FLORIDA POLYTECHNIC UNIVERSITY

CEN 4033.02 "Secure Software Engineering"

Course Information

- **Course Number and Title**: CEN 4033 – Secure Software Engineering
- **Credit Hours:** 3 (Lecture Hours: 3, Lab Hour: 0)
- **Academic Term**: Spring 2026

Instructor Information

- **Instructor**: Dr. Denis Ulybyshev
- **Office Location**: BARC 2239
- **Office Hours**: M: 1 – 1:55pm, W: 1 – 1:55pm, TR (Thursday): 1:45 – 3pm or by appointment, in person in BARC 2239 or online in Microsoft Teams
- **E-mail address**: dulybyshev@floridapoly.edu

- **Teaching Assistant (TA):** TBA
- **Office Location**: TBD
- **Office Hour**: TBD
- **Email address:** TBD

Course Delivery and Course Description

- **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.
- **Prerequisites:** COP 3415 - Data Structures or COP 3530 - Data Structures & Algorithms.
- **Delivery mode:** Face-to-face (in-person/in-class)
- **Section**: 02
- **Class Meeting Day, Time & Location**: MWF 2:00pm - 2:50pm, IST 1068
- **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

Course Learning Outcomes (CLOs)

CLO-1: Illustrate understanding of secure SDLC and apply it to software development.
CLO-2: Illustrate knowledge of standards such as IEEE and apply them to software development.
CLO-3: Describe the principles and concepts of secure software design.
CLO-4: Describe the principles and best practices of secure software coding and testing.
CLO-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**	

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

- 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).
- This course requires "in-person/in-class attendance".
- The attendance will be taken through "A+ attendance" tool in Canvas every class session.
- The attendance is part of the final grade (see the section "Assignment/ Evaluation Methods").
- Exceptions to any attendance requirements may be made on a case-by-case basis. If you know that you will miss a class for any reason, please discuss the situation with your instructor in a timely manner.
- Only valid and documented excuses will be considered. Standard excused absence reasons: legal responsibilities (jury duty, court obligations); religious observances; military obligations; university-sponsored events; serious illness within their immediate family, or their own illness, or other reasonable circumstances.
- Due to the disruption caused to your classmates' learning process, frequent late arrivals will likewise incur a penalty.
- 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.

4. Late Work/Make-up work

Exams, quizzes, final project reports, final project demo video(s), final project presentation slides submitted after the deadline will not be graded unless permission has been obtained from the course 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.

Make-up exams and make-up quizzes for the course will only be given under extraordinary circumstances such as illness and these extraordinary circumstances must be verifiable and documented. Make-up exams and make-up quizzes must be arranged prior to the exams and quizzes.

Homework and programming assignments submitted more than 48 hours after the submission deadline will not be graded. 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 after the submission deadline. *Part of a late day counts as a full late day.* Documentation justifying the late submission of homework and programming assignments more than 48 hours after the submission deadline will be evaluated on a case-by-case basis, and exceptions may be made on a case-by-case basis.

Example: if the homework or programming assignment is graded out of 100 points, it is due on March 04, 11:59pm and it was submitted at 10pm on March 05, then 10 points will be deducted from the total homework or programming assignment score. If it was submitted on March 06 at 8am, then 20 points will be deducted from the total homework or programming assignment score. If it was

submitted on March 07 at 11am, then it will not be graded, and the total homework or programming assignment score will be 0. Documentation justifying the late submission will be evaluated on a case-by-case basis.

5. Assignment/Evaluation Methods

Item	***Percentage***
Attendance/ Participation	10%
Homework and Programming 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 or on any group assignment, then you can discuss it with the course instructor and dispute your grade within *five days* after that assignment or test grade has been released.

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

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

7. Quizzes

Announced quizzes will be given at the beginning or at the end of the class session. 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.

8. Mid-Term Exam

Mid-Term exam will cover material from lectures in class prior to the exam. Mid-Term exam is 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.

9. Final Exam

The final exam will be comprehensive and will cover all the material from the semester. The final exam is 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.

10. Final Project

In the final project, you are required to work in your assigned project team to design and implement a software project based on user requirements. Project teams are asked to create a project plan and apply a SDLC for the software development. More information about the project will be given after the first few weeks of classes. The following project deliverables are expected:

- **Final Project Reports**: the goal is to deliver four different reports during the semester:
  1) project plan,
  2*)* Software Requirements Specification (SRS),
  3*)* Software Design Specification (SDS),
  4) final project report, including software testing report.
- **Final Project Presentation**: each team must present their final project and summarize their findings and accomplishments. The presentation may include a live demo of your final project.
- **Final Project Demo Video**: each team must record and submit a demo video (10 – 30 minutes long) that demonstrates your final project solution and its basic features. The demo video must include the source code walkthrough, briefly explaining the main components of your solution and how they interact.
- **Final Project Source Code**: each team must upload their source code to the repository accessible by a course instructor and TA(s). Source code should contain comments helping to understand your design and implementation.

Your instructor will provide you with the specific guidelines for the final project deliverables after the first few weeks of classes (format and length, presentation guidelines and logistics, grading rubric, etc.) Final project presentations will take place in class. Final project reports, slides, demo video, link to the source code repository, and other supporting documents must be submitted in Canvas by the submission deadline.

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.

Course Schedule (Tentative)*

See Important Dates in Academic Calendar:

Week	Topics	Activities
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) **No class on Jan. 19 (MLK Day)**	
Week 3 (1/26 – 2/01)	Secure Software Development Lifecycle Principles of Software Security and Quality	Final Project Selection
Week 4 (2/02 – 2/08)	Capturing the Requirements Eliciting and Analyzing the Requirements Software Requirements Specification (SRS) UML: Use Case Modeling Chapter 4 (required textbook)	Quiz # 1 Assignment #1
Week 5 (2/09 – 2/15)	Security Requirements Misuse case model	
Week 6 (2/16 – 2/22)	Designing the Architecture Architecture Styles (Client-Server, Layered, Publish-Subscribe, Pipes and Filters, etc) Chapter 5 (required textbook)	Assignment #2
Week 7 (2/23 – 3/01)	Designing the Modules Software Design Specification (SDS) Chapter 6 (required textbook)	
Week 8 (3/02 – 3/08)	Designing for Security and Quality	Quiz # 2
Week 9 (3/09 – 3/15)	Secure Coding Principles Midterm Exam	Midterm Exam
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)	Final Project Intermediate Report
Week 12 (3/30 – 4/05)	Buffer Overflows, Integer Overflows, Format String vulnerability Chapters 4, 6 (recommended textbook - Computer Security)	
Week 13 (4/06 – 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 Final Project Presentations Chapters 10, 11 (required textbook)	Quiz # 3 Final Project Deliverables
Week 16 (4/27 – 5/03)	Final Project Presentations April 29-30, May 01: Reading Days, no classes	
	Final Exam: TBA	Final Exam

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

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 (TLC)**: 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.

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 accommodation 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 accommodation.

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 accommodation must be made in advance. Accommodation is 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
ODS website: https://floridapoly.edu/studentlife/disability-services/

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. You may speak to your professor, but your professors have an obligation 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 discussion resources and options available.

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.

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 accidently, 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****.*

Civility and Collegiality

Faculty and students come to the university for the same reason, which is to participate in a highly professional educational environment. To that end, both students and faculty are expected to treat each other with mutual regard and civility. Communication, written, oral and behavioral, between faculty and students must remain respectful. Within and outside of the classroom, students must refrain from derogatory comments toward the faculty member and their fellow students, and faculty as well must refrain from derogatory comments toward their students. Faculty and students should address each other

with respect, in accordance with the wishes of the faculty and the students: for example, no one should be addressed by their last name alone.

Faculty from the outset of a course can and should specify what constitutes activities and behavior that take away from, that diminish, the educational environment. An individual student's distracting behavior impedes the education of fellow students, which itself is a form of disrespect. Civility and collegiality also include respecting each other's time: for example, neither students nor faculty should arrive late to class (unless unforeseen, pressing circumstances prevail); faculty should be present at the posted office hours; and students and faculty should be punctual when meeting times are scheduled. In more general terms, collegiality means respecting the right of both faculty and students to participate fully and fairly in the educational enterprise.