ECE 651 Software Engineering
Spring 2019
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Course webpage: http://adhilton.pratt.duke.edu/ece-651

Textbook

There is no textbook for this class. We will periodically mention some well-known books in the field—reading any of these is entirely optional.

Class Format

We expect lively and active participation of all students in class time (and as described below, participation will be part of your grade!). The professors will present material on a variety of software engineering topics (testing, design, etc)—but you are expected to think critically, and ask and answer questions.

Topics

This course will cover generally the following topics:

- Design principles
- Software Development Process
- Task breakdown + work estimation
- Review of black and white box testing
- Mutation testing
- Design patterns
- Code smells and refactoring
- Technical debt
- Software teamwork
- Continuous Integration/Continuous Deployment
- Testing stubs/spies/mocks
- Different scales of testing: Unit, Integration, System
- Model/View/Controller paradigm

- UI/UX
- System architecture
- Security (introduced from a software engineering perspective)
- Other topics as appropriate and time permits

Assignments and Grading

Your grade for this course will be comprised of four components:

- Class Participation: 5%
- Individual Programming Assignment 1: 9%
- Individual Programming Assignment 2: 9%
- Team Project Evolution 1: 10%
- Team Project Evolution 2: 10%
- Team Project Evolution 3: 15%
- Project Presentations: 7%
- Midterm Exam: 15%
- Final Exam: 20%

Late Policy

For all programming assignments (individual and team), the late penalty is based on when you request late days and how many you request. Asking for a late day earlier has less penalty than asking at the last minute. The following table shows the marginal (additional) cost of each late day.

	Days after assignment released													
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
1^{st} late day	3	4	5	6	7	7	8	8	9	9	10	10	11	11
2^{nd} late day	6	8	10	12	13	15	16	17	18	19	20	21	22	22
3^{rd} late day	9	13	16	18	20	22	24	25	27	28	30	31	32	34
4^{th} late day	12	17	21	24	27	29	32	34	36	38	40	42	43	45
5^{th} late day	15	21	26	30	34	37	40	42	45	47	50	52	54	56
6^{th} late day	18	25	31	36	40	44	48	51	54	57	60	62	65	67
7^{th} late day	21	30	36	42	47	51	56	59	63	66	70	73	76	79

Examples:

- 3 days after the assignment is released, you realize that you need 2 late days. You look in the column for 3 days after the assignment is released and see the first late day will result in a penalty of 5 points, and the second will result in a penalty of 10 points. The total penalty for these 2 late days is 15 points.

- 14 days after an assignment is released, you realize you have managed your time badly and need 3 more days. You ask for 3 late days 14 days after release. You look at the 14 days after release column, and see that these days cost 11, 22, and 34 points respectively. The total penalty for these 3 days would be 67 points (note that if you had asked for them 1 day after, they would have only cost a total of 18 points).

- The day after the assignment is released, you plan your work carefully and realize that you need 1 extra day. You request 1 late day, for a cost of 3 points. 4 days later (on day 5), you realize that your team has fallen horribly behind schedule and you will need one more day. You now have one late day requested on day 5 and one requested on day 1. You look at row 1, column 5 for one day and see that it costs 7 points. You look at row 2, column 1 for the second day, and see that it costs 6 points. The total penalty is 13 points.

Please note that this policy applies to circumstances in which you do not manage your time well and/or find the assignment takes longer than expected. In extenuating circumstances, you should talk to your professor as soon as possible to make appropriate accommodations. Extenuating circumstances are things such as long term illness/hospitalization, extensive official work-related travel, religious holidays, or other circumstances generally beyond your control.
Final letter grades are assigned based on the following scale (with slight modification as described below):

A-range	>97 A+	93–97 A	90–93 A-
B-range	87–90 B+	83–87 B	80–83 B-
C-range	77–80 C+	73–77 C	70–73 C-
F	<70 F		

Before assigning letter grades, we *may* alter the scale by lowering the threshold for a certain grade (e.g., making a B- span 79.5–83 instead of 80–83). Such a change is **solely at our discretion**, and occurs when the change results in a letter grade more accurately reflecting the quality of the students work and effort.

Academic Integrity

Academic integrity is very important, and misconduct will not be tolerated in this course. All students should already be aware of a few basic principles which govern academic integrity at Duke in general:

- I will not lie, cheat , or steal in my academic endeavors, nor will I accept the actions of those who do.

- I will conduct myself responsibly and honorably in all my activities as a Duke student.

If I suspect academic misconduct in my class, I will report you to the appropriate Associate Dean, who will carry out the required due process to determine if you committed academic misconduct. If you are found responsible for academic misconduct, I will give you a 0 on the corresponding assignment. The Associate Dean overseeing your case is likely to impose additional sanctions against you.

Some concrete expectations for how you will perform your work in my class:

Individual Programming Assignments

We expect you to produce all of the code that you write in the individual programming assignments yourself. Do not show your code to anyone else, nor look at anyone else's code. This includes any code directly related to the assignment that might be on the internet. You may look at general internet resources (*e.g.*, the API for a JSON library, examples of how to use the JSON library).

Ultimately, we expect that you will (a) learn from the experience and (b) produce code reflective of *your own* capabilities as a programmer.

Team Programming Assignments

For the team project, you are expected to work in a team of 3 students. We expect you to work together, and have one code base to which you all contribute. We expect that your team will keep its work private from other teams, and will not look at the work done by other teams.

You should think of each team as its own company, and that you must not infringe on the IP of any other team ("company") nor any outside parties. This constraint means that you are welcome to use open source libraries, but should not steal code from other parties.

Exams

Exams are expected to be entirely individual effort. You may bring **one page of notes** to the exam. You must keep your eyes on your own paper.

Class Participation

Class participation is graded, but has no constraints related to academic integrity. We expect a full and open discussion. Of course, if you have questions or comments, we encourage you to direct them to the full class so that everyone can discuss the point together.

Lying

Lying to any University official (including faculty) is a serious offense under any circumstances. Lying during the course of an official investigation is particularly serious. If you are suspected of academic misconduct, and lie to anyone conducting the investigation, you will face additional charges.

Other

If you are unsure if something is OK, please ask me. If you do not want to ask me because you think I will probably say "no," that is a good indicator that it is not acceptable.

If you do something wrong and regret it, please come forward. I recognize the value and learning benefit of admitting your mistakes. You should not take this to mean that coming forward of your own volition will absolve you of all consequences, just that it can be taken into account in reducing the sanctions.

If you are aware of someone else's misconduct, please report it to me or another appropriate authority.

Students Needing Special Accommodations

Duke University is committed to providing equal access to students with documented disabilities. Students with disabilities may contact the Student Disability Access Office (SDAO) to ensure your access to this course and to the program. There you can engage in a confidential conversation about the process for requesting reasonable accommodations both in the classroom and in clinical settings. Students are encouraged to register with the SDAO as soon as they begin the program. Please note that accommodations are not provided retroactively. More information can be found online at access.duke.edu or by contacting SDAO at 919-668-1267, SDAO@duke.edu.

Emergencies

Though very unlikely, there is always a possibility that there might be some type of emergency while we are in this classroom this semester. Emergencies come in many different forms, and different levels of severity—such as Duke closing for an imminent snowfall, or a need to seek immediate cover from a tornado.

In most cases, you will receive a DukeALERT notification by email and text if there is an emergency situation on campus, and you may also hear the outdoor sirens. If you see that I am not aware of an emergency situation at any point during our class—before, during or after class, please stop me and do what you can to make me aware. It is very important that I am aware.

If you need more information about emergency procedures at Duke, please see
`https://emergency.duke.edu/what-to-do/`