FLORIDA POLYTECHNIC UNIVERSITY

Syllabus- CEN 4033 Secure Software Engineering

Course Information

- **Course Number and Title**: CEN 4033 Secure Software Engineering
- **Credit Hours:** 3 (3 lecture / 0 lab)
- **Current Academic Term**: Spring 2026

Instructor Information

- **Instructor**: Dr. Karim Elish
- **Office**: BARC-2227
- **Office Hours**: MWF: 11:00 am - 12:00 pm or by appointment
- **Office Phone**: (863) 874-8646
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Course Details

- **Section**: 3
- **Class delivery mode:** Face-to-face (in-person/in-class)
- **Class Meeting Day, Time & Location**: MWF 1:00pm - 1:50pm, IST-1030
- **Course Website:** Canvas
- **Official Catalog Course Description**: This course aims to introduce students to object-oriented software engineering, secure software development life cycle, security requirements, secure software design, and secure coding and testing principles. It is designed to give students practical experience with building a software system and securing it.
- **Prerequisite(s):** COP 3415 - Data Structures or COP 3530 - Data Structures & Algorithms **Required Textbook**: "Software Engineering: Theory and Practice", 4th Edition, by Shari Pfleeger and Joanne Atlee, ISBN: 9780136061694.
- **Recommended Textbooks:**
  1. "Secure Software Development: A Security Programmer's Guide", by Jason Grembi, ISBN: 978-1-4180-6547-8.
  2. "Computer Security: A Hands-on Approach", 3rd Edition, by Wenliang Du, ISBN-13: 978-1733003957 , ISBN-10: 1733003959
- **Equipment and Materials**: none.
- **Course Objectives:** To introduce the discipline of secure software engineering and what it entails to produce high quality secure software based on engineering principles from planning to delivery.
- **Course Learning Outcomes**:
  1. Illustrate understanding of secure SDLC and apply it to software development.
  2. Illustrate knowledge of standards such as IEEE and apply them to software development.
  3. Describe the principles and concepts of secure software design.

4. Describe the principles and best practices of secure software coding and testing.
5. Operate in a team to create a secure system development and implementation plan based on requirements and user needs.

- **Alignment with Program Outcomes (ABET)**:
  The Computer Science program at Florida Polytechnic University has aligned its Program Outcomes with the ABET Students Outcomes 1-6 from the ABET General Criterion 3 and the ABET Program Criteria. The table shown below summarizes how the CLOs stated above align with the Program Outcomes (ABET 1-6). These outcomes are:
  1. **Analyzing a Problem**: Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions
  2. **Implementing a Solution**: Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline
  3. **Communicating Effectively**: Communicate effectively in a variety of professional contexts
  4. **Performing Legal & Ethical Analysis**: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles
  5. **Collaborating as a Team**: Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline
  6. **Applying theory**: Apply computer science theory and software development fundamentals to produce computing-based solutions.

Program Outcome (ABET)	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
Analyzing a Problem	X	X	X	X	
Implementing a Solution	X	X	X	X	
Communicating Effectively					X
Performing Legal & Ethical Analysis					X
Collaborating as a Team					X
Applying theory	X	X	X	X	

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 https://floridapolytechnic.libguides.com/writingservices

Course Policies:

1. Course Communication Policy

Florida Polytechnic University email is the official method of communication for the University. Students are required to check their Florida Polytechnic University email and course Canvas daily. The subject of your course-related emails must start with [CEN 4033:] followed by the topic. Failure to provide the correct subject may result in ignoring the email. Any email received from an address other than the one from Florida Polytechnic University email floridapoly.edu domain will not be replied to. Please add the course instructor's and TA(s)' email addresses to your approved email recipients list to ensure that you will receive emails regarding this course. Please note the instructor of this course is not responsible for missed email communication directed to your spam folder.

2. Attendance:

Please see the University Policy, "Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor".

- This class requires "in-person/in-class attendance".
- The attendance is part of the final grade (see next section).
- The attendance will be taken through "A+ attendance" tool in Canvas.
- In case of absence, please inform the instructor of absence in advance, if possible, or as soon as possible afterward.
- A student with an excused absence will get more time to make up missed work without any reduction in the assigned work or final course grade given that the student provides an official/documented excuse.
- Standard excused absence reasons: religious observances; legal responsibilities (jury duty, court obligations); military obligations; university-sponsored events; death or serious illness within their immediate family, or their own illness, or other reasonable circumstances.
- Exceptions to any attendance requirements may be made on a case-by-case basis.
- Campus CARE Services are available to work with students with serious or unusual circumstances. Contact care@floridapoly.edu

3. 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.

Participation in all course activities is a very important element of this course, is a basic expectation, and counts for part of your grade. Course participation consists of active and respectful involvement in class discussions, presentations, postings, replies, projects, and other interactions. High-quality class participation in lecture discussions is expected. The course participation grade will take into account quality, quantity, and timeliness of student participation.

4. Late Work/Make-up work:

Late submissions of homework and programming assignments will be graded out of 90% of the total points in the first 24 hours, and out of 80% of the total points in the second 24 hours. *Part of a late day counts as a full late day.* No late submission of homework and programming assignments is allowed 48 hours after the submission deadline, no exceptions will be made. *Homework and programming assignments submitted more than 48 hours after the submission deadline will not be graded.* This policy does not apply for excused absence, and exceptions may be made on a case-by-case basis. Documentation justifying the late submission will be evaluated on a case-by-case basis.

Example: if the homework or programming assignment is graded out of 100 points, its due is March 18, 11:59pm and it was submitted at 10pm on March 19, then 10 points will be deducted from the total homework or programming assignment score. If it was submitted on March 20 at 8am, then 20 points will be deducted from the total homework or programming assignment score.

Exams, quizzes, final project reports and presentation slides submitted after the deadline are not graded unless permission has been obtained from the instructor in advance. Medical emergencies with valid documentation would be about the only exception. Any other documentation justifying the late submission will be evaluated on a case-by-case basis.

Makeup exams and quizzes for the course will only be given under extraordinary circumstances such as sickness and these extraordinary circumstances must be verifiable and documented. Makeup exams and quizzes must be arranged prior to the exams and quizzes.

5. Assignment/Evaluation Methods:

Item	***Percentage***
Attendance/ Participation	10%
Assignments	20%
Quizzes	10%
Mid-Term Exam	20%
Final Project	20%
Final Exam	20%
Total	**100%**

If you have an issue with a grade on any individual assignment or test, then you can discuss it with the course instructor and dispute your grade within *seven days* after that assignment or test grade have been released.

6. Grading Scale: (See also University Grading Policy).

A	≥ 93	B	83-86	C	73-76	D	63-66
A-	90-92	B-	80-82	C-	70-72	D-	60-62
B+	87-89	C+	77-79	D+	67-69	F	< 60

7. Individual work:

For coursework (assignments, exams, quizzes), you are expected to do your own work individually and privately without any discussion with other students, the use of previously graded academic work, or the use of outside resources. Failing to do so will result in treating this as a violation of the Academic Integrity policy and your penalty will be a F grade in the course.

Quizzes

Announced quizzes will be given at the beginning or at the end of the lecture session in class, in online form in Canvas. Quizzes are closed-book. You are responsible for relevant information from the textbook, even if it is not covered fully in class. You are also responsible for reading the required reference materials.

Mid-Term Exam

Full period Mid-Term exam will cover material from lectures in class prior to the exam. Mid-Term exam is closed-book and will be held in class in Canvas online. You are responsible for relevant information from the textbook, even if it is not covered fully in class. You are also responsible for reading the required reference materials.

Final Exam

The final exam will be comprehensive and will cover all the material from the semester. The final exam is closed-book and will be held in class in Canvas online. You are responsible for relevant information from the textbook, even if it is not covered fully in class. You are also responsible for reading the required reference materials.

Final Project

In the final project, you are required to work in teams to design and implement a software project based on user requirements. Teams are asked to create a project plan and to apply a SDLC to the software development. More information about the project will be given after the first few weeks of classes.

- Final Project Reports: the goal is to deliver four different reports during the semester: *i)* project plan, *ii)* software requirements specifications, *iii)* software design specifications, and *iv)* final project report, including software testing report.
- Final Project Presentation: each team will have to present their final project and summarize their findings within 10-15 minutes. Final presentations can include a live demo of the software project.
- Final Project Demo Video: each team will have to record the demo video (10 – 30 minutes long) to demonstrate your final project solution and explain its basic features.

Your instructor will provide you with the specific guidelines for the final project reports, final project presentation and demo video shortly after the first few weeks of classes (format and length, presentation guidelines and logistics, rubric, etc.) Final project presentations will take place in class during the last two weeks of classes. Final project reports, slides, demo video, and other supporting documents must be submitted through Canvas by the deadline.

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; 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 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****.*

Disclaimer: **This syllabus is tentative and may be subject to change. Everything in the syllabus might change except for:**
1) Course description.
2) Textbook(s).
3) Grading policy.

Tentative Schedule*
Important Dates: https://floridapoly.edu/academics/academic-calendar/index.php

Week	Class (MWF) / Topic	Activity
Week 1 (1/12 – 1/18)	Course Overview, Introduction Why Software Engineering? Chapter 1 (required textbook)	
Week 2 (1/19 – 1/25)	Modeling the Process and Life Cycle SDLC, Waterfall, Spiral, Agile Chapter 2 (required textbook)	
Week 3 (1/26 – 2/1)	Secure Software Development Lifecycle Principles of Software Security and Quality No class on Jan. 20 (M)	
Week 4 (2/2 – 2/8)	Capturing the Requirements Eliciting and Analyzing the Requirements Software Requirements Specifications (SRS) UML: Use Case Modeling Chapter 4 (required textbook)	Quiz # 1 Assignment #1
Week 5 (2/9 – 2/15)	Security Requirements Misuse case model	
Week 6 (2/16 – 2/22)	Designing the Architecture Architecture Styles, C-S, Layered, Pipes and Filters Chapter 5 (required textbook)	Assignment #2
Week 7 (2/23 – 3/1)	Designing the Modules Software Design Specifications (SDS) Chapter 6 (required textbook)	
Week 8 (3/2 – 3/8)	Designing for Security and Quality Midterm Exam	Midterm Exam
Week 9 (3/9 – 3/15)	Secure Coding Principles	
Week 10 (3/16 – 3/22)	Spring Break, no classes	
Week 11 (3/23 – 3/29)	Language-Based Security, Memory Organization Buffer Overflows Chapter 4 (recommended textbook - Computer Security)	Quiz # 2
Week 12 (3/30 – 4/5)	Buffer Overflows, Integer Overflows, Format String vulnerability Chapters 4, 6 (recommended textbook - Computer Security)	
Week 13 (4/6 – 4/12)	Software Vulnerability Mapping Cyber Risk Management for Software	

Week 14 (4/13 – 4/19)	Testing for Security and Quality Chapters 8, 9 (required textbook)	Assignment #3
Week 15 (4/20 – 4/26)	Delivering and Maintaining the System Chapters 10, 11 (required textbook) Final Project Presentations	Quiz # 3
Week 16 (4/27 – 5/3)	Final Project Presentations	
	Final Exam: TBD	Final Exam

**I reserve the right to modify this schedule as required by the progression of the class.*