SIE 277 Fall 2021 Object-Oriented Modeling and Design

MWF 12:00 - 12:50

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Course Description

Modeling and design of complex systems using the Unified Modeling Language (UML). Most effort will be in the problem domain (defining the problem). Some effort will be in the solution domain (designing and/or producing hardware or software), but fully implementing hardware and software are not required for this course.

Course Prerequisites or Co-requisites

ECE 175 or C SC 127A.

Instructor and Contact Information

Sherilyn Keaton   Email: keatons@email.arizona.edu

Course Objectives and Expected Learning Outcomes

By the end of this course, students should be able to do the following:

1. Develop models of systems that may contain software and non-software components,
2. Represent these models using the Unified Modeling Language (UML),
3. Design a system:
    a) Derive requirements statements and use cases based on a set of business requirements
    b) Derive the UML Analysis Model (the problem domain) by refining and analyzing the requirements statements and use cases,
    c) Derive the UML Design Model (the solution domain) by refining and analyzing the Analysis Model,
    d) Derive planning-level documentation and diagrams for the UML Implementation Model (how the system will be implemented) and Operational Model (the running system) *.
        We will only plan for the Implementation and Operational Models because creating software and hardware components are not required for this course. You may wish to create prototypes for your Semester Project, but that is entirely optional and up to you.

Assessments and Weighted Distribution

Assessment	Weight	Learning Outcome	Description
Class Participation Homework	10 %	All	• Each of these categories, Class Participation and Homework, are designed to provide practice, evoke, questions, and help self-assess progress and understanding. • Class Participation measures in-class engagement including participating by asking and answering questions, helping others, and submitting low-stake, ungraded in-class activities which are

			based on real-world problems as practice. • Homework consists of more detailed practice that is similar to in-class activities, but usually much longer. Conventionally graded (e.g., A is 90 to 100%).
Quizzes	10%	All	Quizzes may be paper-based, online, or both. These may or may not be timed assessments. Quizzes help inform the student and instructor on progress and / or gaps in learning.
Midterm Exam 1	20%	1, 2, 3a	• Comprehensive. • A typical exam may be paper-based, online, or both and will include one or more case study to provide an overview of the problem to the solved.
Midterm Exam 2	20%	1, 2, 3a, 3b	• Comprehensive. • A typical exam may be paper-based, online, or both and will include one or more case study to provide an overview of the problem to the solved.
Final Exam	20%	All	• Comprehensive. • A typical exam may be paper-based, online, or both and will include one or more case study to provide an overview of the problem to the solved.
Semester Project	20%	All	• Comprehensive. • The semester project will begin with a larger case study that gives an overview of the system to be modeled and described. • The student will create a solution that includes deriving requirements, analysis of the requirements to create use cases, an analysis, design, implementation, and operational model of the system described in the case study.

Assessments and Distribution

Semester grades use Regular Grades:

A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
E	0% - 59%

Required Textbook

This textbook is required and reading assignments will begin immediately in this course.
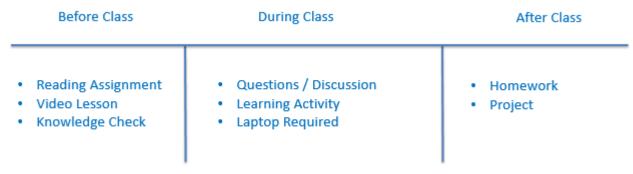
Arlow, J., and Ila Neustadt, <u>UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design</u>, Second Edition, Addison-Wesley (Pearson Education, Inc.), 2005.

Course Format and Teaching Methods

This course will include a required textbook, lectures, videos, in-class activities and discussion, projects, UML software (access will be provided free by the University after the first Midterm Exam), internet resources, and intermittent assessment. The activities during the synchronous class sessions are designed to provide practice, evoke questions, and help you assess your progress and understanding by applying recent course learning to real-world example problems as practice.

Please make sure you visit the D2L site frequently to stay up-to-date. Any notices, changes, or corrections will be posted in the Announcements section of the course (Course Home) on D2L. All course information and materials will be posted on the site.

A quick overview of a typical class meeting is illustrated below:

Before Class	During Class	After Class
• Reading Assignment • Video Lesson • Knowledge Check	• Questions / Discussion • Learning Activity • Laptop Required	• Homework • Project

There are very few lectures given during class. Most are pre-recorded, last 5 to 10 minutes, and are viewed prior to class. Class begins with questions and discussions based on what you want to discuss, have questions, or are curious about. If I have an agenda item to discuss, then I will cover that first so that we can move on to your interests. We will typically delve into a relevant learning activity, so please remember to bring your laptops to class. After class you will work on any assigned homework or project.

Active learning, partially represented by in-class activities mentioned in the last paragraph, reinforces important material, concepts, and skills. The activities I have designed for this course are experiential; based on real-world work that I have performed as an engineer and also assigned to engineering teams not as a learning experience, but as part of our work. This representative work allows you to apply what you have learned, and what you are actively learning, to promote a personal bond between you and that work. I've also found that I don't know what questions I have until I try something firsthand.

Equipment and Software Requirements

For this course you will need daily access to a laptop or web-enabled device with webcam and microphone; regular access to a reliable internet signal; and the ability to download and run the following software: web browser, Adobe Acrobat, etc.

We will also use Enterprise Architect which will be provided to you for free by the University. Students are required to use Enterprise Architect on certain assignments including the semester

project. We will provide links to the software and instructions before you start using Enterprise Architect after the first Midterm Exam.

Reference Material (Optional, but helpful)

- McGuire, Saundra Yancy, and McGuire, Stephanie, <u>Teach Yourself How to Learn : Strategies You Can Use to Ace Any Course at Any Level</u>, First Edition, Stylus Publishing, LLC., 2018.
  - From our Library: https://bit.ly/3g1xcoI
- Craig C. Larman, <u>Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development</u>, Third Edition, Pearson Education, Inc., 2005.
- Rumbaugh, J., Jacobson, I. and Booch, G., <u>The Unified Modeling Language User Guide</u>, Second Edition, Addison-Wesley Professional, 2005.
- Rumbaugh, J., Jacobson, I. and Booch, G., <u>The Unified Modeling Language Reference Manual</u>, Second Edition, Addison-Wesley Professional, 2004.
- Fowler, M. and Scott K., <u>UML Distilled: A Brief Guide to The Standard Object Modeling Language</u>, Third Edition, Addison-Wesley, 2003.
- Jacobson, I., Booch G. and Rumbaugh, J., <u>The Unified Software Development Process</u>, Addison-Wesley, 1999.
- Cockburn, A., <u>Writing Effective Use Cases</u>, Addison-Wesley, 2001.
- Official UML website: http://www.uml.org/

Project Due Date and Final Examination Date and Time

Project Deadline: Wednesday December 1st 11:59 pm
Final Examination: *   Wednesday December 15th 10:30 am to 12:30 pm

* This date and time is set by the Office of the Registrar and states that the policy "As Confirmed by the Faculty Senate: No deviation from the exam schedule, once it is published, is authorized."

https://registrar.arizona.edu/faculty-staff-resources/room-course-scheduling/schedule-classes/final-exams/final-exams-fall-2021

Absence and Class Participation Policy

Unless it is an emergency, you are required to send a request via email well in advance of any class or deadline that you might miss. If possible, I will work with you to help you complete missed work.

Participating in the course and attending class meetings and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings.

If you miss a class meeting you are responsible for any in-class assignments missed. If the assignment was to be handed in, then you are responsible for handing in the work after notifying me. It is best if you hand in the work before the start of the next class meeting time.

I have only added course-specific and highlights here. The link to the full University policy concerning Class Attendance, Participation, and Administrative Drops is available at the link provided under the heading below, University Policies.

Class Meeting Recordings

For any class meeting recordings, which are used at the discretion of the instructor, students must access the content in D2L only. Students may not modify content or re-use content for any purpose other than personal educational reasons. All recordings are subject to government and university regulations. Therefore, students accessing unauthorized recordings or using them in a manner inconsistent with University of Arizona values and educational policies are subject to suspension or civil action.

Code 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.

The University Libraries have some excellent tips for avoiding plagiarism, available at http://new.library.arizona.edu/research/citing/plagiarism.

Re-distributing class notes and / or other course materials in any way is not permitted without the instructor's express written consent. This includes student notes or summaries that substantially reflect lectures or other materials. These resources are made available only for personal use by students.

Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions and may also constitute copyright infringement. Course sanctions include notation of the violation(s) on the student's transcript, a failing grade in the course, or revocation of a student's degree, suspension or expulsion from the program, department, college, or University.

University Policies

The university policies on absence and class participation, threatening behavior, accessibility and accommodations, academic integrity, and non-discrimination and anti-harassment may be found at https://academicaffairs.arizona.edu/syllabus-policies.

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.