



Northeastern
University

CSYE 7230 Software Engineering Course Syllabus

Course Information

Course Title: CSYE 7230- Software Engineering

Term and Year: FALL 2024

Credit Hours: 4.0

Instructor:

Abdulkareem Alali

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Restrictions:

Must be enrolled in one of the following Levels: Graduate

Must be enrolled in one of the following Colleges: College of Engineering

Prerequisites:

Graduate level CSYE 6200 Minimum Grade of C-

Course Description:

Looks at the software life cycle (requirements analysis and specification, software design, coding, testing, and maintenance). Offers verification, validation, and documentation at various stages of the life cycle. Covers the Unified Modeling Language as applied to the software life cycle. Covers applications of design patterns. Overviews user interface design, software metrics, and software development environments. Emphasis is on modular software construction and development of modular libraries. Requires a small software development project.

Prereq. CSYE 6200; engineering students only.

Program Learning Outcomes (PLOs):

The main objective of this course is to introduce the students to the discipline of Software Engineering. In particular:

- Identify the problems that one should expect when developing large software systems.
- The methods that the software developer can use to deal with each of the problems.
- The tools that the software developer can use.
- The procedures that can be followed in developing software.

Course Learning Outcomes

The goal of this course is to teach students advanced software design techniques and expose them to some of the cutting-edge design and modeling tools. Students should gain an understanding of the modeling practices

of software engineers that range from model-centric to code-centric approaches. The students should understand model-driven engineering concepts. Students will have some applied experience in developing sufficiently large systems using model-driven methodology.

Based on satisfactory completion of this course, a student should learn and understand:

1. The Software Life Cycle with a focus on iterative methods and Agile Modeling
Based on the Unified Process
2. Evolutionary Requirements and Use Cases
3. Applying UML in the Context of OO Software Development
4. OO Analysis and Design (OOAD)
 - a. Domain Object Modeling
 - b. Responsibility-Driven Design
 - c. Essential OO Design
 - d. Layered Architectures
 - e. GoF Design Patterns, GRASP, and Best Practices
5. The mapping of domain object design to Java code and the application of TDD and Refactoring
6. Understanding of the layered architecture, UI to domain to technical service layers

Text Book

[Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development, Third edition](#)

Author: Craig Larman

Publisher: Prentice Hall

ISBN-10: 0131489062, ISBN-13:978-0131489066

Selected readings, tutorials, guides, and possibly videos will be provided by the Instructor - these will be made available on the course webpage

Course Outline:

Topic	Name	Description
1	An Overview	Syllabus and Plan Introduction to Software Engineering Introduction to Object-Oriented Analysis and Design Intro to UML
2	The Iterative Process	Iterative, Evolutionary, and Agile Inception Evolutionary Requirements Use Cases Elaboration Iteration
3	Object Orientation	The Domain Model System Sequence Diagrams Operation Contracts Requirements to Design—Iteratively Logical Architecture and UML Package Diagrams
4	Object Design	On to Object Design Interaction Diagrams UML Class Diagrams GRASP: Designing Objects with Responsibilities Object Design Examples with GRASP Designing for Visibility Mapping Designs to Code
5	Testing and Refactoring	Testing, Test-Driven Development and Refactoring
6	Design Patterns	GRASP: More Objects with Responsibilities Applying GoF Design Patterns SOLID Design Patterns: Elements of Reusable Object-Oriented Software
7	Code Smells	Code that indicates a deeper problem in the application codebase
8	Software Metrics	Quantifiable measurements of software to assess software quality and performance
9	Selected Topic	A contemporary topic of relevance to the course

Policy on late work: late submissions of coursework will not be graded or considered without a documented and approved excuse.

Grade Breakdown:

Projects	55%
Midterm Exam	20%
Final Exam	20%
Class Participation	5%
Attendance required	0%

Grading: Graduate Programs Final Grading Scale

95-100%	A	87-89.9%	B+	77-79.9%	C+	69.9% or below	F
		84-86.9%	B	74-76.9%	C		
90-94.9%	A-	80-83.9%	B-	70-73.9%	C-		

Academic Integrity:

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to <http://www.northeastern.edu/osccr/academic-integrity-policy/> to access the full academic integrity policy.

CPS expects independent and original work. Dishonesty and/or carelessness violates fundamental values of an intellectual and professional community and will be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) as a violation of the Academic Integrity Policy. To safeguard the integrity of assignments and programs, your course may use systems such as TurnItIn, which checks written work, and Examity, an online exam proctoring system. Work that contains academic integrity violations (AIV) will be graded on a case by case basis. Work displaying AIV may earn a failing grade, a zero, or even result in the instructor assigning the student a failing grade for the class. Students may not withdraw from a class to avoid the grade penalty for serious academic integrity violations.

For additional information or for answers to frequently asked questions, please visit:

<https://cps.northeastern.edu/academic-resources/academic-integrity>

You may also email CPS-AcademicIntegrity@northeastern.edu.

Student Accommodations:

The College is committed to providing equitable access to learning opportunities to students with documented

disabilities (e.g. mental health, attentional, learning, chronic health, sensory, or physical). To ensure access to this class, and program, please contact The Disability Resource Center (<http://www.northeastern.edu/drc/>) to engage in a confidential conversation about the process for requesting reasonable accommodations in the classroom and clinical or lab settings. Accommodations are not provided retroactively so students are encouraged to register with the Disability Resource Center (DRC) as soon as they begin their program. The College of Professional Studies encourages students to access all resources available through the DRC for consistent support.

Student Well-Being:

All students have access to We Care – 617-373-7591 wecare@northeastern.edu for health concerns, referrals for mental health and assistance with leaves of absence. Additionally we have FIND@ Northeastern - Available 24/7/365 1-877-233-9477 (domestic) 1-781-457-7777 (international)
<https://www.northeastern.edu/uhrs/find-at-northeastern/>

Library Services:

The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals. For more information, visit <http://library.northeastern.edu/>.

Wyzant Tutoring Services:

Northeastern University's College of Professional Studies is covering the cost of twenty-five hours per academic year of tutoring from Wyzant to help ensure your success in challenging courses. Tutors on Wyzant have helped thousands of students in 300+ subjects ranging from College Algebra to Academic Writing, Statistical Analysis to Microbiology. To access your free Wyzant Tutoring for students in the College of Professional Studies, please complete the following steps:

- Login to Northeastern University's [Canvas](#) platform and click on your active course.
- Once you are logged in your class, scroll to the bottom red link on the left side of the course navigation that says "Wyzant Tutoring".
- After clicking this link, you will be prompted to access your free tutoring using your Northeastern login credentials. Indicate your program, time zone, the course you'd like support in, and the specific topics or materials you'd like help with.
- You'll receive an activation email from Wyzant for Higher Ed. (If you don't see it, check your spam or junk folders.) From the email, click on the activation button.
- Potential tutors will begin reaching out to you. Their messages will be sent to your Northeastern email inbox and will be accessible via your Wyzant account dashboard.
- Respond back to the tutors you believe might be a good fit to schedule an online session when it's convenient for you — even late at night!

24/7 Canvas Technical Help:

For immediate technical support for Canvas, call 1-833-450-3937. You can chat and report an issue to Canvas technical support right from within Canvas through the Help icon located in the Canvas global navigation.

myNortheastern, e-mail, and basic technical support

Visit the [Information Technology Services \(ITS\) Support Portal](#)

Email: help@northeastern.edu

ITS Customer Service Desk: 617-373-4357 (help)

Diversity and Inclusion:

Northeastern University and the Office of Institutional Diversity and Inclusion (OIDI) is committed to

equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, member of the University community work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice.

Please visit <http://www.northeastern.edu/oidi/> for complete information on Diversity and Inclusion.

TITLE IX:

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits sex and gender-based discrimination, including sexual harassment, sexual assault, sexual exploitation, relationship or domestic violence, and stalking. The Title IX Policy refers

to sex and gender-based discrimination as “Prohibited Offenses.” The Title IX Policy applies to the entire Northeastern community, including students, faculty and staff of all gender identities.

Allegations of Prohibited Offenses can be reported to the Title IX Coordinator within The Office for University Equity and Compliance at: titleix@northeastern.edu and/or through the Northeastern University Police Department (NUPD) by phone: for an Emergency 617.373.3333; for Non-Emergency 617.373.2121. Reporting to NUPD does NOT commit the victim/affected party to future legal action.

Faculty members are considered “responsible employees at Northeastern University, meaning they are required to report all reports of and information about alleged Prohibited Offenses to the Office for University Equity and Compliance.

If you or someone you know has experienced a Prohibited Offense, confidential support and guidance can be found through (<https://www.northeastern.edu/ouec/resources/main-campus-resources/>), University Health and Counseling Services (UHCS) staff (<http://www.northeastern.edu/uhrs/>) and the Center for Spiritual Dialogue and Service (CSDS) clergy members (<http://www.northeastern.edu/spirituallife/>). Employees within the VRC, UHCS, and CSDS are not required to report allegations of Prohibited Offenses to the Office for University Equity and Compliance.

In case of an emergency, please call 911 OR NUPD’S Emergency line: 617-373-3333.

Please visit www.northeastern.edu/titleix for a complete list of reporting options and resources, both on- and off-campus.

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