Course Syllabus

Course Description

Software engineering is concerned with developing and maintaining software systems that behave reliably, efficiently, and securely while satisfying all of the requirements that customers have defined for them. In this course, we will first introduce the software engineering process and then discuss each phase in the process: requirements analysis, software design, implementation, testing, and maintenance. Finally, we will briefly introduce some advanced concepts in software engineering.

We will “learn-by-doing”; this will strengthen our understanding of the materials covered in the course. Class participation is highly encouraged to improve critical thinking and communication skills of students. Students will do a group project (5-6 people per group) following all the stages of the software development lifecycle. Students will: document software requirements, design software, implement code, and test the functionality of a software project.

Class Meetings

We will be meeting over on Zoom every **Tuesdays and Thursdayss from 5:00 pm to 6:15 pm Eastern Time.**

Zoom Link: **https://virginiatech.zoom.us/j/84994160324 (https://virginiatech.zoom.us/j/84994160324)**

Note: Students must be signed into Zoom using their Virginia Tech ID to join the link.

The Team

Instructor	Taha Khan, Adjunct Professor, Computer Science Department
Email	**tkhan@vt.edu (mailto:tkhan@vt.edu)**
Office Hours	Wednesday 1:00 pm to 3:00 pm, or by appointment
Zoom Link (Office Hours)	**https://virginiatech.zoom.us/my/tkhan50 (https://virginiatech.zoom.us/my/tkhan50)**

Graduate TA	Xiaoxiao Gan (XG)
Office Hours	Tuesday 10:00 am to 12:00 pm (Zoom), Thursday 1:00 pm to 3:00 pm (TORG 1120)
Zoom Link (Office Hours)	**https://virginiatech.zoom.us/j/3425097338 (https://virginiatech.zoom.us/j/3425097338)**

Graduate TA	Tianjia Wang (TW)
Office Hours	Monday 1:30 pm to 3:30 pm (TORG 1120), Friday 1:00 pm to 3:00 pm (Zoom)
Zoom Link (Office Hours)	**https://virginiatech.zoom.us/j/2215733276 (https://virginiatech.zoom.us/j/2215733276)**
Undergrad TA	Yasir Hassan (YH)
Office Hours	Monday, Wednesday 10:00 am to 12:00 pm (TORG 1120), Friday 10:00 am to 12:00 pm (Zoom)
Zoom Link (Office Hours)	**https://virginiatech.zoom.us/j/89672974345 (https://virginiatech.zoom.us/j/89672974345)**
Undergrad TA	Tanay Khopey (TK)
Office Hours	Monday 11:30 pm to 1:30 pm (TORG 1120), Wednesday Thursday 2:00 pm to 5:00 pm (Zoom), Friday 1:45 pm to 4:45 pm (Zoom)
Zoom Link (Office Hours)	**https://virginiatech.zoom.us/j/8255587692 (https://virginiatech.zoom.us/j/8255587692)**

TA Office Hours Summary

Monday	Tuesday	Wednesday	Thursday	Friday
TW, YH, TK	XG	YH, TK	XG, TK	TW, YH, TK

Course Objectives

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

- Identify and document requirements for a specified problem space using techniques such as use case modeling and user stories.
- Identify the role risk plays in developing software and ways to manage that risk through software engineering.
- Develop an appropriate design that meets the requirements identified using software engineering techniques and processes.
- Work effectively in a team environment to design, develop, implement and test a working software system.
- Articulate and defend the software engineering choices made in a design and implementation.

Course Topics

During this course we will cover the following software design topics:

- Software engineering processes
- Requirement analysis
- Security and environment
- Software design
- Architecture styles
- Design patterns
- Unified Modeling Language
- Software testing
- Software maintenance
- SE research topics

Course Prerequisites

This course does have prerequisites. Students who have not completed the required prerequisites may not get credit for the course:

- CS 2114 Data Structures and Algorithms (Min Grade: C)

Course Materials

These are the "*required"* textbooks for this course:

- Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, 8th Edition. McGraw Hill, 2005. (PRE) ISBN: 978-0078022128 **(PDF Version) (https://canvas.vt.edu/courses/204890/files/37344509/download?download_frd=1)**
- Kenneth Rubin: *Essential Scrum: A Practical Guide to the Most Popular Agile Process,* (RUB)ISBN: 978-0321700407 (Link to VT Library eBook version: **https://learning.oreilly.com/library/view/-/9780321700407/ (https://learning.oreilly.com/library/view/-/9780321700407/)**
- Craig Larman, *Applying UML and Patterns: An Introduction to Object-oriented Analysis and Design*, 3rd Edition, Prentice Hall, 2005 (LAR) ISBN: 978-0131489066 **https://learning.oreilly.com/library/view/applying-uml-and/0131489062/ (https://learning.oreilly.com/library/view/applying-uml-and/0131489062/)**
- Ross J. Anderson: *Security Engineering: A Guide to Building Dependable Distributed Systems*, 2nd edition (AND) ISBN: 978-0470068526 (Available here: **http://www.cl.cam.ac.uk/~rja14/book.html (http://www.cl.cam.ac.uk/~rja14/book.html)**)
- Eric Freeman; Elisabeth Robson, *Head First Design Patterns, 2nd Ed,* O'Reilly Media, 2020 (HF) (Link to VT Library ebook version: **https://learning.oreilly.com/library/view/-/9781492077992/**

(https://learning.oreilly.com/library/view/-/9781492077992/)

There will be additional **Supplemental Readings** (https://canvas.vt.edu/courses/204890/pages/supplemental-readings) from time to time during the course.

What does "*required*" textbook mean? It means that you need to have access to the book, not necessarily that you buy it. I understand that textbooks are hideously expensive, but these books are staples in the field. If you can, I encourage you to get copies of both Larman and Pressman. You will use them as a reference for years to come. Otherwise, buy used or rent the text from a service like Amazon. Regardless, make sure to get the correct editions as listed above.

Alternatively, as students, you have access to the **Safari Online book database** (https://learning.oreilly.com) to which VT Libraries subscribes. Most of our books are available there. Just login create an account with your vt.edu email address.

Course Website: We will be using the Canvas system to provide the course website this semester. Among other things, it will be used for:

1. Course syllabus (this document) and staff information (office location, office hours, etc.)
2. Course notes.
3. Assignments and project deliverables.
4. Course Communications: We will use Piazza for discussions, linked from Canvas.
5. Grades: All grades and assignment feedback will be returned via Canvas.

Assessment and Grading

Complete descriptions and instructions for completing assessments will be provided when an assignment is made. Dates for the assignment of an assessment and due dates for assessment completion will be indicated on the course schedule.

Group Project: A semester-long group project where you will work with a group of your peers to address a software design. There will be a number of deliverables along the way. Unless otherwise specified, all project deliverables are due **on the due date**, at the **scheduled time** as indicated in Canvas.

Quizzes: Quizzes on the material we talk about throughout the semester

Discussions: I will post items about software engineering topics from time to time. You are expected to read the item and comment based on your application of the material we have covered in class to the topic, in a clear, cogent and compelling manner.

Examinations: A final examination will be given.

Grading Scheme:

Presentations/Quizzes/Discussions: 20%
Group Project: 65% (broken up across multiple deliverables)
Final: 15%

Final Grades: All assignments receive a numeric grade. Each assignment grade will be weighted depending on its classification. For example, the sum of all of your project deliverables will be weighted as 65% of your final grade. Final grades will be based on raw score and class distribution. I may curve final grades, but I will only curve up. *Individual assignment grades will not be curved.* Your final grade score will be converted to a letter grade using the standard VT grading scale:

Grading Scale

A	93.3%–100%	**A-**	90.0%–93.3%	**B+**	86.6%–90.0%	**B**	83.3%–86.6%
B-	80.0%–83.3%	**C+**	76.6%–80.0%	**C**	73.3%–76.6%	**C-**	70.0%–73.3%
D+	66.6%–70.0%	**D**	63.3%–66.6%	**D-**	60.0%–63.3%	**F**	00.0%–60.0%

I don't curve individual assignment grades. Depending on the final distribution of numeric scores — at the end of the term — a slight adjustment may be applied, only to ensure that students with nearly identical numeric scores will receive the same letter grade. This can potentially **increase** (and never decrease) your letter grade.

Special Accommodations

If any student needs special accommodations because of any disabilities, please contact the instructor during the first week of classes. Such students are encouraged to work with **The Office of Services for Students with Disabilities (https://www.ssd.vt.edu/)** to help coordinate accessibility arrangements.

Academic Integrity

All students must abide by all aspects of the Honor Code. Please review the Syllabus as well as the Honor System site regarding expectations, rights, and responsibilities specific to the Honor Code. *Unless otherwise stated,* all graded work submitted during this course must be the student's (or the groups) ***entirely original and individual work***. For group work, a violation of the Honor Code by one member may be considered a violation by the group. This course has a zero-tolerance 100% enforcement policy for academic dishonesty, including cheating, plagiarism, and copyright violations. Academic dishonesty may be discovered through any means, automated or otherwise. If you have a question, please ask before rather than after.

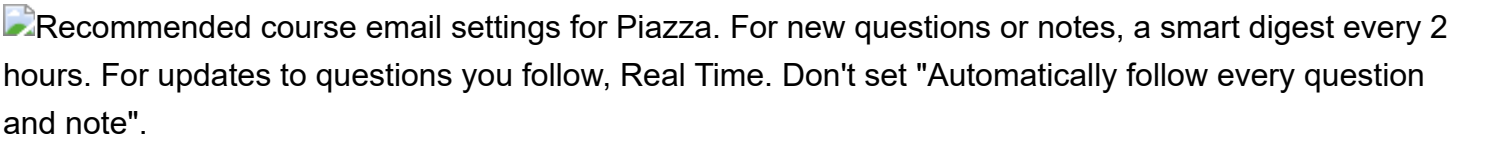
Conduct

The instructors and all students are expected to adhere to Virginia Tech Code of Conduct, including but not limited to those addressing conduct and professionalism. It is expected that all participants in this course will conduct themselves as professionals, and will support and contribute to each other and our learning community in a respectful manner.

Communications

In order to stay connected and engaged in this class, it is expected that there will be a great deal of interactivity among students, and between the instructor(s) and students. Course communications will take place primarily on Piazza, including course announcements. Instructor email address(es) will be provided, but the preferred method of contacting an instructor is via Piazza. If a student has a private concern, the student should select the option to post to "Instructors" (rather than "Entire Class") in Piazza. If email must be used – such as during an outage of Piazza – students are required to use their vt.edu email accounts. Email from any other sources may be blocked or delayed.

Make sure you have your Canvas and Piazza notifications set rationally. Having Piazza deliver you a digest of the postings each week won't be terribly helpful. This option can be set on a per-course basis in the "Account/Email settings" behind the "gear" menu in the upper right in Piazza. I recommend :


Recommended course email settings for Piazza. For new questions or notes, a smart digest every 2 hours. For updates to questions you follow, Real Time. Don't set "Automatically follow every question and note".

In Canvas, you can also set preferences for mail/notification delivery. These are in the "Notifications" menu option in the "Account" left menu option. I would suggest immediate for announcements, grades, and the like, and daily for other categories. I would not suggest "weekly" for any of the options.

Questions

Students are expected and encouraged to ask as many questions as necessary within Piazza and/or the Q&A sessions to successfully complete the course requirements. Additionally, students should feel free to answer their classmates questions. When answering questions, it is fine to discuss approaches ("In this scenario, use onViewCreated() instead of onCreateView()"), but don't provide code.

Piazza questions directed to instructors only that are related to the course materials might be shared with classmates, at the discretion of an instructor (with redaction as needed) so that other students may benefit from the discussion.

Every effort will be made to respond to questions within 8 hours on weekdays, and 24 hours on weekends or holidays.

Honor Code

The Virginia Tech Honor System rules apply to this and every course. Students enrolled in this course are responsible for abiding by the Honor Code. A student who has doubts about how the Honor Code applies to any assignment is responsible for obtaining specific guidance from the course instructor before submitting the assignment for evaluation. Ignorance of the rules does not exclude any member of the University community from the requirements and expectations of the Honor Code. For additional information about the Honor Code, please **visit the Honor System site (https://honorsystem.vt.edu/)** .

You may:

- Offer or ask for assistance, as long as it is done within our course forum.
- Use code from instructors as provided as part of an assignment.
- Backup your work in a private repository accessible only by you.
- Perform searches regarding general topics of interest or ungraded aspects of the course.
- Use code from outside sources (ex: StackOverflow) so long as you provide a reference for where the code comes from.

You may NOT:

- Use generative AI for the completion of assignments
- Offer or ask for any assistance outside of our course forum. (ie post on StackOverflow/Chegg/etc asking about how to do your assignment, or asking someone to complete it)
- Use code from any source outside of our course forum, assignments, or materials without providing a complete reference for where the code comes from.
- Allow your code to be accessible by any other student (former, current, or future).
- Perform searches regarding specific questions on any graded assignments (ie dropping the exact text for a quiz question into google or a GenAI tool and using the results to create your answer.

The above examples are meant to be illustrative, not exhaustive. If you have any questions at all about what is or isn't acceptable, please contact the faculty. Note that all work submitted for this course is archived and subject to both manual review and automated mechanisms to detect cheating and plagiarism.

Special Accommodations

We strive to ensure that every aspect of this course is accessible to all students. If you have any special accessibility needs, or require additional accommodations, please notify the instructors during the first week of the semester, or as soon as you become aware of your needs.

Students seeking accommodations based on disabilities should register themselves with **Services for Students with Disabilities (https://ssd.vt.edu/)** and request a formal accommodation.

Accessibility Policies

The accessibility policies for the primary web sites used in the course are as follows:

- **Canvas Accessibility Policy (https://www.instructure.com/canvas/accessibility)**
- **Piazza Accessibility Policy (https://piazza.com/product/accessibility)**
- **Zoom Accessibility Policy (https://zoom.us/accessibility)**

Course Policies

Academic Support: I encourage any student requiring academic support to come to talk to me at any time, and to investigate the options offered by the Office of **Academic Affairs (http://www.undergraduate.provost.vt.edu/index.html)** .

Attendance/Participation: Attendance is required. Your participation in class is for your benefit as well as for your classmates. Come to class prepared to discuss the readings/notes assigned for the day. Additionally, there are often activities in class related to the group project that you will require your presence. There may also be material that is covered in class that may not be in the notes. Students are responsible for all materials covered in class, including the materials presented by your colleagues. Pop-quizzes may be used in class may be used to encourage attendance.

Illnesses: Illnesses during the semester happen. If you have an illness that makes you miss an exam or delays submitting an assignment, let me know **BEFORE THE EXAM OR SUBMISSION DUE DATE**. Reasonable accommodations will be made.

Hardware/Software Usage: You must have access to a reliable computer for this course. Remember to back up your work early and often. "My hard drive crashed" is not an acceptable excuse for not turning your work in on time.

Neatness, Legibility, and Professionalism in Submitted Work: The ability to express ideas in a clear, cogent, compelling, **and concise** manner, and to present these ideas in a **highly-legible format**, is of paramount importance in the CS profession. **Marks will be deducted** if

- *homework is not properly identified* (name, course, assignment name, date). (See notes on Homework Submission below)
- *professionalism is lacking*, e.g., page formats are not consistent, diagrams not labeled, page numbers missing, etc.

When you submit your deliverables, they should look like they came from one person, not a group of people that copy and paste whatever they felt like in the doc. You may use whatever tools you like so long as the output is neat, easy to read, and professional. I suggest that you select a set of tools with your group.

Assignment submissions: Homework/project assignments must be submitted **electronically *by the due date and time as indicated in Canvas***. Remember that your clock and Canvas' clock may be different, so plan accordingly. Also, if the assignment is due at 5:00 PM, that means 5:00:00 PM. Canvas treats 5:00:01 as late, so again, plan accordingly.

Assignments must be submitted in **PDF** format unless otherwise noted.

- Assignments more than 24 hours late will not be accepted (score of zero recorded).
- Accepted late assignments will be penalized as follows: first infraction: **25%** (of marks *awarded*), second infraction: **50%**, third and subsequent infractions: **100%** (i.e., score of zero).

If you are unable to complete/submit an individual assignment due to extenuating circumstances (e.g., medical, family emergency, alien invasion, zombie apocalypse), you must contact me within three days of when the situation has been resolved. A score of zero will be recorded after that interval.

Note that for group deliverables, I doubt there is a scenario where no one will be unable to submit. That is part of working as a group. Thus, there will be no extensions for group assignments without a prior discussion with the instructor, and even then, it is unlikely an extension will be granted.

When you have read the syllabus, send me a private Piazza message with a picture RDML Grace Hopper, USN (Ret), and a brief description of the common computer science term attributed to her. Consider this your first pop quiz. You have until 3:45 PM on Wednesday, 22 Jan to send me the message.

Make-Up Exams and Exam Change of Date Requests Make-up examinations will be given ONLY if a legitimate, documented excuse exists (personal sickness, family emergency, or university-scheduled trip). Additionally, the excuse and supporting documentation must be provided to the instructor either **prior to** the examination date (preferable) or no more than **three days after** you are back on campus.

Final exam date changes will only be entertained if 3 exams with 24 hours, and you have formally filed to have an exam changed with the College. Note the deadline for having an exam rescheduled is typically three weeks before exams. Requests made afterward will not be entertained.

Return of Graded Items: Every effort will be made to return graded items within 7 days of the due date.

Re-Grades: Homework assignments and exams are graded thoroughly and with great care. If you feel a grading error has been made, however, you can submit the item for re-grading by:

- discussing in person with the TA who completed the grading, during the TA's office hours.
- discussing in person with the Instructor during office hours (or other agreed-upon time).
- submitting a written re-grade request, clearly explaining what you feel was graded incorrectly and why, and what you believe should be done. **The re-grade request must be made as a COMMENT WITHIN CANVAS TO THE ITEM TO BE REGRADED.**

In either case, the request must be made within **three days of the date the work was returned in Canvas**. Adjusted scores shall be considered final. Note that the Instructor reserves the right to re-

grade the entire assignment, which may result in a **lower** grade than was initially achieved.

Course Summary:

Date	Details	Due
Fri Jan 24, 2025	Setting up Code VT (https://canvas.vt.edu/courses/204890/assignments/2326768)	due by 11:59pm
Mon Feb 3, 2025	Deliverable 1: Form a Group & Pick a Topic (https://canvas.vt.edu/courses/204890/assignments/2355356)	due by 11:59pm
Tue Feb 4, 2025	Discussion Activity 02/04 (https://canvas.vt.edu/courses/204890/assignments/2357694)	due by 6:15pm
	Quiz 1: Intro and Project Management (https://canvas.vt.edu/courses/204890/assignments/2326752)	due by 11:59pm
Thu Feb 20, 2025	Deliverable 2: Product Vision/Roadmap (https://canvas.vt.edu/courses/204890/assignments/2326757)	due by 11:59pm
Fri Feb 28, 2025	Quiz 2: Use Cases in HokieSpa (https://canvas.vt.edu/courses/204890/assignments/2326750)	due by 11:59pm
Wed Mar 19, 2025	Deliverable 3: Sprint 1 Report (https://canvas.vt.edu/courses/204890/assignments/2326758)	due by 11:59pm