ITT Technical Institute

SD3410T

Software Testing

Onsite and Online Course

SYLLABUS

Credit hours: 4.5

Contact/Instructional hours: 67 (41 Theory Hours, 26 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

Prerequisite: SD1230T Introduction to Application Design and Development or equivalent, SD3320T Programming in Visual Basic or equivalent

Course Description:

This course examines practical ways to test software in development environments. Methods and tools involved in test planning, execution, and reporting throughout the software development life cycle will be introduced. Validation and resolution methods and tools will also be explored.

COURSE SUMMARY

COURSE DESCRIPTION

This course examines practical ways to test software in development environments. Methods and tools involved in test planning, execution, and reporting throughout the software development life cycle will be introduced. Validation and resolution methods and tools will also be explored.

MAJOR INSTRUCTIONAL AREAS

- Testing principles, practices, and patterns
- Testing approaches and types
- Test design and validation
- Test automation
- Test results and evaluation
- Reporting

COURSE LEARNING OBJECTIVES

By the end of this course, the learner should be able to:

1. Use essential terminology related to software testing.
2. Identify advantages and disadvantages of testing practices such as automated testing.
3. Design a testing plan incorporating industry standards and best practices.
4. Implement a test according to a plan.
5. Execute a test according to a plan.
6. Evaluate test results to present a conclusion.
7. Write a test summary report.

COURSE OUTLINE

MODULE 1: DESIGN, PRINCIPLES, TECHNIQUES, AND METHODOLOGY

COURSE LEARNING OBJECTIVES COVERED

- Use essential terminology related to software testing.

TOPICS COVERED

- Intent of Code
- Design and Testability
- Software Development Models
- Test Types
- Test Organization
- Testing Techniques
- Categories of Test Case Design Techniques

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Vance, *Chapters 2 and 4*	No	2 hrs
Reading: ITT Tech Virtual Library> School of Study> School of Information Technology> Books 24x7> • Search *Software Testing: An ISTQB-ISEB Foundation Guide> Chapter 2 (Software Development Models and Test Types), Chapter 4 (Categories of Test Case Design Techniques, Specification-Based [Black Box] Techniques, Experienced-Based Techniques, Choosing Text Techniques), Chapter 5 (Test Organization)* • Search *Testing IT: An Off-the-Shelf Software Testing Process> Chapter 4 (The Organization of Testing, Roles and Responsibilities)*	No	4.5 hrs
Lesson: Study the lesson for this module.	No	1 hr
Discussion: Participate in the discussion titled "The Importance of Testing."	Yes	N/A

Lab: Complete the lab titled "Virtual Lab Introduction."	Yes	N/A
Project: Read and begin the project.	No	1 hr

Total Out-Of-Class Activities: 8.5 Hours

MODULE 2: TEST TOOLS, COVERAGE, AND PROCEDURE

COURSE LEARNING OBJECTIVES COVERED

- Use essential terminology related to software testing.
- Identify advantages and disadvantages of testing practices such as automated testing.
- Design a testing plan incorporating industry standards and best practices.
- Implement a test according to a plan.
- Execute a test according to a plan.
- Evaluate test results to present a conclusion.

TOPICS COVERED

- An Approach to Testing
- Testing Principles
- Testing Tools
- Test Coverage
- When to Stop Testing
- Test Case Specification
- Test Automation

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Vance, *Chapters 3, 5, and 6*	No	5 hrs
Reading: ITT Tech Virtual Library> School of Study> School of Information Technology> Books 24x7> • Search *Software Testing: An ISTQB-ISEB Foundation Guide> Chapter 1 (General Testing Principles), Chapter 4 (The Idea of Test Coverage), Chapter 6 (What is a Test Tool, Test Tools)* • Search *Manage Software Testing> Chapter 2 (When Do* We Stop Testing?, How Do We Measure Our Test Coverage), Chapter 4 (Testing Principles), Chapter 7 (Test Automation), Chapter 8 (Test Case Specification), Appendix A (A.5: Example: Requirements Traceability Using TestDirector™), Appendix D	No	6 hrs

Lesson: Study the lesson for this module.	No	2 hrs
Discussion: Participate in the discussion titled "Testing Tools."	Yes	1 hr
Lab 1: Complete the lab titled "Test Coverage."	Yes	N/A
Lab 2: Complete the lab titled "Test Procedure Specification Test Technique."	Yes	N/A
Analysis: Submit the analysis titled "Automated Testing Tool."	Yes	2 hrs
Project: Continue work on Project Part 1.	No	2 hrs

Total Out-Of-Class Activities: 18 Hours

MODULE 3: FAULTS, TEST CASES, ESTIMATES, AND STRATEGY

COURSE LEARNING OBJECTIVES COVERED

- Use essential terminology related to software testing.
- Identify advantages and disadvantages of testing practices such as automated testing.
- Design a testing plan incorporating industry standards and best practices.
- Implement a test according to a plan.
- Execute a test according to a plan.
- Evaluate test results to present a conclusion.

TOPICS COVERED

- Engineering Craftsmanship
- Test Strategies
- Coding and Unit Testing
- Requirements Specification
- Test Plan
- Estimates of Bugs in the System
- Unit Test Process

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Vance, Chapter 1	No	1.5 hrs
Reading: ITT Tech Virtual Library> School of Study> School of Information Technology> Books 24x7> • Search *Software Testing: An ISTQB-ISEB Foundation Guide> Chapter 5 (Test Approaches [Test Strategies])* • Search *Manage Software Testing> Chapter 6 (Coding* and Unit Testing), Chapter 8 (Test Plan, Requirements Specification), Chapter 14, Appendix B (B.5: Requirements Analysis Checklist), Chapter 18 (Estimates of Bugs in the System) • Search *The Art of Software Testing> Chapter 5* (Module[Unit] Testing)	No	12 hrs
Lesson: Study the lesson for this module.	No	2 hrs

Discussion: Participate in the discussion titled "Test Effectiveness."	Yes	N/A
Lab 1: Complete the lab titled "Test Strategy."	Yes	N/A
Lab 2: Complete the lab titled "Test Results Evaluation."	Yes	N/A
Project: Submit Project Part 1.	Yes	2 hrs

Total Out-Of-Class Activities: 17.5 Hours

MODULE 4: TEST CASE TECHNIQUES AND TESTING EVALUATION

COURSE LEARNING OBJECTIVES COVERED

- Use essential terminology related to software testing.
- Identify advantages and disadvantages of testing practices such as automated testing.
- Design a testing plan incorporating industry standards and best practices.
- Implement a test according to a plan.
- Execute a test according to a plan.
- Evaluate test results to present a conclusion.
- Write a test summary report.

TOPICS COVERED

- Adjusting Visibility
- Interlude: Revisiting Intent
- Error Condition Verification
- Test Techniques
- Test Documents
- Integration Testing Plan

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Vance, Chapters 9, 10, and 11	No	4.5 hrs
Reading: ITT Tech Virtual Library> School of Study> School of Information Technology> Books 24x7> • Search *Manage Software Testing> Chapter 8, Chapter 11,* Chapter 12 • Search *The Art of Software Testing> Chapter 4 (White-Box* Testing) • Search *Software Testing: A Craftsman's Approach>* Chapter 13	No	13.5 hrs
Lesson: Study the lesson for this module.	No	2 hrs
Discussion: Participate in the discussion titled “Black Box and White Box Testing.”	Yes	N/A

Lab 1: Complete the lab titled "Black Box and White Box Testing."	Yes	N/A
Lab 2: Complete the lab titled "Integration Test Plan and Test Cases."	Yes	N/A
Analysis: Submit the analysis titled "Test Results Evaluation."	Yes	2 hrs

Total Out-Of-Class Activities: 22 Hours

MODULE 5: REGRESSION TESTING AND BUG REPORT

COURSE LEARNING OBJECTIVES COVERED

- Use essential terminology related to software testing.
- Identify advantages and disadvantages of testing practices such as automated testing.
- Design a testing plan incorporating industry standards and best practices.
- Implement a test according to a plan.
- Execute a test according to a plan.
- Evaluate test results to present a conclusion.
- Write a test summary report.

TOPICS COVERED

- Parallelism
- Existing Seams
- Regression Testing
- Bug Analysis
- Bug Report
- Debugging

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Vance, Chapters 12 and 13	No	5 hrs
Reading: ITT Tech Virtual Library> School of Study> School of Information Technology> Books 24x7> • Search *Manage Software Testing> Chapter 7 (Keeping the* Configuration Management System in Order, Bug Management Process and Tool), Chapter 15 (Regression Testing) • Search *Testing IT: An Off-the-Shelf Software Testing Process> Appendix J* • Search *The Art of Software Testing> Chapter 8*	No	6 hrs
Lesson: Study the lesson for this module.	No	2 hrs
Discussion: Participate in the discussion titled "Importance of Locating Software Faults."	Yes	N/A

Lab 1: Complete the lab titled "Regression Testing."	Yes	N/A
Lab 2: Complete the lab titled "Evaluate and Document Regression Testing."	Yes	N/A
Analysis: Submit the analysis titled "Regression Test Tools."	Yes	2 hrs
Project: Continue work on Project Part 2.	No	2 hrs

Total Out-Of-Class Activities: 17 Hours

MODULE 6: JAVA AND OBJECT-ORIENTED DESIGN

COURSE LEARNING OBJECTIVES COVERED

- Use essential terminology related to software testing.
- Identify advantages and disadvantages of testing practices such as automated testing.
- Design a testing plan incorporating industry standards and best practices.
- Implement a test according to a plan.
- Execute a test according to a plan.
- Evaluate test results to present a conclusion.
- Write a test summary report.

TOPICS COVERED

- Test Driven Java
- Legacy JavaScript
- Encapsulation
- String Handling
- Object-Oriented Testing Versus Traditional Testing

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Vance, Chapters 7, 8, 14, and 15	No	5 hrs
Reading: ITT Tech Virtual Library> School of Study> School of Information Technology> Books 24x7> • Search *Testing IT: An Off-the-Shelf Software Testing Process> Appendix R* • Search *Software Testing: A Craftsman's Approach> Chapter* 16 (Units for Object-Oriented Testing, Implications of Composition and Encapsulation)	No	2 hrs
Lesson: Study the lesson for this module.	No	2 hrs
Discussion: Participate in the discussion titled "Java Test Tools."	Yes	N/A
Lab: Complete the lab titled "Object-Oriented Design and Testing."	Yes	N/A
Project: Submit Project Part 2.	Yes	2 hrs

Total Out-Of-Class Activities: 11 Hours

EVALUATION AND GRADING

EVALUATION CRITERIA

The graded assignments will be evaluated using the following weighted categories:

CATEGORY	WEIGHT
Discussion	10%
Lab	30%
Analysis	30%
Project	30%
TOTAL	100%

GRADE CONVERSION

The final grades will be calculated from the percentages earned in the course, as follows:

GRADE		PERCENTAGE
A	(4.0)	90–100%
B+	(3.5)	85–89%
B	(3.0)	80–84%
C+	(2.5)	75–79%
C	(2.0)	70–74%
D+	(1.5)	65–69%
D	(1.0)	60–64%
F	(0.0)	<60%

LEARNING MATERIALS AND REFERENCES

REQUIRED RESOURCES

COMPLETE TEXTBOOK PACKAGE

- Vance, S. (2014). *Quality code: Software testing principles, practices, and patterns (1st* ed.). Upper Saddle River, NJ: Pearson Education Inc.

OTHER ITEMS

- Virtual machine to support Android Studio, Microsoft Visual Studio, Windows SDK, and Windows Phone SDK
- Microsoft Office
- Microsoft Visio
- External USB hard drive to host the virtual machines specifically required for this program.

RECOMMENDED RESOURCES

- Books and Professional Journals
  - International Journal of Software Engineering (IJSE)
  - Institute of Electrical and Electronics Engineers (IEEE)
  - Association for Computing Machinery (ACM)
  - Professional Tester Magazine

- ITT Tech Virtual Library (accessed via Student Portal | https://studentportal.itt-tech.edu)
  - Browse> Browse by Format> Books> Books 24x7
    - Jorgensen, Paul C. (2008). *Software testing: A craftsman's approach (3rd* ed.). Boca Raton, FL: Auerbach Publications. Chapter 2 (Test Levels), Chapter 4 (Choosing Test Techniques), Chapter 13.
    - Watkins, J. & Mills, S. (2011). *Testing IT: An off-the-shelf software testing process (2nd ed.).* New York, NY: Cambridge University Press. Chapters 4, 5, and 6.

- Other References
  - Conferences and Journals on Software Testing:

http://oscar-lab.org/people/~jxuan/page/resource/testing-conf-jour.htm

- Software Engineering Journals:
  http://software.nju.edu.cn/zychen/journal.htm
- Professional Tester Magazine:
  http://www.professionaltester.com/magazine/
  Conferences and Journals on Software Testing:
  http://oscar-lab.org/people/~jxuan/page/resource/testing-conf-jour.htm

INSTRUCTIONAL METHODS AND TEACHING STRATEGIES

The curriculum employs a variety of instructional methods that support the course objectives while fostering higher cognitive skills. These methods are designed to encourage and engage you in the learning process in order to maximize learning opportunities. The instructional methods include but are not limited to lectures, collaborative learning options, use of technology, and hands-on activities.

To implement the above-mentioned instructional methods, this course uses several teaching strategies, such as discussions that enable you to explore pertinent topics related to software testing. You can use these discussions to build your knowledge, apply research skills, analyze problems, demonstrate your understanding of the subject, and share your opinions. The labs are provided to work as application-level learning events where you get hands-on practice of concepts and procedures. The lessons in this course will focus on practical ways in which you can test software in development environments and foster comprehension and application-level of learning. Your progress will be regularly assessed through a variety of assessment tools such as discussion, lab, analysis, and project.

OUT-OF-CLASS WORK

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a “time-based option” for establishing out-of-class activities which would equate to two hours of
out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation

during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

ACADEMIC INTEGRITY

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct. For more information on the academic honesty policies, refer to the Student Handbook and the School Catalog.

INSTRUCTOR DETAILS

Instructor Name	
Office Hours	
Contact Details	

(End of Syllabus)