SE 333/433 – Software Testing and Quality Assurance
Course Instructor: Christopher Hield
Course Email: chield@depaul.edu -or- christopher.hield@gmail.com

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:

- 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

You must have taken the following:

- For SE 333: CSC 383 (Data Structures and Algorithms in Java) or SE 330 (Object Oriented Modeling) or CSC 301 (Data Structures in Java II)
- For SE 433: CSC 403 (Data Structures II)

Grading Policy

Course Grade Evaluation:

Midterm	30%
Assignments	40%
Final	30%
Total	100%

Grading Scale

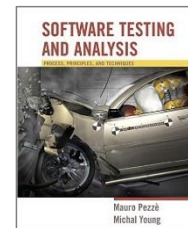|					
A:	100 > total >= 93	B-:	83 > total >= 80	D+:	70 > total >= 67
A-:	93 > total >= 90	C+:	80 > total >= 77	D :	67 > total >= 63
B+:	90 > total >= 87	C :	77 > total >= 73	D-:	63 > total >= 60
B :	87 > total >= 83	C-:	73 > total >= 70	F :	60 > total

Course Attendance

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. A failure to do so will in no way excuse poor course performance.

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

Textbook Resources

- **Required Course Textbook:**
  - *Software Testing and Analysis: Process, Principles and Techniques*, by Mauro Pezze, Michal Young, Wiley, April 2007.

    Assigned readings will come from this text.

Course Performance Requirements

Course grades are *solely* based upon the student's academic performance. This means a student's grade is based *only* upon their performance on the Midterm Exam, Assignments, and Final Exam. No other factors will be considered. *THIS POLICY WILL BE STRICTLY ENFORCED. If you are not comfortable with this policy, please drop the class now.*

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 with a 10% penalty per class period past the deadline. (i.e., turned in from 1 minute to 1 week late = 10% penalty, 1 minute past 1 week to 2 weeks late = 20% penalty, 1 minute past 2 week to 3 weeks late = 30% penalty, etc.). *THIS POLICY WILL BE STRICTLY ENFORCED. If you are not comfortable with this policy, please drop the class now.*

A series of assignments and two examinations comprise the general requirements of the course. All assigned readings are expected to be completed in a timely manner. The project assignments are designed so the student can master the course concepts, as well as insure that the student leaves the course with a working knowledge of these concepts.

The dates/deadlines assigned to the various assignments and exams 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. There will be no make-up exams nor extra credit assignments - please don't ask. If there is an extreme emergency and you must miss an exam, you must notify me and provide documented evidence of the emergency. *If you are not comfortable with this policy, please drop the class now.*

Instructor

Christopher Hield has been at the Chicago Board Options Exchange (CBOE) since 2001, and is currently the Director of Software Development & Testing. As director of Software Development & Testing for CBOE's state-of-the-art electronic financial trading system, he is responsible for the design, development and maintenance of the multi-tiered, serviced-based software used within the Systems Development department.

Before joining CBOE, Christopher spent time working as a Senior Software Engineer and Business Consultant the Marketing, Systems and Development Division (MSD) of Hitachi Computer Products America. There he was involved in the design and development of object-based data mining and data exploration tools for the health care industry.

Prior to his position at Hitachi, Christopher spent 13 years in the Decision and Information Sciences Division at Argonne National Laboratory, where he served as Senior Software Engineer and Technical Lead in the Information Systems Section. His duties included the development of a variety of object-based information systems, as well as object-oriented frameworks to support distributed, multidisciplinary modeling, simulation, and visualization applications.

Since 1995, he has been teaching various courses in software analysis, design, development, testing, and project management concepts at the Illinois Institute of Technology, Northwestern University, and DePaul University.

The official office hours for this class are held in the classroom, from approximately 5:15 - 5:45 p.m. before class, and 9:00 - 10:00 pm after class.

Schedule of Topics

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

Week 1 (1/3)
- Introduction to Software Testing.
- Software Development Process.
- Software Testing axioms.
- Precision and accuracy.
- Verification and validation.
- Textbook Chapters 1 & 2

Week 2 (1/10)
- Static and dynamic testing.
- White box, black box, and gray box testing.
- Static & Dynamic with Black Box & White Box
- Equivalence partitioning.
- Textbook Chapters 10, 18 & 19

Week 3 (1/17)
- Boundary value analysis.
- Decision table testing.
- Combinatorial Testing
- State-based testing.
- Risk-based testing.
- Textbook Chapters 3, 11 & 12

Week 4 (1/24)
- Types of Testing
  - Unit Testing
  - Integration Testing
  - Functional & System Testing
  - Acceptance Testing
  - Regression Testing
  - Beta testing
- Test Plan Development
- Textbook Chapters 21 & 22

Week 5 (1/31)
- MIDTERM EXAM

Week 6 (2/7)
- Planning and Documenting the Test Effort
- Test Plans
- Test Design Specifications
- Test Cases and Test Procedures
- Textbook Chapters 17 & 20

Week 7 (2/14)
- Testing Non-functional Requirements
- Performance, Load, and Stress Testing
- Rollout Testing
- Security Testing
- Usability Testing
- Textbook Chapters 4 & 15

Week 8 (2/21)
- Automated Testing
- Test Tools (JUnit)
- Software Test Automation
- Test Case Tracking and Reporting
- Textbook Chapter 23

Week 9 (2/28)
- Bug Reporting
- Metrics
- Software Quality Assurance
- Textbook Chapter 24

Week 10 (3/7)
- Topics in Software Testing

Final Exam: 3/14

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.

Student Guidelines

- Be on time for class.
- Take an active role in class discussions and activities.
- Be a respectful participant by keeping phones in silent mode.
- Please keep eyes up (and off your electronic devices) when attention should be paid to the group discussion or presentation. It is unprofessional and disrespectful to the instructor and other students to be surfing the internet, chatting, or checking social media.
- Practice professionalism in your communications (face-to-face, emails, etc.) with the professor and fellow students.

A professional and academic attitude is expected throughout this course. Measurable examples of non-academic or unprofessional attitude include but are not limited to: talking to others when the instructor is speaking, mocking another's opinion, cell phones ringing, emailing, texting, or using the internet whether on a phone, tablet, or computer. If continuing issues arise, a student may be asked to leave the classroom. The professor will partner with the Dean of Students Office to assist in managing such issues.

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 each student. Any instances of disrespect or hostility can jeopardize a student's ability to be successful in the course. The professor will partner with the Dean of Students Office to assist in managing such issues.

Academic Integrity and Plagiarism

This course will be subject to the university's academic integrity policy. More information can be found at http://academicintegrity.depaul.edu/. If you have any questions, be sure to consult with your professor.

The university and school policy on plagiarism can be summarized as follows: Students in this course should be aware of the strong sanctions that can be imposed against someone guilty of plagiarism. If proven, a charge of plagiarism could result in an automatic grade of 'F' in the course and possible expulsion. The strongest of sanctions will be imposed on anyone who submits as his/her own work any assignment which has been prepared by someone else.

All assignment submissions to D2L are subjected to automated plagiarism analysis tools.

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.

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.

Lewis Center 1420, 25 E. Jackson Blvd.
Phone number: (312)362-8002
Fax: (312)362-6544
TTY: (773)325.7296

Online Teaching Evaluation

Evaluations are a way for students to provide valuable feedback regarding their instructor and the course. Detailed feedback will enable the instructor to continuously tailor teaching methods and course content to meet the learning goals of the course and the academic needs of the students. They are a requirement of the course and are key to continue to provide you with the highest quality of teaching. The evaluations are anonymous; the instructor and administration do not track who entered what responses. A program is used to check if the student completed the evaluations, but the evaluation is completely separate from the student's identity. Since 100% participation is our goal, students are sent periodic reminders over three weeks. Students do not receive reminders once they complete the evaluation.