: EGN 2002C – Mechanical Engineering Skills and Design

Spring semester 2026

Course Information

Course Number and Title: EGN 2002C Mechanical Engineering Skills and Design

Credit Hours: 2 (1 lecture and 1 lab)

Current Academic Term: Spring 2026

Instructor Information

Instructor: Caleb Traylor, PhD

Office: BARC-1182

Office Hours: M 1:00 PM – 2:00 PM, T 2:30 PM – 3:30 PM, W 11:00 AM – 12:00 PM, or by appointment.

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Course Details

Official Catalog Course Description:

This course aims to advance the knowledge and experience of students using engineering tools and professional skills to seek solutions to real world problems. Students will engage in engineering design activities, use Computer Aided Design (CAD) software, and continue to mature with professional skills emphasizing teaming and leadership, and communication in a variety of mediums. Intermediate Computer Aided Design (CAD) skills including parts assembly, model motion and analysis, and design tables. The project will allow students to integrate these intermediate level skills with subtractive manufacturing processes. This course will enhance students' knowledge of design processes as well as build intermediate level mechanical engineering skills, which will continue to prepare them for future open-ended problems in their capstone design course.

Course Prerequisites: EGN2001C – Engineering Skills and Design
Co-Requisite or prerequisite: EGN3311 – Statics
Communication/Computation Skills Requirement (6A-10.030): No

Required Texts: www.solidprofessor.com (Online software approx. cost $125 for 4-yr license)

Equipment and Materials: Canvas, MS Office, MATLAB, Solidworks, FL Poly email, calculator

- **Note**: Only use of calculator models as used on the Fundamentals of Engineering (FE) Exam will be allowed
  - **Casio:** All fx-115 and fx-991 models (Any Casio calculator must have "fx-115" or "fx-991" in its model name.)
  - **Hewlett Packard:** The HP 33s and HP 35s models, but no others
  - **Texas Instruments:** All TI-30X and TI-36X models (Any Texas Instruments calculator must have "TI-30X" or "TI-36X" in its model name.)

Course Objectives:

- The engineering design process
- Theory in Dynamics and Strength of Materials to support design
- Additive (3D printing) and subtractive (CNC milling) manufacturing
- Basic skills with Computer Aided Design (CAD) software
  - Engineering Drawings
  - Assemblies and Mechanisms
  - Geometric Dimensioning and Tolerancing (GD&T)
- Professional communication skills, e.g., written report, oral presentation
- Professional skills in teaming, leadership, and team management

Course Learning Outcomes

Students will be able to demonstrate the ability to do the following:

a. Produce a semester-long project employing both theory (dynamics, etc.) with practice (engineering drawing and fabrication).
b. Produce engineering drawings for manufacturing using CAD and principles of GD&T.
c. Demonstrate professional communication skills in written and oral reporting.
d. Illustrate professional skills in teaming, leadership, and team management.
e. Demonstrate ethical and professional responsibility, considering global, economic, environmental, and societal outcomes.

Alignment with Program Outcomes:

Students will be able to demonstrate the ability to do the following:

Course Learning Outcome	Learning Level (Bloom's / ABET Assessment Example)	Program Learning Outcome (ABET, GenEd, Other)
a. Produce a semester-long project employing both theory (dynamics, etc.) with practice (engineering drawing and fabrication).	**Application** – Ability to use learned material in new situations. **ABET Assessment** – report of project with supporting documentation of calculations and product fabrication.	**ABET 6** – an ability to develop and conduct appropriate experimentation, analyze, and interpret data, and use engineering judgment to draw conclusions
b. Produce engineering drawings for manufacturing using CAD and principles of GD&T.	**Knowledge**- Ability to recall previously learned material **ABET Assessment** – Portion of project illustrating components.	**ABET 7** - an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
c. Demonstrate professional communication skills in written and oral reporting	**Application** – Ability to use learned material in new situations. **ABET Assessment** – Final report and presentation.	**ABET 3** - an ability to communicate effectively with a range of audiences
d. Illustrate professional skills in teaming, leadership, and team management.	**Application** – Ability to use learned material in new situations. **ABET Assessment** – Illustrated in poster with oral communication in poster session and write communication in paper.	**ABET 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
e. Demonstrate ethical and professional responsibility, considering global, economic, environmental, and societal outcomes.	**Application** – Ability to use learned material in new situations. **ABET Assessment** – Portion of project report and assessment.	**ABET 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 context.

Academic Support Resources

Library: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to library@floridapoly.edu.

Tutoring and Learning Center: The Tutoring and Learning Center (The TLC) provides tutoring to all Florida Poly students who may need additional academic support. The TLC is staffed by students who have excelled in the courses they tutor. They offer support by reviewing concepts and materials from class, clarifying points of confusion and providing assistance with learning strategies. While the focus of TLC is to provide support to students in freshman-level courses, upper-level courses are also tutored at the Center. The TLC is located in the IST Commons (second floor).

Knack Tutoring: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Florida Polytechnic University has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit floridapoly.joinknack.com and sign in with your student account.

Academic Success Coaches: All students at Florida Poly are assigned an Academic Success Coach. Your Academic Success Coach can assist you with academic success strategies. Please visit the Student Success Center on the second floor of the IST building to meet with an Academic Success Coach.

Writing Center: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit floridapoly.edu/writing center.Library: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to library@floridapoly.edu.

Course Policies

Attendance

Students in **face-to-face (this includes labs and C-courses)** courses are expected "to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor" (University Policy, FPU-5.0010AP). **Attendance is mandatory.** Exceptions to any attendance requirements may be made on a case-by-case basis.

Late Work/Make-up work

- A **LATE PENALTY** of 10% will be assessed for homework turned in after the deadline. The Assignment in Canvas will stay open until 11:59 PM of the next day should the 'due date' be missed.
- ALL HOMEWORK AND PROJECT DELIVERABLES MUST BE TURNED IN AND **POSTED IN CANVAS ASSIGNMENTS TO EARN CREDIT** AND RECEIVE A GRADE. IF THE ASSIGNMENT IS NOT POSTED IN CANVAS, A ZERO WILL BE RECORDED FOR THAT ASSIGNMENT.
- Should you have extenuating circumstances, **CONTACT YOUR INSTRUCTOR**. Your instructor will work with you and others, as needed, in the university community to make the appropriate adjustments. They may, at their discretion, accept a past due assignment, however, **YOU must email your instructor and ask them to open the assignment for you.** The instructor retains the right to ask for documentation of your extenuating circumstance before they reopen the assignment. The Canvas Assignment will remain open for 24 hours, after the request has been accepted with a confirmation email from the instructor.
- Late/makeup work *MAY* be excepted on a case-by-case basis.

Assignment/Evaluation Methods

- **Homework: Homework will be assigned after every class and is due in Canvas per the specified due date. Usually, you will have one week to complete the homework assignments.** Be sure to check your Assignments in Canvas, and set your reminders as necessary, for the dates and times that correspond to the start of your class period.
- Deliverables and due dates for the design projects will be specified in handouts during class. Late submissions will not be accepted for project work.
- All deliverables, other than those deemed as a team assignment, will be individual where everyone must **submit their own work**.
- Homework policies are designed to keep you 'on task' and 'on track' for mastering the material throughout the semester. The 'hard due dates' are to help you budget your time with this class while you are taking your other classes.
- **Your instructor wants to work with you! Communication is key!**

Activity	Percentage	Breakout %
Attendance	10%	
Assignments	10%	
'Catapult' related activities	45%	
In-class activities		10%
Drawing Package		10%
Catapult Design		5%
Final report – team written		10%
Final report – team presentation		5%
Final report – individual reflection		5%
MATLAB Activities	10%	
SolidProfessor Lessons	10%	
Design Activities	10%	
GD&T Activity	5%	
Total	**100%**	

Grading Scale

Grade	Percentage
A	100 - 93
A-	92 - 90
B+	89 - 86
B	85 - 83
B-	82 - 80
C+	79 - 76
C	75 - 70
D	69-60
F	59 - 0

Percentages that fall between grades will be rounded up

Grades for will be posted to Canvas for reference only, and students should make sure they are recorded correctly. However, there is no guarantee that the percentages or projected grades provided there are correct. The instructor will calculate final percentages and will determine final grades regardless of Canvas calculations.

University Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The University, through the Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations.

If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive.

If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible.

The Office of Disability Services (ODS):
DisabilityServices@floridapoly.edu
(863)874-8770
The Access Point
ODS Website: https://floridapoly.edu/student-affairs/health-wellness/disability-services.php

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals regarding admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. It is important for you to know that there are resources available if you or someone you know needs assistance. You may speak to your professor, but your professors have an obligation to report the incident to the Title IX Coordinator. It is an educational goal that you feel able to share information related to your life experiences in classroom discussions and in one-on-one meetings. However, it is requirement for university employees to share information with the Title IX Coordinator regarding disclosure. However, please know that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment.

Academic Integrity

The faculty and administration take academic integrity very seriously. Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in an academic integrity hearing and sanctions against the accused student if found in violation. Sanctions range from receiving a zero on the exam or assignment, to expulsion from the university. Repeat offenders are subject to more severe sanctions and penalties. Do not compromise your integrity for a perceived short-term gain.

Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action).

Recording class activities other than class lectures, including but not limited to lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers ***is prohibited****.*

Tentative Schedule (Subject to Change)

Syllabus may be modified as deemed appropriate. Modifications will be announced in class.

Week	Date	Day	Topic	
			Tuesday	**Thursday**
1	2026.01.13	1	Introduction and Course Overview	
	2026.01.15	2		Introduction to Design
2	2026.01.20	3	Predesign/Problem Definition Methods	
	2026.01.22	4		Conceptual Design
3	2026.01.27	5	Conceptual Design	
	2026.01.29	6		Introduction to Dynamics
4	2026.02.03	7	Embodiment Design	
	2026.02.05	8		Dynamics – Projectiles
5	2026.02.10	-	NO CLASS – Career Day	
	2026.02.12	9		Dynamics Calculations *Introduce Semester Project*
6	2026.02.17	10	Materials and Manufacturing	
	2026.02.19	11		Introduction to MATLAB
7	2026.02.24	12	Reporting and Documentation	
	2026.02.26	13		Intro to MATLAB- Basic Graphing
8	2026.03.03	14	Introduction to 3D Printing	
	2026.03.05	15		MATLAB Essentials- SolidProfessor Sections 1&2
9	2026.03.10	16	Additive Manufacturing	
	2026.03.12	17		MATLAB Essentials- SolidProfessor Section 3 – Advanced Graphing
10	2026.03.17	-	NO CLASS – Spring Break	
	2026.03.19	-		NO CLASS – Spring Break
11	2026.03.24	18	Creating Engineering Drawings- Engineering Graphics & GD&T	
	2026.03.26	19		Creating Engineering Drawings- GD&T Essentials and Skills
12	2026.03.31	20	Creating Engineering Drawings- GD&T Essentials and Skills	
	2026.04.02	21		GD&T Essentials
13	2026.04.07	22	Scientific Presentations	
	2026.04.09	23		Final Project – Testing
14	2026.04.14	24	Software Tutorials	
	2026.04.16	25		GD&T Activity
15	2026.04.21	26	Final Project – Presentations	
	2026.04.23	27		Final Project – Presentations
16	2026.04.28	28	Final Project – Presentations	