Course Syllabus

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CS-5704-MIT Fall 2020 Syllabus

Course: CS-5704 | Software Engineering
Instructor: Gregory Kulczycki (Dr. K)
Contact: The best way to contact me is via Piazza. Note that can post private messages on Piazza, but unless the message has personal information, please post public messages. My VT ID is gregwk.
Office Hours: Office hours will be held by request via Zoom.

Course Description

The course involves the study of the principles and methodologies applicable to the development and controlled evolution of complex software systems. Principles and methodologies for all phases of the life cycle are presented. Various process models are introduced, including both prescriptive and agile models. Particular attention is focused on all aspects of software design, including component design, refactoring, design patterns, and user interface design.

Course Objectives

Upon completion of the course, students will be able to do the following.

1. Distinguish between programming and software engineering.
2. List the major activities in the software life cycle and identify the actions the take place within each activity.
3. Explain how two different process models are similar and how they are different.
4. Recognize instances of bad design and describe how to improve upon them.
5. Diagram the requirements, flow of operations, objects, and/or the state of a program using the Unified Modeling Language.
6. Redesign a poorly designed software program – without affecting the functionality of the program – so that it exhibits good design.
7. Employ well-known design patterns among multiple components to achieve a working program.
8. Verify that a program performs correctly by using unit tests.
9. Complete a trace of programming code that demonstrates how the state changes from the beginning to the end of the code.

Course Structure

The course will be held entirely on-line. Each week, students are expected to do the following.

- Listen to the recorded lectures

- Do the reading assignments
- Participate in online discussions
- Take ungraded practice quizzes
- Work on programming assignments (if any)
- Complete required assessments (if any)

Live Q&A Sessions

Live, online Q&A sessions will be held on Zoom every Monday at 8pm. Attendance will *not* be mandatory. However, if you cannot attend, it is mandatory to view the recording of the Q&A session.

Course Requirements

Prerequisites

The prerequisite for this course include a graduate-level proficiency in English and a basic understanding of an object-oriented language such as Java or C#. Programming assignments will use Java. Completion of CS 5044 is required for MIT students.

Primary Text

Software Engineering: A Practitioner's Approach, Ninth Edition by Roger Pressman and Bruce Maxim.

Additional Texts

In addition to the Pressman book, we will have readings from a variety of other sources, all of which are available online. These include – but may not be limited to – the following.

- **The Mythical Man-Month** (https://learning.oreilly.com/library/view/mythical-man-month-the/0201835959/) by Fred Brooks.
- **Fact and Fallacies of Software Engineering** (https://learning.oreilly.com/library/view/facts-and-fallacies/0321117425/) by Robert Glass.
- **Agile Principles, Patterns, and Practices in C#** (https://learning.oreilly.com/library/view/agile-principles-patterns/0131857258/) by Micah and Robert Martin.
- **UML Distilled (3rd edition)** (https://learning.oreilly.com/library/view/uml-distilled-a/0321193687/) by Marin Fowler.
- **Effective Java (3rd edition)** (https://learning.oreilly.com/library/view/effective-java-3rd/9780134686097/) by Joshua Bloch.
- **Head First Design Patterns** (https://learning.oreilly.com/library/view/head-first-design/0596007124/) by Eric Freeman et al.
- **Applying UML and Patterns (3rd edition)** (https://learning.oreilly.com/library/view/applying-uml-and/0131489062/) by Craig Larman.

Technology

Working and reliable computer and Internet access is required as well as access to **Canvas** (https://tlos.vt.edu/NextGenerationLMS/) and **Zoom** (https://virginiatech.zoom.us/). For the programming assignments, installation of the latest version of **Eclipse** (http://www.eclipse.org/downloads/packages/eclipse-ide-java-developers/marsr) or **NetBeans** (http://www.oracle.com/technetwork/articles/javase/jdk-netbeans-jsp-142931.html) is highly recommended and may be required for some assignments. Some assignments will be submitted via **Web-CAT** (https://web-cat.cs.vt.edu/Web-CAT/WebObjects/Web-CAT.woa). Occasionally you will have viewing assignments for screencasts on **LinkedIn Learning** (https://www.linkedin.com/learning). **Piazza** (https://piazza.com/) will be used for the Q&A discussions, and Canvas will be used for the weekly discussion topics.

Participation

Students should expect to spend about eight hours per week involved in the activities and completion of assignments for this course. If exceptional circumstances prevent the timely completion of any assignment, students should contact the instructor in advance and not after the completion date has passed.

Expectations

In the first week of class, students will be asked to sign the expectations document. It outlines the expectations of the instructor and the students in an online environment.

Honor Code

All students are bound by the **Graduate Honor Code**. Please see the code for specific information regarding expectations and policies.

Assessments and Grading

The grade for this course is based on the following assessments. The points in each section are subject to change, but they will not change by a lot. The midterm and final exams will be online.

Midterm Exam	50 points
Midterm Essay	10 points
Final Exam	100 points
Project 1 - Refactoring	50 points
Project 2 - Components	50 points
Project 3 - Presentation	50 points
Project 4 - Design Patterns	50 points
10 Discussion Boards	40 points

Admin Assignments	10 points

Communication and Discussions

As this course is asynchronous, discussion boards will be the primary way we communicate. We will use Canvas for some types of discussion and Piazza for others. We will have the following discussion boards.

Canvas Discussion Boards

- **Introductions Forum** – This forum will be open for reading the entire semester, but if you would like to introduce yourself (highly recommended), please post to within the first week or so of class.
- **Graded Discussions** – There will be 10 of these discussion boards worth 4 points each (approximately one per week). When they open, you will have one week to make at least one post to the discussion. If you make a post in the time limit, you will receive 4 points; if you do not, you will receive 0 points. **So make sure you post!** There will be suggested topics, but you can also choose your own as long as it is relevant to the material we covered that week. Posts should be non-trivial: at least a couple sentences and not just saying something like "I agree with Jane. She seems smart." Replies to other people's posts are also considered posts. At the end of the week, please read through the discussions and see what other people said. If there is a particularly interesting conversation, I may put a question about it on one of the exams.

Piazza Discussion Boards

- **Assignment Discussions** – Piazza is really made for question-and-answer style forums. Typically assignment discussions are very active, so make sure you read these, especially if you are having difficulty with your assignment! The rules for these forums are that you can ask – and answer – general questions, but you cannot give direct solutions to questions or problems. Usually, there is no problem with this as long as you follow this simple rule: **Do not post code!**
- **Exam Discussions** – There will be a midterm and a final exam and discussion forums for these. Typically, the exams are self-explanatory so there is not a lot of discussion in these during the exam. However, once the exams have been completed, students may ask about a particular question and why it was graded one way instead of another.
- **Other Discussions** – Syllabus Q&A, Tools & Technology Q&A, and possibly more as the course progresses.

Netiquette

Please follow these simple rules to make online communication easier for everyone.

- If you have a question regarding an assignment, please post it to the appropriate discussion board. I will monitor these discussion boards, but if you do not get a satisfactory response there in an appropriate amount of time, feel free to email me at gregwk@vt.edu.
- Please be respectful in all correspondence in this course. In particular, refer to the **Core Rules of Netiquette (http://www.albion.com/netiquette/corerules.html)** for general guidelines of proper

behavior.

- When making a post or sending an email, please sign the email with your first name (or what you prefer to be called) so that others know whom they are talking to. It is not always apparent from your email address.
- I will send out announcements through Canvas periodically. These will go to your VT email address, so make sure you monitor it.

Course Support

Technical Support

The instructor for this course does not provide technical support. For technical support assistance regarding any problems with Canvas, **please use the "Help" button** of Canvas that you see on the left sidebar. This will take you to the Canvas help folks, who will coordinate with VT if needed. For help with Zoom or e-mail, contact VT's 4Help center by using the **Help Request Form** **(http://4help.vt.edu/)** or by calling (540) 231-HELP (4357).

Accessibility

Presentation recordings will either be captioned or scripts will be available on request. Please note that this may not apply to recorded Q&A sessions or quick video notes made by the instructor. Documents and online reading material will be in a format where copying text is available.

Privacy

The privacy policies for the technologies we used can typically be found on their respective websites.

- **Canvas privacy policy** **(http://www.canvaslms.com/policies/privacy)**
- **Piazza privacy policy** **(https://piazza.com/legal/privacy)**
- **Virginia Tech's privacy policy** **(http://www.vt.edu/about/privacy.html)** (for tools such as Web-CAT)

Accommodations for Special Needs

Any student who has been confirmed by the University as having special needs for learning must notify the instructor in the first week of the course. For more information please go to **http://www.ssd.vt.edu/** **(http://www.ssd.vt.edu/)** .

Academic Support Services

Any student requiring academic support should investigate the University's services at **https://graduateschool.vt.edu/academics/what-you-need-to-graduate/academic-support-resources.html** **(https://graduateschool.vt.edu/academics/what-you-need-to-graduate/academic-support-resources.html)** .

For complete information on student services at Virginia Tech, please see **http://www.dsa.vt.edu/students.php** **(http://www.dsa.vt.edu/students.php)** .

Schedule

The **course schedule** give an outline of the course and project, and contains links to the respective modules.

Course Summary:

Date	Details	
Fri Nov 29, 2019	VT SPOT (https://canvas.vt.edu/calendar?event_id=515004&include_contexts=course_115592)	12am
Fri Apr 24, 2020	VT SPOT (https://canvas.vt.edu/calendar?event_id=515003&include_contexts=course_115592)	12am
Sun Aug 30, 2020	Assignment 0 (Message) (https://canvas.vt.edu/courses/115592/assignments/963299)	due by 11:59pm
	Expectations Document (https://canvas.vt.edu/courses/115592/assignments/963300)	due by 11:59pm
Tue Sep 1, 2020	Discussion - Software Engineering (https://canvas.vt.edu/courses/115592/assignments/963298)	due by 11:59pm
Sun Sep 20, 2020	Project 1 - Refactoring - Summary (https://canvas.vt.edu/courses/115592/assignments/963305)	due by 11:59pm