CS 4513 A – Software Engineering

Spring 2021

Instructor's name & title

Professor Callahan

Department of Computer Science and Engineering

NYU – Tandon School of Engineering

e-mail

ejc369@nyu.edu

Teaching Assistants/Grader

Rihui Zheng rz1276@nyu.edu

Gordon Lei gl1776@nyu.edu

Course Information

Pre-Requisites *credits*

Co-Requisite: Operating Systems 3.0

Junior or higher majoring in Computer Science, Computer Engineering, or Electrical and Computer Engineering

Class times and location

Tuesdays and Thursdays, 11:00 AM – 12:20 PM, Online

Course Objectives

The goal of this course is to introduce you to software-engineering techniques that can be applied to practical software projects. Upon the successful completion of the course you will be able to:

- Explain the importance of software engineering, in developing software projects using the software development life cycle, and project management
- Perform creative problem discovery, understand the challenges of idea generation as part of the I2E initiative. Use various tools for idea generation and for focusing project discussion used in selecting team projects
- Perform software requirements election and specification including software architecture, analysis, design, and prototyping
- Create a software design using techniques for Object-Oriented, function-based and real-time systems to design and build software
- Explain how software reliability and software life cycle support processes including testing (verification and validation), software reviews, configuration management, and defect detection and correction strategies are implemented
- Utilize software project management, process improvement, and quality are studied as the basis for project oversight and tracking.
- Complete a class project utilizing the Personal Software Process to demonstrate the software engineering processes and life cycle. Utilize oral presentation skills in a formal project presentation.

General Content

This is the first course in a two-course software engineering design sequence. Focusing on software engineering, the course introduces techniques to specify, evaluate, design, test, and document medium to large scale software systems. This course introduces software engineering techniques to specify, design, test, and document medium and large software systems. Creative problem discovery techniques and processes are used for project selection in a team environment. Design techniques include Information engineering, object-oriented, and complexity measures; testing methods such as path testing, exhaustive test models, and construction of test data. An introduction to software tools and project management techniques is presented. Student projects involve team software development and tracking, and a formal oral presentation.

Methods of Instruction

The primary method of instruction is lectures supplemented with related assignments, readings, and projects

My stress in this course is on the process of learning. If you strive to understand and apply the concepts you learned in class, you will be successful in it. Asking questions and doing is the best way to learn. There are no stupid questions. You are not in class to impress me but to learn and develop one step closer to being an independent researcher. Asking a lot and early is the way to

go. Do not wait for five minutes before homework due time/quiz/project presentation to ask a question because I will not have sufficient time to go into details with you.

All course material will be posted on NYU Classes. Lecture topics can change without notice depending on the students enrolled and their backgrounds.

Projects

Through an independent project, you will learn to recognize techniques covered in the course, evaluate their usefulness in the real world and compare them to other techniques available. You will also develop your own strategies to solve a practical problem.

- *Project format:* You will be expected to complete an independent team project as part of the course. You will work in a group of 3 - 4 people. You will have to document and give a presentation at the end of the term.
- *Project content:* You will be expected to write a professional-style documentation/paper (I will provide you with a template).
- *Project presentation:* The whole class will present their projects in a seminar-like setting (will be advertised) on the last day(s) of the class. Your project will be graded based on the technical validity, written part, and the oral presentation.

Presentation

Each project team is required to deliver a formal in-class presentation describing the technical details and processes (covering the system life cycle from idea generation to requirements elicitation through design documentation). The presentation delivery, format, and content should be based on material covered in a presentation preparation course (EG or another course such as public speaking). Presentation skills will be graded in the oral presentation skills lecture. Presentation worksheets will be distributed to assist teams in the development of their presentations. All team members are expected to participate in the presentation. Presentation details are (Submission: Presentations are to be posted to the team assignment menu on NYU Classes)

- Type: Formal presentation (video)
- Participation: All team members must participate (10 minutes/member)
- Audience: Instructor (acting as project manager), class
- Dress: Informal/casual
- Format/Media: PowerPoint or other delivery mechanisms (i.e. Web-based)
- Content:
    - ➢ Overview, team member introductions
    - ➢ Project process/management
    - ➢ Requirements (Use Cases, written requirements)
    - ➢ Analysis (Classes, static and dynamic behavior)
    - ➢ PIR (what did we do right? What did we wrong? What would we do differently?)
    - ➢ Conclusions

Textbooks, Readings, materials

Textbook

Sommerville, "Software Engineering", 10th ed, Pearson, 2016, ISBN: 978-0-13-394303-0

Note: CS 4513 Software Engineering course is participating in the Follett Access program. This is an NYU Bookstore initiative that delivers required course materials digitally at the lowest possible price. The book, Software Engineering by Sommerville will be delivered to you digitally. You will receive an email the week before classes giving you the link to access the material. The cost of the book is $39, which will be added as a "book charge" to your bursar bill**,** this is a savings of $154.50 over the new hardcopy price. If you decide not to use this digital edition you can opt-out of the program. The deadline for opting out is the end of the drop/add period.

Should you choose to remove yourself from the program and find your course materials elsewhere. You must log in and opt-out of having the course materials provided to you by the end of the drop/add period. Once you have opted out of a course, you cannot opt back in!

Questions? Contact us at the bookstore:
email - *wsq.text@nyu.edu*
phone - *212-998-4656*

Supplemental Material

Posted on NYU Classes

Supplementary Readings

Kruchten, Philippe - The Unified Process – An Introduction, Addison Wesley Longman, New York, 1999 .

Rubin, Kenneth - Essential Scrum, Addison Wesley, New York, 2013 Cohn, Mike – Succeeding with Agile, Addison Wesley, New York, 2013

Humphrey Watts S., Introduction to the Personal Software Process, SEI Series in Software Engineering, Addison Wesley Longman, New York, 1997.

Course Policies

(Additional Policies are posted in NYU Tandon Policies and Procedures)

Class Attendance/Lateness

Students are expected to attend lectures. Attendance is required. In case of absence, the student is responsible for the material covered during that lecture. Absence from exams will be

accepted **only** if the student notified before the exam with an acceptable reason. A make-up exam will be given only for the exams, not for quizzes (See excused absences in the NYU Tandon Policies and Procedures)

Class Attendance

Students are expected to attend all lectures and participate in class discussions. For excused absences see the NYU Tandon Policies and Procedures. More than 3 unexcused absences or missed quizzes will result in a reduction in attendance and participation grading points.

Class Participation

Class participation includes actively engaging in class dialog and discussions and formal oral presentations.

Exams and Assessments

Examinations

A midterm exam and final project presentation will be given as shown on the schedule. The midterm exam covers material from the beginning of the semester up to the exam. Exam/quiz questions are based on material from the text, handouts, and lectures.

System/Software Project

An essential requirement of this course is the systems project. Virtually all analysis and design activities are carried out in project teams, or groups, in which communication and cooperation are vital to success. The group project is intended to give students experience in performing systems development activities as part of a team.

I will be available for consulting with groups at all stages of the project. **Do NOT fall behind!** The project will be divided into milestones. The project milestones are included in the course schedule.

Grading and Weighting

Grading Policies

Class participation: Active class participation is very important. It will count as much as homework towards the final grade. After each class, I will note your level of participation. Active participation means getting to class prepared, reading the assigned text, doing your homework, and getting involved in discussions. You will be expected to read the material indicated on the course site before coming to class (except for the first day of class). I praise effort, not necessarily the right answers. I do not expect you to have mastered the material before coming to class (this is what we do together), but I do expect you to put in a serious effort to try and master it.

Homework: Homework will be assigned and solutions posted at this course site. Students are required to turn in their homework on time, by the beginning of the class, on the day the homework is due. Homework will count toward the final grade.

Quizzes: Weekly quizzes will be given in class.
Final: There will be no final exam – There will be a final project presentation. *Project:* You will be expected to do an independent team (3 – 4 members) project.

Grading: Grading is absolute, not on a curve. This means I will grade you based solely on your work and will not compare you to the others in the class. This is done so that you can obtain a grade based on your independent performance and not in competition with others. This also means that everyone can get an A (everyone can get another grade as well, but I am hoping you will strive for better). The final grade will be calculated as follows:

- 15%: class participation/attendance
- 10%: homework
- 30%: quizzes/exams
- 45%: team project (35%).

Performance Status

During the class lectures, the study material shown in the schedule is discussed, including the questions at the end of the assigned chapters. There will also be lecture quizzes and knowledge checks given during class. A portion of the grade is based on answering these questions

Withdrawal

You must formally withdraw from this course to avoid a failing grade. Failure to attend class or to submit work is not enough. Information about formal withdrawal is contained in the Schedule of Classes. After the last day to withdraw, requests that must be approved by the instructor. They will be approved upon the presentation of convincing evidence that unforeseeable conditions beyond the student's control prevent him or her from devoting sufficient time to meeting the requirements of the course.

Course Calendar and Schedule

Week/Lesson	Date	Chapter	Assessment (due date)	
			Homework	Project
1/2	1/28	Introduction Chapter 1 Introduction		
2 /1	2/2	Chapter 1 Introduction		
2/2	2/4	Chapter 2 Software processes	Chapter 1	
3/1	2/9	Chapter 2 Software processes		Project Team Selection Form
3/2	2/11	Chapter 3 Agile Software Development		

4/1	2/16	Chapter 3 Agile Software Development	Chapter 2	Project Proposal
4/2	2/18	Chapter 3 Agile Software Development		
5/1	2/23	Chapter 4 Requirements Engineering	Chapter 3	
5/2	2/25	Chapter 4 Requirements Engineering		
6/1	3/2	Chapter 4 Requirements Engineering		
6/2	3/4	Chapter 5 Systems Modeling	Chapter 4	SRS - Project Domain Definition Sections 1 – 5, 10 and Appendices (except 13.1, 13.2, and 13.3)
7/1	3/9	Chapter 5 Systems Modeling		
7/2	3/11	Chapter 5 Systems Modeling		
8/1	3/16	Chapter 6 Architectural Design Mid Term **(TBD)** (Chapters 1-5)		SRS - Project Requirements (Definition Plus sections 6, 7, and 8)
		Team Project 6 Best practices Agile Mini-Lectures Handouts		(except 13.1, 13.2, and 13.3)
8/2	3/18	Chapter 6 Architectural Design		
9/1	3/23	Chapter 6 Architectural Design		
9/2	3/25	Chapter 7 Implementation		
10/1	3/30	Chapter 7 Implementation	Chapter 6	
10/2	4/1	Chapter 7 Implementation		SPMP - Project Management Plan
11/1	4/6	Chapter 8 Software Testing	Chapter 7	
11/2	4/13	Chapter 8 Software Testing		
12/1	4/15	Chapter 8 Software Testing		SRS - Project Analysis (Complete document)
12/2	4/20	Chapter 9 Software Evolution	Chapter 8	
13/1	4/22	Chapter 9 Software Evolution		
	4/27	Thanksgiving		
14/1	4/29	Chapter 9 Software Evolution		
14/2	5/4	Chapter 22 or 15	Chapter 9	
15/1	5/6	Chapter 22 or 15		
15/2	5/11	Oral Presentations		
	5/12 - 5/18	Final Oral Presentations		

ABET New Criteria: 1, 2, and 6

NYU and Tandon Policies and Procedures

(Additional Policies are posted on NYU Classes and Tandon website)

Henry and Lucy Moses Center for Students with Disabilities

New York University is committed to providing equal educational opportunity and participation for students with disabilities. We work with NYU students to determine appropriate and reasonable accommodations that support equal access to a world-class education. https://www.nyu.edu/students/communities-and-groups/students-with-disabilities.html

Academic Code of Conduct

Plagiarism, cheating, sharing of examination answers, submitting work done by others as your own, and all other forms of deception proscribed in University rules are forbidden. For the sake of your own dignity and self-esteem, it is better to get a low grade than to engage in dishonesty. (see NYU/Tandon Policy for additional details). https://engineering.nyu.edu/campus-and-community/student-life/office-student-affairs/policies/student-code-conduct and https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/university-student-conduct-policy.html

Excused Absence

An absence can be excused if you have missed no more than **10 days of school.** If an illness or special circumstance has caused you to miss more than two weeks of school, please refer to the section labeled Medical Leave of Absence.

Students may request special accommodations for an absence to be excused in the following cases:

- Medical reasons
- Death in immediate family
- Personal qualified emergencies (documentation must be provided)
- Religious Expression or Practice

If illness or an accident causes you to miss a class (or classes) or an exam, you should do the following:

- Notify the Office of Student Affairs by email of your absence, the reason for the absence, how long you think you may be away and supporting documentation.

Medical documentation should state:

- Exact dates of absence
- Estimated of the length of your absence
- Return Date

**If medical documentation does not list the above, your request for excused absence will be considered incomplete, which may delay processing the request. **

Students should not provide anyone except the Office of Student Affairs with a copy of your medical documentation. If a professor requests a copy, refer them to the Office of Student Affairs. This is to protect the confidentiality of your medical information.

It is important for instructors to know when you are experiencing an issue that might interfere with your studies. However, it is also important that your personal matters be kept confidential.

Therefore, the Office of Student Affairs is the office designated to receive documentation regarding private concerns. An official verification notice must be sent to the Office of Student Affairs **within two weeks of the absence**, after that time Student Affairs cannot advocate on your behalf. https://engineering.nyu.edu/campus-and-community/student-life/office-student-affairs/policies#chapter-id-30199

Policy Regarding Observing Religious Holidays

The School of Engineering's policy requires students provide Deanna Rayment, the Coordinator of Student Advocacy, Compliance, and Student Affairs with written notification 14 days in advance of the days to be taken off using the online form.

Tandon Academic Calendar

The Academic Calendar provides all relevant holidays, breaks, commencement, school start/end dates as well as Registration and bursar dates.
https://www.nyu.edu/registrar/calendars/university-academic-calendar.html

Learning Analytics

"Learner engagement, both in class and online, is an important element of this course. I will be looking at our class interactions both in person and digitally in order to tailor the course to best meet your learning needs and make improvements to the course design overall. In person, this means "reading the room" by looking at how students engage with different course materials and activities. Online this means digitally "reading the room" by looking at information about how students engage with different course materials and activities."

University Policies on Sexual Misconduct

Please consult the following link for information on sexual assaults and sexual harassment:
http://nyu.edu/titleix

Reporting an Incident of Sexual Assault, Harassment, or Other Sexual Misconduct. Anyone may report an alleged incident to any of the following:
NYU Department of Public Safety (718-260-3537; 212-998-2222)
The Title IX Coordinator (212-998-2352) or via the web at: https://www.nyu.edu/about/policies-guidelines- compliance/equal-opportunity/harassment-and-discrimination/submitcomplaint.html

- A Residence Life and Housing staff member (212-998-4600)
- The Associate Dean of Student Affairs in the Tandon School of Engineering (718- 260-3773)
- The Office of Student Conduct and Community Standards (212-998-4311) • The Student Health Center (212-443-1000)
- The Wellness Exchange (212-443-9999)
- Or another campus official from the contact list