

SFWE 101: Introduction to Software Engineering

Course Syllabus

Course Description

Units: 3

This course introduces you to the different software development lifecycle (SDLC) phases used in developing, delivering, and maintaining software products. You will also acquire basic software development skills and understand common terminology used in the software engineering profession. You will also learn and practice using traditional coding standards/guidelines. Python software development libraries and debugging tools will be explored and used in projects to familiarize you with basic tasks involved in modifying, building, and testing software. The course will also lay the foundation for achieving academic and career success in Software Engineering.

Instructor and Contact Information

Instructor Name: Professor Sharon O'Neal

Email: sharononeal@arizona.edu

Office: Engineering Room 255

Phone: 520-822-4040

Office Hours: Monday – 2:00pm – 3:30 and Friday 11:00 – 12:30 pm

Or you can make an appointment (e.g., email/after-class appointment for in-person/zoom office hours)

You are encouraged to reach out to your instructor frequently throughout the semester via email, phone, text, office hours, or a scheduled synchronous meeting (in-person or Zoom). Every attempt will be made to respond to questions and concerns that you may have within 24 hours.

Course Pre-/Co-requisites

Prior to enrolling in the course, you should have completed **MATH 112: College Algebra Concepts and Applications** or higher.

It is recommended you are either concurrently enrolled, or have previously taken **MATH 122B: First-Semester Calculus**, or **MATH 125: Calculus I**.

Course Format and Teaching Methods

This course is structured around weekly progress. It will include a combination of lectures, and small group activities focused on experiential learning, discussions, and web-based assignments. The expected weekly progress is outlined in the course schedule. At a minimum it is recommended that you keep up with coursework by following the outlined course schedule on D2L.

Course Objectives

During this course, you will:

1. List and describe the fundamental phases of the Software Development Lifecycle (SDLC).
2. Define and describe fundamental software engineering terminology and coding practices.

3. Explain relationships between software engineering and other engineering disciplines (Systems Engineering, Electrical and Computer Engineering, Industrial Engineering).
4. Modify and build a software program that introduces students to software development tools and environments.
5. Troubleshoot and debug changes made to an existing software program.
6. Develop an original Python software program, learning basic Python language syntax.
7. Build a foundation for academic success in the Software Engineering degree program.

Expected Learning Outcomes

Upon completion of this course, you should be able to:

1. Describe basic software development and computing fundamentals that make up the Software Development Lifecycle.
[ABET Student Outcome 1 of the Software Engineering Addendum]
2. Modify basic software programs and verify functionality of all changes made using Python programming language and integrated development environment (IDE) toolset.
[ABET Student Outcome 1 of the Software Engineering Addendum]
3. Experiment with and use traditional software development process and testing tools, such as configuration management, interpreters/compilers, and debuggers.
[ABET Student Outcome 6]
4. Analyze the functionality and performance of software application programs.
[ABET Student Outcomes 6]
5. Compare and contrast how diverse software applications produce solutions to meet specific objectives/needs in a variety of fields including, but not limited to public health, safety, global, cultural, social, environmental, and economic applications.
[ABET Student Outcome 2]
6. Demonstrate and communicate software engineering principles effectively through written reports and/or verbal presentations.
[ABET Student Outcome 3]
7. Summarize both ethical and professional responsibilities of a software engineer.
[ABET Student Outcome 4]
8. Build a foundation for academic success in the Software Engineering degree program.
[ABET Student Outcome 7]

Textbooks & Software

Required Textbooks

The *Software Engineering 10th Ed* textbook is available electronically through the [University Bookstores' Pay One Price program](#). This is a digital-preferred, flat-rate courseware program that grants access to all required course textbooks on the first day of classes via the D2L site.

The *Programming in Python 3 (with zyLabs)* online interactive textbook is available through VitalSource. Your instructor will provide instructions on how to obtain the interactive textbook at the start of each semester. *(Do NOT go directly to the zyBooks website to purchase a license).*

- **Software Engineering** (10th ed)
by Ian Sommerville
ISBN: 9780137586691
- **Programming in Python 3** (with zyLabs)
by Bailey Miller for zyBooks
Digital access with courseware required

Required Software

You will need to download and install the following *free* software – links and instructions are available in the Start Here module of the D2L course site:

- An IDE of your choice (Visual Studios Code is recommended, but others are sufficient).
- Latest version of Python (compatible with the IDE)

Assignments and Examinations

Homework (~x18)

There are two types of homework assignments in this course (1) written homework, and (2) labs-based homework.

NOTE: additional labs may be added depending on overall class progress as the semester progresses.

Written homework assignments include instructor-defined questions and exercises pulled from the *Software Engineering* textbook by Ian Sommerville. These assignments should be typed and submitted electronically to the D2L Assignments tool.

Labs-based homework consist of the zyBooks coding labs. Access to these assignments will be through the D2L Content tab under the associated module. ***Be sure to only use the D2L links provided to the zyBooks labs otherwise your grades will not be automatically transferred to the D2L gradebook.***

Class Participation (x8)

Class participation consists of full-class and/or small-group discussions.

Discussion questions may include the application of course concepts to personal projects/experiences, zyBooks Class Participation activities, zyBooks Challenge activities.

If you are an online student, you will engage in discussions via the D2L Discussion tool. Participation in discussions will be dependent on both the quality and quantity of your posts.

If you are a Main Campus or Yuma student, you will engage in discussions during class, and likely submit portions of your “in class” work to designated D2L assignment folders. To get credit for participation in class you will submit to one of the following mediums per the instructors direction: D2L Discussion post, In Class Participation Activity assignment folder, or thru the zyBooks Participation and Challenge activities (*grades from zyBooks are automatically transferred to the gradebook if the D2L links are used*).

Knowledge Checks (x32)

Each pre-recorded lecture includes embedded PlayPosit questions, designed to help you self-assess your understanding of the lecture content. PlayPosit questions are auto-graded (i.e., multiple choice, multi-select, fill-in-the-blank, etc.). You have an unlimited number of attempts at each PlayPosit bulb (i.e., interactive video); if you didn’t achieve your desired score, select to retry the bulb.

Exams (x3)

There are three exams in the course – two mid-term exams and one cumulative final exam. All exams are completed through the D2L Quiz tool and may contain true/false, multiple choice/select, and short response questions. Exams are timed – 50 minutes for mid-term exams, and 120 minutes for the final. They are open book open notes, but closed collaboration (should be your own work).

Python Project

Beginning in Module 7, you will apply your software development and Python skills to create an Alien Invasion game. This is an individual project, but collaboration is welcome. For this project, you will submit the Source Code, a Summary of Changes, and a video demonstration of your game to the D2L Assignment tool.

Grade Distribution, Scale & Policies

The grading distribution for course assignments is as follows:

| | |
|--------------------------|-------------|
| Homework (~x18) | 20% |
| Class Participation (x8) | 10% |
| Knowledge Checks (x32) | 15% |
| Mid-term Exams (x2) | 20% |
| Final Exam | 20% |
| Python Project | 15% |
| Total | 100% |

Late Work Policy

Homework and Python Project: Homework and projects are due at the time specified in the course schedule and/or the D2L site. Late homework and projects *will not* be accepted without prior approval by the instructor and will receive zero points.

Exams: A make-up exam may only be given under extraordinary circumstances. To request a make-up exam, you should contact the instructor well in advance and provide *written* documentation for the reason that you will not be able to attend the regularly scheduled exam. It is up to the discretion of the instructor to accept the justification provided.

Instructor Grading & Student Appeals Policy

Written Homework, Class Participation, Projects, and Exams will be graded by the instructor within one week of the submission deadline. Feedback will be posted to D2L in the form of (1) detailed rubrics and (2) individualized written remarks. This feedback is designed to help you improve your craft; questions regarding your assignment feedback is welcomed during Office Hours or via email.

zyBooks Homework and Knowledge Checks are machine-scored; grades are available shortly after submission. Feedback on these items may be auto generated and more general in nature (i.e., only indicates what is correct/incorrect). Questions regarding the feedback on these activities are welcomed during Office Hours or via email.

To appeal a grade on any assignment, submit an email identifying the assignment, question, and justification for the appeal within two weeks of the grade being posted to D2L.

Grading Scale

The following scale will be used to award final grades:

| | |
|---|---------|
| A | 90-100% |
|---|---------|

| | |
|---|---------------|
| B | 80-89% |
| C | 70-79% |
| D | 60-69% |
| E | less than 60% |

Incomplete (I) or Withdrawal (W):

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

Course Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Generative AI Policy

In this course, generative artificial intelligence/large-language-models tools, such as ChatGPT, Dall-e, Bard, Bing, may be used for written homework assignments and portions (not all) of the semester project with appropriate acknowledgment and citation, **but not for any zyLabs, knowledge checks, quizzes or exams**. If you are in doubt as to whether you are using generative AI tools appropriately in this course, I encourage you to discuss your situation with me. Be aware that many AI companies collect information; do not enter confidential information as part of a prompt. LLMs may make up or hallucinate information. These tools may reflect misconceptions and biases of the data on which they were trained and the human-written prompts used to steer them. You are responsible for checking facts, finding reliable sources for, and making a careful, critical examination of any work that you submit.

Safety on Campus and in the Classroom

For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): <https://cirt.arizona.edu/case-emergency/overview>.

Also watch the video available at

https://arizona.sabacloud.com/Saba/Web_spf/NA7P1PRD161/common/learningeventdetail/crtfy00000000003560.

University Policies

Links to the following UA policies are available at, <https://academicaffairs.arizona.edu/syllabus-policies>:

- Absence and Class Participation Policies
- Threatening Behavior Policy
- Accessibility and Accommodations Policy
- Code of Academic Integrity
- Nondiscrimination and Anti-Harassment Policy
- Subject to Change Statement