Course Overview

CS 4501 / 6501
Software Testing
Goals

• Become better testers
  • Understand and be able to create high-quality tests at all testing levels
  • Understand practical ways to design and automated high-quality tests
  • Understand how to apply theory (test criteria) in practical ways

• Become better programmers
  • Be aware of potential problems in software and able to create high-quality developer tests

• Become better engineers
  • Understand and be able to build programs and test them in a unified manner

• Become better thinkers
  • Understand and be able to approach software problem solving in logical, analytical ways
How Do We Get There?

• What is software testing?
• Why do we test software?
• When should we test software?
• Who should test software?
• How should we test software?
• When should we stop testing? Good enough?

• How many tests do we need to write?
• How do we choose test inputs effectively?
• How can we measure the quality of a test suite?
Course Topics

• Importance of Software Testing
• Testing in Practice
  • Testing activities: test design, test automation, test execution, and test evaluation
• Test Automation
• Test-Driven Development
  • Test harness
  • Testing in Agile process
• Test Coverage Criteria
  • Input space partitioning
  • Graph coverage
  • Logic coverage
  • Syntax coverage

Instead of how testing is done, we cover testing how it should be done and how it will be done
Prerequisite

- Discrete math, programming, data representation, and general knowledge of software engineering

- Java, syntax and semantics of multiple programming languages

- Software installation

- **Intent:** Prerequisites define what you need to know before taking a class **to success** in the class

- Not knowing that material means you are taking the class “**at risk**” – that is your responsibility

Please do not ask if you “can take the class without the prerequisites”
You **can**, but I have to advise **against** it
Logistics

- **Class URL:** [http://www.cs.virginia.edu/~up3f/swtesting/](http://www.cs.virginia.edu/~up3f/swtesting/)

- **Objective:** How to design effective tests

- **Readings:** Posted in schedule, please read before class

- **Textbook:**
  - **Solution** [https://cs.gmu.edu/~offutt/softwaretest/exer-student.pdf](https://cs.gmu.edu/~offutt/softwaretest/exer-student.pdf)

- **Video:** Recording lectures / class meetings ... depends on attendance

- **Guest speaker sessions:** Required attendance
Learning Activities

• **Quizzes:** Weekly, first 10-15 minutes of class
  • No makeups, 2 lowest grades dropped for unavoidable absences
  • Replaces traditional midterm exam

• **In-class exercise:** Weekly
  • No makeups, 2 lowest grades dropped for unavoidable absences

• **Homework:** Almost weekly, due at the beginning of class
  • 25% deduction for late submissions per day
  • Not accepted after 2 days past the due date

• **Showcase:** Choose one
  • Option 1: Test generation
  • Option 2: Position paper
  • Option 3: Digital media

• **Final:** Comprehensive closed-book/note, in class
Discussion Board Use

• This course uses Piazza
  • URL: https://piazza.com/virginia/fall2018/cs45016501/home
  • You should have gotten an invitation today
  • If not, check your UVA email or check with me

• Questions should be posted to an appropriate thread
  • Answered by instructor or TAs
  • Questions and answers available for all to see
Grading Policy

- Final exam: 20%
- In-class exercises: 20%
- Homework assignments: 20%
- Quizzes: 30%
- Showcase: 10%
CS 4501 vs CS 6501

• Level of difficulty
  • Homework
  • Quizzes
  • Final exam

• Extra credit
  • CS 4501 – do advanced homework problems given to 6501
  • CS 6501 – do research paper (also open to 4501 who are interested)