

# SFWE 101: Introduction to Software Engineering

## Course Syllabus



**Instructor:** Sharon O'Neal

**Contact Information:** [sharononeal@arizona.edu](mailto:sharononeal@arizona.edu)  
520-822-4040 (cell)

**Office:** Engineering Room 255 or via Zoom

**Class meets on M W F**

**Section 1: 1:00 -1:50pm - ENGR 214**

**Section 2: 2:00 – 2:50pm – ENGR 301**

**Yuma Distance Campus students can join synchronously from 2:00 – 2:50pm over Zoom on link provided on D2L. The Zoom passcode for our class is SFWE101.**

**Office Hours: Mon and Wed from 12pm – 1pm and 3pm – 4pm (AZ time zone)**

*Appointments can be made outside of normal office hours by contacting the instructor to schedule a time that is mutually convenient*

Our TA is Shalaka Satam and she can be reached at  
[shalakasatam@email.arizona.edu](mailto:shalakasatam@email.arizona.edu)

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## Course Description

This course introduces students to the different software development lifecycle (SDLC) phases used in developing, delivering, and maintaining software products. Students will also acquire basic software development skills and understand common terminology used in the software engineering profession. Students 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 students

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.

### Course Objectives:

During this course, students will be able to:

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. Explore/explain relationships between software engineering and other engineering disciplines (Systems Engineering, Electrical and Computer Engineering, Industrial Engineering)
4. Modify/build a software program that introduces students to software development tools / 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 the completion of this course, students should be able to:

- 1) Describe basic software development and computing fundamentals that make up the Software Development Lifecycle. *[ABET Student Outcome 1 - SW Engineering Addendum]*
- 2) Explore relationships between software engineering and other engineering disciplines (Systems Engineering, Electrical and Computer Engineering, Industrial Engineering, and Computer Science) *[ABET Student Outcome 3 and Student Outcome 1 - SW Engineering Addendum]*
- 3) Modify basic software programs and verify functionality of all changes made using Python programming language / integrated development environment (IDE) toolset. *[ABET Student Outcome 1 - SW Engineering Addendum]*
- 4) Experiment with and use traditional software development process and testing tools, such as configuration management, interpreters/compilers and debuggers. *[ABET Student Outcomes 6]*
- 5) Analyze the functionality and performance of software application programs *[ABET Student Outcomes 6 and 7]*
- 6) 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]

- 7) Demonstrate and communicate software engineering principles effectively through written reports and/or verbal presentations. [ABET Student Outcome 3]
- 8) Summarize both ethical and professional responsibilities of a software engineer. [ABET Student Outcome 4]
- 9) Build a foundation for academic success in the Software Engineering degree program. [ABET Student Outcome 7]
- 10)

**Course Prerequisites:**

Co-requisite: MATH 122B or MATH 125

**Course Format and Teaching Methods:**

This course is structured around weekly progress. It will include a combination of lectures, and small groups activities focused on experiential learning, in-class discussions, and web-based assessments. The expected weekly progress is outlined in the course schedule. At a minimum it is recommended that students keep up with coursework by following the outlined course schedule on D2L. Note the **DUE DATES** on course deliverables are all posted on D2L.

**Course Communications:**

Announcements and important reminders will be regularly posted on D2L. Log in frequently to check for new announcements, reminders, and information related to the course.

You are encouraged to reach out to your instructor frequently throughout the semester via email, phone call, text, or schedule an in-person or Zoom meeting. Every attempt will be made to respond to any questions or concerns that you may have within 24 hours, if possible (often sooner).

**Class Attendance / Participation Policy:**

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

Participating in this course is vital to the learning process. As such, timely participation in online discussions and/or any team collaboration assignments is absolutely required. Students are expected to attend/watch all lectures and access the course at least twice a week. At a minimum, it is recommended that students keep up with coursework by following the outlined course schedule and notifications that will be posted on D2L. Note: **DUE DATES** for course deliverables will be documented both in the course calendar located on the course D2L Homepage and in the Content section of D2L.

Absences or failure to participate in class may affect a student's final course grade. If you anticipate being absent, are unexpectedly absent, or are unable to participate in class online activities, please contact the instructor as soon as possible. To request a disability-related accommodation to this attendance policy, please contact the Disability Resource Center at (520) 621-3268 or [drc-info@email.arizona.edu](mailto:drc-info@email.arizona.edu). If you are experiencing unexpected barriers to your success in your courses, the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office is in the Robert L. Nugent Building, room 100, or call 520-621-7057.

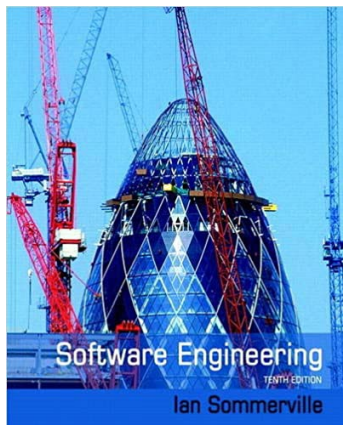
The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

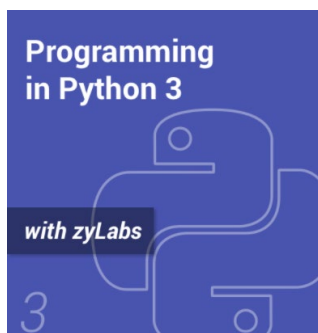
### Textbooks:

The required textbooks used in this course are:

- 1) *Software Engineering, 10th Edition*  
Author: by Ian Sommerville



*Programming in Python 3*  
with zyLabs  
[Programming in Python 3 with zyLabs](#)



## Directions for getting access to the zyLabs / zyBooks

Log Into D2L, navigate to the Start Here Content folder  
Click the link called “zyBooks Table of Contents” in the Start Here Content folder

You are required to use your university email to log into your zyBooks account  
(use the “.....@email.arizona.edu” form of the email address)

A subscription is \$77. Students may begin subscribing on Dec 28, 2021 and the cutoff to subscribe is May 13, 2022. Subscriptions will last until Jun 16, 2022.

**Other Supplemental Readings / References:** *Additional supplemental materials will be referenced and provided to students via D2L.*

### Course Schedule:

The following table provides an outline for the topics and objectives that will be covered during each module for this course. Specific dates will be posted on D2L for any given semester.

Module	Topic	Learning Outcomes
Module 1	Introduction to the Software Engineering Lifecycle (SDLC)	<ul style="list-style-type: none"> <li>Describe different types of software in modern applications / products</li> <li>Identify ethical and professional issues that are important for software engineers</li> <li>Illustrate examples of different activities involved in each phase of the SDLC</li> <li>Identify the role of software in social issues of the day such as voting systems, social media, cybersecurity, etc.</li> <li>Summarize basic software processes and software process models</li> <li>Investigate how to deal with change / evolution of software</li> <li>Describe software process improvement and the factors that affect software quality</li> </ul>
Module 2	Software Requirements Analysis	<ul style="list-style-type: none"> <li>Derive software requirements from user and/or system level requirements</li> <li>Write measurable and testable software requirements</li> <li>Describe requirements management and why it is necessary</li> </ul>
Module 3	Software Architecture and Design	<ul style="list-style-type: none"> <li>Show how graphical models and UML are used to represent software systems</li> <li>Explain the importance of software architectural design</li> <li>Connect software architectural elements to detailed design elements</li> <li>Describe basic strategies of Object-Oriented design techniques</li> <li>Explore common software design patterns</li> <li>Discover how skipping the software design</li> </ul>

		<p>phase can lead to code that is difficult to maintain or evolve</p> <ul style="list-style-type: none"> <li>• Explore strategies to incorporate open-source or reused software into software design</li> </ul>
<b>Module 4</b>	<b>Introduction to Software Implementation</b>	<ul style="list-style-type: none"> <li>• Explain fundamental concepts in writing a software program</li> <li>• Explain what a Python interpreter is</li> <li>• Develop code to declare variables and expressions</li> <li>• Experiment with Python software development tools</li> <li>• Develop code to declare different Python data types</li> </ul>
<b>Module 5</b>	<b>Basic Python Execution Control Constructs</b>	<ul style="list-style-type: none"> <li>• Write a simple Python program using Python strings</li> <li>• Write a simple Python program using different Python branching constructs</li> <li>• Write a simple Python program using different Python looping constructs</li> </ul>
<b>Module 6</b>	<b>Python Classes, Functions, and Modules</b>	<ul style="list-style-type: none"> <li>• Write a simple Python program using Python functions</li> <li>• Write a simple Python program using Python classes</li> <li>• Write a simple Python program using Python modules</li> </ul>
<b>Module 7</b>	<b>Different Types of Software Testing and Introduction to <i>Alien Invasion</i></b>	<ul style="list-style-type: none"> <li>• Describe the different stages of software testing</li> <li>• Review the software requirements and design of the <i>Alien Invasion</i> game</li> <li>• Describe the implementation of the <i>Alien Invasion</i></li> <li>• Install a separate Python IDE from the one used in the zyLabs book</li> </ul>

		<ul style="list-style-type: none"> <li>• Make simple changes and test to <i>Alien Invasion</i></li> </ul>
<b>Module 8</b>	<b>Adding New Features to a Python Program – <i>Alien Invasion</i></b>	<ul style="list-style-type: none"> <li>• Implement required modifications to a Python program – <i>Alien Invasion</i></li> <li>• Test additional functionality made to a Python program - <i>Alien Invasion</i></li> </ul>

### D2L Course Management System:

This course uses the University of Arizona’s D2L course management system. You are **required** to use D2L with this class and are encouraged to check our D2L class course space daily.

You are also encouraged to have D2L email forwarded to your primary University of Arizona email account. We will use D2L for course assignments, exams, content distribution, and important announcements. The University of Arizona’s D2L system is available at: <http://D2L.arizona.edu>.

### Course Assignments and Exams:

There will be regular homework assignments on the topics covered in class, with approximately 8 homework assignments and one semester project. There will also be module-based discussion board prompts that each student is required to participate in and will be graded for. There will be two midterm exams and a final exam. All exams will be given as an online, timed exam, administered by a proctor, that will be available during the regularly scheduled exam time. **Note: the instructor will give students ample notice of the format, time, and any resulting stipulations about where and how the exams will be administered.**

### Final Examination:

The date and time of the final exam or project, along with links to the Final Exam Regulations can be found at <https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information>, and Final Exam Schedule, <http://www.registrar.arizona.edu/schedules/finals.htm>

The grading distribution for course assignments, class participation, semester project, and exams is as follows:

<i>Homework Assignments:</i>	20%
<i>Class Participation (via in class exercises and D2L Discussion boards):</i>	10%
<i>Knowledge Checks and zyBooks Participation Activities (Playposit quizzes embedded in pre-recorded lectures and zyBooks interactive exercises):</i>	15%
<i>Exam 1:</i>	10%



Exam 2:	10%
Comprehensive Final Exam:	20%
Python Project:	15%
<b>Total</b>	<b>100%</b>

Rubrics will be posted on D2L for all homework assignments.

### Grading Scale and Policies:

The following scale will be used to award the final grades:

Percentage	Letter Grade
90% – 100%	A
80% – 89%	B
70% – 79%	C
60% – 69%	D
<60%	E

Homework is due at the time that it is specified in the course schedule and/or D2L content pages. **Late homework and projects will not be accepted without prior approval by the instructor and will receive 0 points.**

### Course Time Zone:

All dates and times mentioned in this course represent Mountain Standard Time (Arizona), which is UTC-7 hours. Arizona does not observe Daylight Savings Time. You can use the following link to get the current local time in Tucson, Arizona: <http://www.timeanddate.com/worldclock/city.html?n=393>

### Course Policies:

**Make-up exams:** A make-up exam may only be given under extraordinary circumstances. The student requesting a make-up exam should contact the instructor well in advance and provide *written* documentation for the reason that he/she will not be able to attend the regularly scheduled exam. It is up to the discretion of the Instructor to accept the justification provided by the student.

Requests for incompletes (I) and withdrawal (W) must be made in accordance with University policies which are available at <http://catalog.arizona.edu/2015-16/policies/grade.htm#I> and <http://catalog.arizona.edu/2015-16/policies/grade.htm#W> respectively.

### Dispute of Grade Policy:

You can dispute any grade that you receive within two weeks that the grade has been awarded.

### **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.

### **Academic Policies and Institutional Resources:**

#### **Academic Policies and Procedures:**

As a University of Arizona student, you are expected to become familiar with and abide by the university-wide policies and procedures. You can find complete, up-to-date information at: <http://catalog.arizona.edu/policies>

#### **Academic Integrity:**

This course has a **zero tolerance policy** with respect to violations of academic integrity. Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

Academic Dishonesty occurs whenever any action or attempted action is pursued that creates an unfair academic advantage or disadvantage for student and/or any member or members of the academic community. All forms of academic dishonesty are subject to sanctions under the Code of Academic Integrity. Sanctions include written warning, reduction in grade for work involved, disciplinary probation, loss of credit for work involved, failing grade in the course, suspension, and/or expulsion. Various forms of academic dishonesty include, but are not limited to cheating, fabrication, facilitating academic dishonesty, and/or plagiarism. If you are unclear what constitutes plagiarism, please ask the instructor.

Academic Misconduct is defined as any behaviors not conforming to prevailing standards or rules within the academic community. All forms of academic misconduct are subject to sanctions under the Code of Conduct. Sanctions include restricted access to University property, administrative hold, warning, probation, suspension, and/or expulsion. Various forms of academic misconduct include, but are not limited to disruptive behavior, threatening behavior, and/or the theft or damage of University property. For more specific examples of academic dishonesty, academic misconduct, and how to avoid such behaviors, please visit the following website: <http://deanofstudents.arizona.edu/tipsforavoidingacademicdishonesty>

The University Libraries have some excellent tips for avoiding plagiarism available at: <http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA email to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student email addresses. This conduct may also constitute copyright infringement.

### **Classroom Behavior Policy:**

To foster a positive learning environment, students and the instructor 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.).

### **Online Collaboration/Netiquette:**

In this course, you will primarily communicate with the instructor and peers through a variety of tools such as discussion forums, Jamboard, email, and other forms of web conferencing. The following guidelines will enable everyone in the course to participate and collaborate in a productive, safe environment.

- Be professional, courteous, and respectful as you would in a physical classroom.
- Online communication lacks the nonverbal cues that provide much of the meaning and nuances in face- to-face conversations. Choose your words carefully, phrase your sentences clearly, and stay on topic.
- It is expected that students may disagree with the research presented or the opinions of their fellow classmates. To disagree is fine but to disparage others' views is unacceptable. All comments should be kept civil and thoughtful. Remember that this course abides by university policies regarding disruptive behavior: <http://policy.arizona.edu/education-and-student-affairs/disruptive-behavior-instructional-setting>
- Compose your messages and posts in a word processing tool and check your spelling and grammar before submitting your post / email.

### **Threatening Behavior Policy:**

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to one's self. See: <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

### **UA Nondiscrimination and Anti-harassment Policy:**

The University is committed to creating and maintaining an environment free of discrimination, <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

### **Statement of copyrighted materials:**

All lecture notes, lectures, study guides and other course materials disseminated by the instructor to the students, whether in class or online, are original materials and reflect intellectual property of the instructor or author of those works (with the exception of other published reference materials – i.e. course textbooks). All readings, study guides, lecture notes and handouts are intended for individual use by students. You may not distribute or reproduce these materials for commercial purposes without the express written consent of the instructor. Students who sell or distribute these materials for any use other than their own are in violation of the University's Intellectual Property Policy (available at <http://ogc.arizona.edu/node/16>). Violations of the instructor's copyright may result in course sanctions and violate the Code of Academic Integrity.

### **Student Support:**

The instructor is available to assist with **content-related** issues. You may, at any time, email the instructor. This course also provides an **Ask the Instructor** discussion forum within the D2L environment. You are encouraged to post content-related questions to this forum at any time, especially for things that will benefit all students. *(It is not recommended that you use this forum for individual questions that are specific to your work or performance in the class.)* This forum will be monitored on a regular basis and the instructor will respond in a timely fashion. It is common for other students to participate in answering questions posted in the **Ask the Instructor** forum. You should feel free to contribute to the solution if you can provide knowledge or guidance related to the question.

The following are guidelines for requesting support:

- **General Course Questions:** Use the **Ask the Instructor** discussion forum for questions regarding course materials or policy.
- **Personal Course Questions:** Email the instructor to discuss grades or personal concern.
- **D2L Support Questions:** Email [D2L@email.arizona.edu](mailto:D2L@email.arizona.edu)

### **Accommodations for Students with Disabilities:**

The goal for this class is to enable learning experiences that are as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let the instructor know immediately so that we can discuss options. You are encouraged to contact Disability Resources (520-621-3268) to establish reasonable accommodations. For additional information on Disability Resources and reasonable accommodations, please visit <http://drc.arizona.edu/>.

If you have reasonable accommodations, please plan to meet with the instructor by appointment to discuss accommodations and how course requirements and activities may impact your ability to fully participate.

Students needing special accommodations or special services should contact the Disability Resources Center, 1224 East Lowell Street, Tucson AZ 85721, (520)621-3268, FAX (520)621-9423, email: [drc-info@email.arizona.edu](mailto:drc-info@email.arizona.edu), <http://drc.arizona.edu/>. You must register and request that the center or DRC send the instructor official notification of your needs as soon as possible.

Please contact the instructor to discuss accommodations and how this course's requirements may impact your ability to fully participate. The need for accommodations must be documented by the Disability Resources Center.

### Library Support:

The University of Arizona Libraries provides the research tools you need at any time. For an abbreviated list of resources directly related to a specific course, select the **Library Tools** link (located in the Tools drop down on the left of the screen within the Course Navigation bar).

### Course Grievance Policy:

In case of grievances with a course component or grading, students are encouraged to first try and resolve the issue with the instructors. If you feel the issue is not resolved satisfactorily, please send an email to [misonline@eller.arizona.edu](mailto:misonline@eller.arizona.edu).

### Course Surveys and Evaluations:

Near the end of each semester / session, students will receive an invitation via email to complete an online course survey associated with this course administered by the Office of Instruction and Assessment thru the UA Student Course Survey (SCS) tool.

Your feedback is very important to the instructor as shown in the diagram below:

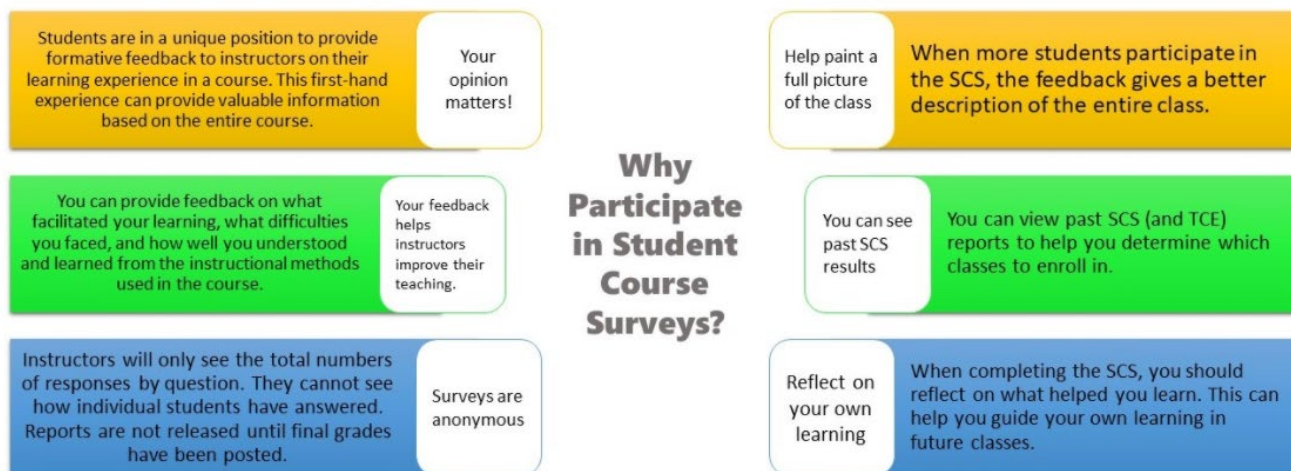


Diagram Source: [whyscscropped.jpg \(1280x491\) \(arizona.edu\)](#)

Your feedback is extremely valuable and will be used to make changes and enhancements to the course to better meet student needs in the future.

**Additional Resources for Students (recommended links):**

- Student Assistance and Advocacy information is available at:
  - <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>
- **Confidentiality of Student Records:** <http://www.registrar.arizona.edu/ferpa/default.htm>

**Subject to Change Statement:**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.