FLORIDA POLYTECHNIC UNIVERSITY

Syllabus: Computer Manufacturing and Control

Spring semester 2026

Course Information

- **Course Number and Title**: EML 3535C Computer Manufacturing and Control
- **Credit Hours:** 3 (2 lecture, 1 lab)
- **Current Academic Term**: Spring 2026

Instructor Information

- **Instructor**: Dr. Edwar Romero-Ramirez
- **Office Location**:ARC-1184
- **Office Hours**: TWR 1:00-2:00 PM
- **E-mail address**: eromeroramirez@floridapoly.edu

Course Details

- **Class Meeting Day, Time & Location**: TR, 2:00-3:15 PM, IST-1067 (2– 75 minute sessions)
- **Official Catalog Course Description**: Students will be exposed to introduction to the theory and practice of Computer Aided Design, Engineering, and Manufacturing with emphasis in Geometric Dimensioning and Tolerancing (GD&T) and Computer Numeric Control (CNC) for manufacturing as well as Piping and Instrumentation Diagrams (P&ID) and Programmable Logic Controllers (PLC) for controlling industrial processes.
    - **Course Prerequisites:** EGN 2002C Skills and Design 2, COP 2271C Intro. to Comp. & Prog., EGN3331 Strength of Materials**, Co-Requisite:** none
    - **Communication/Computation Skills Requirement (6A-10.030)**: No

- **Required Texts**: Only Free Open Educational Resources will be used,
    - **Equipment and Materials**: Canvas, computer or tablet, Rocketbook or similar, Microsoft Office, calculator, FL Poly email
    - **Note:** Only use of the following 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 objective of this course is to teach how to design (CAD) and analyze (CAE) mechanical components for computer aided manufacturing (CAM). This course exposes students to the finite element analysis (FEA) for mechanical design, as well as geometrical dimensioning and tolerancing (GD&T) for manufacturing of mechanical components. The course also teaches controls of processes using instrumentation and piping diagrams. Highlights are as follows:

  - To practice a commercial CAD software to build a complete an engineering drawing with GD&T.
  - To apply FEA software for CAE analysis.
  - To use a commercial CAD software for a CAM process.
  - To interpret a P&ID layout.
  - To show how PLC software package can control an industrial process
  - To prepare a report based on results obtained from a CAD/CAE/CAM software and/or PLC package for process automation.

- **Course Learning Outcomes**
  Students will be able to demonstrate the ability to do the following:

  a. Practice CAD/CAE/CAM software to build a complete an engineering drawing with GD&T and CNC manufacturing.
  b. Demonstrate knowledge of the elements of a P&ID layout
  c. Demonstrate how PLCs are used to control industrial processes
  d. Ability to produce a report based on results obtained from a CAD/CAE/CAM software and/or PLC package to document an industrial process.

- **Alignment with Program Outcomes**:

Learning Outcomes of Instruction	**ABET Criteria**	**ABET Criteria (1-7)**
a. Practice CAD/CAE/CAM software to build a complete an engineering drawing with GD&T and CNC manufacturing.	**Knowledge**- Ability to recall previously learned material **Application**- Ability to use learned material in new situations **ABET Assessment** – homework, exams	ABET 1 – an ability to identify formulate, and solve complex engineering problems by applying principles of engineering, science, and math. ABET 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
b. Demonstrate knowledge of the elements of a P&ID layout	**Knowledge**- Ability to recall previously learned material **Application**- Ability to use learned material in new situations **ABET Assessment** – homework, exams	ABET 1 – an ability to identify formulate, and solve complex engineering problems by applying principles of engineering, science, and math. ABET 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
c. Demonstrate how PLCs are used to control industrial processes	**Knowledge**- Ability to recall previously learned material **Application**- Ability to use learned material in new situations **ABET Assessment** – homework, exams	ABET 1 – an ability to identify formulate, and solve complex engineering problems by applying principles of engineering, science, and math. ABET 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

d. Ability to produce a report based on results obtained from a CAD/CAE/CAM software and/or PLC package to document an industrial process..	**Analysis**- Ability to separate material into component parts and show relationships between parts **Application** – Ability to use learned material in new situations. **ABET Assessment-** presentations, project report, lab reports	ABET 3- an ability to communicate effectively with a range of audiences

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.
    - **Homework is due in Canvas by 11:59 the day is due**.
    - A **LATE PENALTY** will be applied to **submissions** turned in after 11:59 PM on the due date.
    - 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.
        - Under **extreme** circumstances, your instructor may, at their discretion, accept a 'past due' assignment, however, **YOU must email your instructor and ask them to open the Canvas assignment for you.** The instructor retains the right to ask for documentation of your 'extreme 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 to the student.
    - Deliverables and due dates for the design projects will be specified in handouts during class. Late or past due work will follow the same polices as homework.
    - All deliverables, other than work group, presentations, videos, or as indicated, will be 'individual' where everyone must submit their own work.

- Participation

Students are expected to participate in the classroom experience. The use of earbuds/headphones during class is specifically not allowed and students who engage in this behavior may be asked to leave the class for the day (noting exceptions for authorized accommodations). In addition, students who routinely do not bring materials to class that are required for participation, will not be given credit for class attendance, and if this becomes a pattern of behavior, may be asked to leave the class for the day. Persistent problems with participation may result in a code of conduct referral.

- **Grading Scale**: Include the grading scale that will be used in the course. (See also University Grading Policy).

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 <u>reference only</u>, 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.

- **Evaluation**

Activity	Percentage
Assignments & Activities	15
Project	20
1st Exam	20
2nd Exam	20
Final Exam	25

- **Assignment/Evaluation Methods**:
  - **Homework (15% of the total grade)**
    - Completion of **assignments** and problem sets posted on Canvas. Homework assignments are intended to enhance learning, promote 'habits of mind' and give students the opportunity to demonstrate what they have learned after materials are covered in class
    - Late Homework –Noting habitual lateness will not be tolerated. Under **<u>extreme</u>** circumstances, your instructor may, at their discretion, accept a 'past due' assignment, however, **YOU must email your instructor and ask them to open the Canvas assignment for you.** The instructor retains the right to ask for documentation of your 'extreme 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 to the student.

  - **Project (20% of the total grade)**
    - The class requires a final project that uses CAD, CAE, CAM, GD&T, CNC, P&ID, and CNC to practice the material discussed during the semester.

  - **Exams (20% each)**
    - Midterm exams will be a 'common' exam for all sections of this course. The midterm exam will be held as scheduled by the university.
    - **Exam Policy**: A student missing an exam will be given the opportunity to make up the exam only if he/she presents satisfactory evidence that his/her absence was unavoidable. It is the obligation of the student to notify the instructor prior to the exam or within twenty-four hours of the time of absence, at which time, arrangements will be made for a make-up exam.

- **Final Exam (25%)**
  - Final Exam will be a 'common' exam for all sections of this course. The final exam will be held during the final exam period, as scheduled by the university.
  - **Exam Policy**: A student missing an exam will be given the opportunity to make up the exam only if he/she presents satisfactory evidence that his/her absence was unavoidable. It is the obligation of the student to notify the instructor prior to the exam or within twenty-four hours of the time of absence, at which time, arrangements will be made for a make-up exam.

- ***Changes in syllabus and assignment sheets may be modified as deemed appropriate. All changes will be announced in class.*

University Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. 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: DisabilityServices@floridapoly.edu; (863) 874-8770; www.floridapoly.edy/disability.

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to 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. Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, 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. The Title IX Coordinator is available for any questions to discuss resources and options available.

Academic Integrity

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 sanctions up to and including expulsion from the university.

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 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****.*

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.

Course Schedule - *Subject to change per course policies.*
Tentative Schedule (Subject to Change)

Week	Date	Topics(s)	Deliverable(s)/Note(s)/Action(s)
1	Jan 13/15	Introduction to Computer Manufacturing and Control Dimensioning & Working Drawings	 HW Dimensioning HW Working drawings
2	Jan 20/22	Assemblies and Working Drawings Computer Aided Design	HW Assembly and Working drawings HW Sheet metal
3	Jan 27/29	Geometric Dimensioning and Tolerancing Geometric Dimensioning and Tolerancing	HW Tolerances HW GD&T
4	Feb 3/5	Geometric Dimensioning and Tolerancing Computer Aided Engineering	HW GD&T HW GD&T
	Feb 10	Career Day	No Classes
5	Feb 12	Exam review Exam 1	HW Weldments
6	Feb 17/19	Computer Aided Engineering, FEA Computer Aided Engineering	HW Mesh Refinement HW Simulation
7	Feb 24/26	Computer Aided Manufacturing Computer Aided Manufacturing	HW Motion HW G-Code
8	Mar 3/5	Computer Aided Manufacturing Computer Aided Manufacturing	HW CAM HW CNC Milling
9	Mar 10/12	Piping and Instrumentation Diagrams Piping and Instrumentation Diagrams	HW P&ID HW P&ID
	Mar 16/20	Spring Break	No Classes
10	Mar 24/26	Piping and Instrumentation Diagrams Piping and Instrumentation Diagrams	HW P&ID HW P&ID
11	Mar 31 Apr 2	Exam review Exam 2	HW Pump Selection
12	Apr 7/9	Design for Manufacturing Industrial Sensors	HW DFM HW Sensors
13	Apr 14/16	Industrial Controls Programmable Logic Controllers	HW Controls HW PLC
14	Apr 21/23	Programmable Logic Controllers Programmable Logic Controllers	HW PLC Switches and Lights HW PLC Traffic lights
15	Apr 28	Programmable Logic Controllers Exam review	Final Project Due (Assembly + Working drawings, FEA, P&ID, PLC Automation)
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	Name, Title	**Date**
Created By	Edwar Romero, Associate Professor	03/25/2019
Revised By	Edwar Romero, Associate Professor	10/29/2019
Last Modified	Edwar Romero, Associate Professor	01/06/2026