

SE 333/433 – Software Testing and Quality Assurance

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Summary of Course

This course is designed for the software engineering professional to gain a greater understanding of the key ingredients in creating and/or managing a successful testing program to meet project needs. Topics covered include test lifecycle planning, test design & coverage analysis, complexity, levels of testing such as unit, integration, system, performance, and stress testing. Best practice strategies in software testing such as verification & validation, early lifecycle testing, risk-based testing and automation will also be examined including exposure to test automation methods and tools.

Upon completion of this course, the student will be able to:

- Describe the value of software testing to a software development project
- Define white-box and black-box testing
- Describe static and dynamic testing
- Describe the importance of boundary conditions and equivalence partitioning
- Describe various coding standards and guidelines, and their role in software quality
- Describe the purpose of unit testing
- Describe the purpose of non-functional testing
- Describe various techniques for performing non-functional testing
- Describe the contents of a software test plan
- Define test design specifications, test cases, and test procedures
- Describe various tools for software testing, and software test automation
- Define the lifecycle for a software bug
- Describe how to track software bugs
- Describe how test-driven development can be used to capture and verify functional requirements
- Acquire software testing skills by designing, documenting, and executing test cases for several software systems

Prerequisites

This course has the following prerequisites that must have been successfully completed:

- SE 333: CSC 383 (Data Structures and Algorithms in Java) or SE 330 (Object Oriented Modeling) or CSC 301 (Data Structures II) is a prerequisite for this class.
- SE 433: CSC 403 (Data Structures II) is a prerequisite for this class.

Grading Policy & Scale

Course Grading:

Attendance	10%
Midterm	30%
Assignments	30%
Final	30%
Total	100%

Course Grading Scale:

A	93-100	C+	77-79
A-	90-92	C	73-76
B+	87-89	C-	70-72
B	83-86	D+	67-69
B-	80-82	D	60-66

Course Drop Dates

Please reference: <https://academics.depaul.edu/calendar/Pages/default.aspx>

Course Attendance

Attendance counts for credit in this course (10%). Live-class students are expected to attend *every* class session; OL students are expected to view the recording of the class *as soon as possible*, usually within 1-2 Days of the in-class meeting. (Online students will be given a means to verify that they have watched the recorded lectures).

Be advised that a significant amount of topic and assignment content is given in class/on recordings and missing that assistance can severely compromise your ability to perform adequately in this course.

Academic Integrity and Plagiarism

Refer to *Appendix A: "Course Academic Integrity and Plagiarism Policy"* for the full Academic Integrity and Plagiarism policy. It is every student's responsibility to familiarize themselves with this policy and to strictly adhere to its content.

Textbooks and Resources

There is no required textbook for this course. However, a series of readings will be assigned each week from a variety of sources. These assigned readings are not optional and should be read *before* the class meeting with which they are associated. As there is no textbook, reading the posted materials is critical to perform well in this course.

Course Grade Evaluation

Course grades are *solely* based upon the student's academic performance - *only* upon their performance on their assignments and quizzes and nothing else. No other factors (including requests for special grade consideration/adjustments, requests for extra credit, requests for altered due dates, and requests for any situation not specified in this syllabus) will be considered or responded to. **THIS POLICY WILL BE STRICTLY ENFORCED.**

Course Performance Requirements

All assigned materials are expected to be reviewed in a timely manner. The assignments and quizzes are designed so the student can master mobile application development topics, as well as ensure that the student leaves the course with a working knowledge of these concepts.

The dates/deadlines assigned to the various assignments and quizzes in this course are firm and will not be changed. There are too many students in the course to tailor the schedule to each student's desires.

Required Software

Successful participation in this course requires the following software:

- Office compatible tools to read/edit Word and Excel documents.
- IntelliJ IDEA with Java JDK 8 or greater
- Other open-source libraries and tools as needed.

Coursework

All assignments in this course must be completed in a timely manner. For full credit on a given assignment, it must be submitted on time.

Late assignments will be accepted up to 1 week with a 10% penalty. (i.e., turned in from 1 minute to 1 week late = 10% penalty). Note that NO LATE SUBMISSIONS are allowed after 1 week beyond the due date. *Note that NO LATE SUBMISSIONS are allowed at all for the last assignment in the quarter. THIS POLICY WILL BE STRICTLY ENFORCED.*

Note: Late submission of assignments will impact subsequent assignments due to their back-to-back timeframes. Submitting assignments beyond the stipulated deadline will reduce the available time for the succeeding assignments. This sequential effect emphasizes the importance of timely submission, ensuring ample time for all assignments.

Schedule of Topics

NOTE: Topic order and appearance are subject to change based upon actual class performance and instructor discretion.

Week 1 (Tuesday/Thursday)

- Introduction to Software Testing.
- Software Development Process.
- Software Testing axioms.
- Precision and accuracy.
- Verification and validation.

Week 2 (Tuesday/Thursday)

- Static and dynamic testing.
- White box, black box, and gray box testing.
- Static & Dynamic with Black Box & White Box
- Equivalence partitioning.

Week 3 (Tuesday/Thursday)

- Boundary value analysis.
- Decision table testing.
- Combinatorial Testing
- State-based testing.
- Risk-based testing.

Week 4 (Tuesday/Thursday)

- Types of Testing
 - Unit Testing
 - Integration Testing
 - Functional & System Testing
 - Acceptance Testing
 - Regression Testing
 - Beta testing

Week 5 (Tuesday/Thursday)

- Test Plan Development
- Planning and Documenting the Test Effort

Week 6 (Tuesday/Thursday)

- Test Plans
- Test Design Specifications
- Test Cases and Test Procedures

Week 7 (Tuesday/Thursday)

- Testing Non-functional Requirements
- Performance, Load, and Stress Testing
- Rollout Testing
- Security Testing
- Usability Testing

Week 8 (Tuesday/Thursday)

- Automated Testing
- Test Tools (JUnit)
- Software Test Automation
- Test Case Tracking and Reporting

Week 9 (Tuesday/Thursday)

- Bug Reporting
- Metrics
- Software Quality Assurance

Week 10 (Tuesday/Thursday)

- Topics in Software Testing

Changes to Syllabus

This syllabus is subject to change as necessary during the quarter. If a change occurs, it will be thoroughly addressed during class, posted under Announcements in D2L and sent via email.

Academic Policies

All students are required to manage their class schedules each term in accordance with the deadlines for enrolling and withdrawing as indicated in the University Academic Calendar. Students who withdraw from the course do so by using the Campus Connection system (<http://campusconnect.depaul.edu>).

Withdrawals processed via this system are effective the day on which they are made. Simply ceasing to attend, or notifying the instructor, or nonpayment of tuition, does not constitute an official withdrawal from class and will result in academic as well as financial penalty.

Student Guidelines

- Attend the live lecture (for live section students).
- Watch the lecture recording within 1-2 days of the live session (for “async” section students)
- Respond quickly and respectfully to any instructor emails.
- Always include the SE 333 or SE 433 course number in email subjects.

DePaul University is a community that thrives on open discourse that challenges students, both intellectually and personally, to be Socially Responsible Leaders. It is the expectation that all dialogue in this course is civil and respectful of the dignity of both students and instructors. Any instances of disrespect or hostility can jeopardize a student’s ability to be successful in the course. The instructor will partner with the Dean of Students Office to assist in managing such issues.

Students with Disabilities

Students who feel they may need an accommodation based on the impact of a disability should contact the instructor privately to discuss their specific needs. All discussions will remain confidential.

To ensure that you receive the most appropriate accommodation based on your needs, contact the instructor as early as possible in the quarter (preferably within the first week of class), and make sure that you have contacted the Center for Students with Disabilities (CSD) at: csd@depaul.edu.

Appendix A: Course Academic Integrity and Plagiarism Policy

1. Purpose and Scope

This Academic Integrity Policy is established to govern the ethical conduct of students in this course. The policy covers all aspects of academic work, including code development, quizzes/exams, and the use of artificial intelligence tools. It provides clear guidelines and consequences to maintain the integrity of the academic environment.

2. Plagiarism and Code Sharing

- a. **Plagiarism Definition:** Plagiarism is defined as presenting the work, ideas, or intellectual property of another person or entity as one's own. This includes, but is not limited to, the content listed in section "b" ("Prohibition") below.
- b. **Prohibition:** Students are strictly prohibited from engaging in any form of plagiarism, including but not limited to:
 - Using software code provided to you by someone other than your instructor in your assignments.
 - Sharing your own (or anyone else's) code with other students in this or any other course.
 - Using any part of previously submitted assignment work written by yourself or someone else.
 - Using or adapting code from online repositories or forums.
 - Using or adapting code generated by any form of AI tool/utility (see section 3).
 - Submitting code obtained from previous course offerings or external sources.
 - Using, rewriting, or in any way modifying code not originally written by yourself for this course.
 - Fabricating code, data, or results and presenting it as original legitimate work.
 - Using any unauthorized assistance when working on assignments or taking quizzes.
 - Taking quizzes in a group setting, or in any context where you obtain assistance from others.
 - Using any assignment or quiz materials from a previous semester.

3. Use of AI Tools and Automation

- a. **AI Tools Definition:** AI tools encompass any software or algorithmic system designed to automate or enhance aspects of coursework development, including but not limited to code generation, testing, and debugging.
- b. **Prohibition:** Students are prohibited from using AI tools to create or modify code that is submitted as their own work. Examples include:
 - Using AI code generators to produce content used in your assignment submission.
 - Using AI code assistants in an IDE to produce content used in your assignment submission.
 - Copying and pasting code generated by any AI tools.
 - Modifying AI-generated code and submitting it as your own work.

4. Individual Work and Collaboration

- a. **Authenticity of Work:** All submitted quizzes/exams, assignments, projects, and code must be the individual work of the student submitting them. There are no group projects in this course, and collaboration with another individual or entity on any course assignments or quizzes is prohibited. The submission of work completed by others, whether from current or previous course offerings, is strictly prohibited.
- b. **Collaboration:** Students are encouraged to discuss course concepts and assignment requirements. However, all submitted work must be the sole effort of the individual student. Collaboration in the form of sharing or jointly producing assignment materials (as outlined in this document) is strictly prohibited.

5. Academic Integrity Violation Detection

- a. **Plagiarism Analysis Tools:** Every submission through the D2L platform undergoes meticulous scrutiny via automated plagiarism detection tools. This evaluation extensively examines submitted code against the entirety of current and

previous course code submissions, as well as cross-references with online code repositories, actively identifying any utilization of AI-generated code. These robust tools serve to guarantee the genuineness and uniqueness of all submitted academic work.

6. Penalties for Violations

- a. **Investigation:** Suspected violations of academic integrity will be thoroughly investigated as detailed in DePaul University's Academic Integrity Policy (<https://offices.depaul.edu/academic-affairs/faculty-resources/academic-integrity/Pages/resources.aspx>).
- b. **Penalties:** Penalties for violations may include, but are not limited to, receiving a grade of zero for the assignment, project, or exam, and potential course failure. Serious or repeated violations may result in academic sanctions, including suspension or expulsion. See DePaul University's Academic Integrity Policy (<https://offices.depaul.edu/academic-affairs/faculty-resources/academic-integrity/Pages/resources.aspx>) for more information.

7. Reporting and Confidentiality

- a. **Reporting:** Students, TAs, and graders are encouraged to report suspected violations promptly. Reports will be treated confidentially, and the identity of the reporting party will not be disclosed without consent.

By enrolling in this course, students acknowledge their understanding and acceptance of the terms outlined in this Academic Integrity Policy. Any violation of these terms may result in academic and disciplinary consequences as outlined in this policy and the institution's broader academic integrity framework.

Please note, your attendance in this course beyond the first day will constitute an implicit confirmation that you have thoroughly read and understood this entire document and agree to all content herein.