University of South Florida  
College of Business Administration  
Information Systems and Decision Sciences  
ISM 4144 – Software Testing (3 credit hours)  
Spring Semester 2013 - Syllabus

Instructor:  
Professor Alan R. Hevner  
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Phone: 974-6753, Email: ahevner@usf.edu  
Office Hours: Monday and Tuesday 5:00pm – 6:00pm and by appointment  
Web: http://business.usf.edu/faculty/isds/hevner/index.html

Course Classroom: BSN 120

Teaching Assistant:  
Onkar Malgonde – omalgonde@mail.usf.edu

Description:  
This course will survey and analyze the best practices in industrial testing groups. New research ideas for improving testing will be explored.

Objectives  
The goal of this course is to provide an understanding of software quality and testing in the software development industry. This industry strives to produce high quality, reliable software system products and services. The processes and techniques of software testing attempt to verify the quality of software systems before they are released into the field. It is well known that one cannot test quality into software. Software quality is predicated on effective development and verification for requirements, specification, design, and implementation. Testing must be an integral component of all development processes to ensure an adequate level of quality. This course will survey and analyze the best practices in industrial testing groups. New research ideas for improving testing will be explored.

Learning Outcomes:  
Upon completion of this course students will:
- Have practical experience with both functional (black box) and structural (clear box) testing methods via assignments.
- Understand automated testing tools which are an important part of the educational experience.
- Have an in-depth understanding of software testing practice and research.

Course Texts:  
Required:  

Recommended:  
Course Prerequisite:
ISM 3113 – Systems Analysis and Design

Course Outline:
(Craft = Jorgensen Text, DL = Web Downloads)
This course outline is subject to change as we progress through the semester.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
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<tbody>
<tr>
<td>Feb. 5</td>
<td>Introduction to Software Testing</td>
<td>Craft 1-4</td>
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<tr>
<td></td>
<td>• Example Test Series</td>
<td>DL 1-2</td>
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<td></td>
<td>• What is Software Testing?</td>
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<td>• Definitions and Taxonomies of Testing Terms</td>
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<td>• Testing Foundations</td>
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<td>• Why is Testing So Hard?</td>
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<td>• Testing Problems</td>
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<td>• Mathematical Foundations</td>
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<td><strong>Study Sheet 1</strong></td>
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<td>Feb. 12</td>
<td>Software Verification Techniques</td>
<td>DL 3-5</td>
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<td>• Testing in the Software Development Life Cycle</td>
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<td>• Formal Technical Reviews</td>
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<td>• Inspections</td>
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<td>• Software Quality Attributes</td>
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<td>• Problem Report Systems</td>
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<td><strong>Study Sheet 2</strong></td>
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<td>Feb. 19</td>
<td>Functional Testing Methods 1</td>
<td>Craft 5-8</td>
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<td>• Design of Test Cases</td>
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<td>• Boundary Values</td>
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<td>• Equivalence Classes</td>
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<td>• Decision Tables</td>
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<td><strong>Study Sheet 3</strong></td>
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<td>Feb. 26</td>
<td>Functional Testing Methods 2</td>
<td>Class Presentation</td>
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<td>• Paradigms of Functional Testing</td>
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<td>• Summary of Functional Testing</td>
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<td><strong>Study Sheet 4</strong></td>
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<td>March 5</td>
<td>Structural Testing Methods</td>
<td>Craft 9-11</td>
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<td>• Control Flow Path Testing</td>
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<td>• Data Flow Path Testing</td>
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<td>• Coverage Metrics</td>
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<td>• Summary of Structural Testing</td>
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<td><strong>Study Sheet 5</strong></td>
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<td>March 12</td>
<td>Spring Break</td>
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<td>March 19</td>
<td>Integration and System Testing</td>
<td>Craft 12-15</td>
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<td>• Integration Methods</td>
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<td>• System Threads</td>
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<td>• Mid-Term Examination Review</td>
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<td><strong>Study Sheet 6</strong></td>
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<td>Study Sheets</td>
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| March 26 Study Sheet 7 | Automated Testing Tools
  Held in Computer Lab CPR (Cooper Hall) 121
  - Demonstrations of Tools
  - Hands-on Laboratory |
| April 2 Study Sheet 8  | Testing Best Practices
  - Securing Testing Model-Based Testing
  - Test-Driven Development (Agile Testing)
  - The Testing Organization
  - Managing a Testing Group |
| April 9 Study Sheet 9  | Industry Testing Panel
  Guest Speakers:
  - Bob Crews – Checkpoint Technology
  - Deborah Sheldon – IBM
  - Steve Splaine – Nielsen
  - Jim Trentadue |
| April 16 Study Sheet 10 | Software Program Understanding
  - Function Extraction (FX) Technology
  Guest Speaker:
  - Richard Linger, Oak Ridge National Laboratory |
| Apr. 23 Study Sheet 11 | Student Testing Project Presentations
  Testing Portfolios Due |

**Study Sheets:**
Study Sheets for all class sessions can be downloaded from Blackboard. An outline of session topics and discussion questions are provided. (Since I continually revise all study sheets during the semester, not all study sheets will be available at the beginning of the semester.) A limited number of recommended papers and texts will appear on the Study Sheets. In our discussions, I will reference material from these sources.

**Feedback Sheets:**
At the end of each class session, each student will complete a one-minute Feedback Sheet over the material covered that session. Completion of these sheets will support the goal of continuous quality improvement of the course materials.

**Grading Policy:**
The Plus/Minus grading system will be used in this course.

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<tr>
<th>Component</th>
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<tr>
<td>Class Participation</td>
<td>10%</td>
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<td>Mid-Term Exam</td>
<td>30%</td>
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<td>Testing Assignments</td>
<td>40%</td>
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<td>- Assignment #1</td>
<td>10%</td>
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<td>- Assignment #2</td>
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<td>- Assignment #3</td>
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<td>- Assignment #4</td>
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<tr>
<td>Final Testing Project</td>
<td>20%</td>
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**Discussion Questions:**
At the completion of each class session, a set of discussion questions will be posted on Blackboard. Participation in the discussions will enhance the student’s learning experience. A portion of the class participation grade will be based on responses to the discussion questions.
**Attendance Policy:**
Attendance during regularly scheduled classes will not be a grading factor. USF General Attendance Policy can be found at [http://www.ugs.usf.edu/policy/GeneralAttendance.pdf](http://www.ugs.usf.edu/policy/GeneralAttendance.pdf)

**Incompletes:**
Only in rare cases, such as serious illness, will an Incomplete be given. An Incomplete must be requested in writing giving the reason for the request and all appropriate documentation.

**Policy on Disability Accommodations:**
Students in need of academic accommodations for a disability may consult with the office of Students with Disabilities Services to arrange appropriate accommodations. Students are required to give reasonable notice prior to requesting an accommodation. USF Policies on Disability Accommodations can be found at
- See student responsibilities: [http://www.sds.usf.edu](http://www.sds.usf.edu)

**Policy on Religious Holidays:**
Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, by the second class meeting. USF Policy on Religious Holidays can be found at [http://www.ugs.usf.edu/policy/ReligiousDays.pdf](http://www.ugs.usf.edu/policy/ReligiousDays.pdf)

**Policy on University Closure:**
In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It’s the responsibility of the student to monitor Blackboard site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.

**Academic Integrity / Plagiarism:**
Academic dishonesty may take several forms, including plagiarizing, collaborating with others without acknowledging their work, submitting work that you did previously or that you are doing for another class (unless I give you permission to do this), falsifying results or data, interfering with another student’s work, and copyright violation. When in doubt, ask me for clarification. Some of the best testing has been done by collaborating testers. You are welcome to test and to do assignments in groups, or to work alone. Of course, if three people work together, I expect them to submit three times as many bugs, or to submit work that is in some way, three times as good or as extensive as I would expect from a person working alone. Bug reports should be submitted by the person who did the majority of the work to find that bug (or to develop / design the test that found that bug). If more than one person contributed to the design or the bug finding, name the other people at the start of the bug description.

You may not collaborate on the mid-term examination. The usual rules governing cheating in take-home exams will be applied. The USF Policy on Student Integrity can be found at [http://www.ugs.usf.edu/policy/AcademicIntegrityOfStudents.pdf](http://www.ugs.usf.edu/policy/AcademicIntegrityOfStudents.pdf)
Readings:
The majority of readings will be downloads available on the class Blackboard. Other readings will provide URL links to source websites. Students should review the material on the website and download material as needed for the class discussion. A few readings come from recommended texts. All readings are to be completed by class on the date assigned.


6. IBM Rational Robot Materials
   - Scan Rational Robot User Guide and SQABasic Reference (Do not print due to large size.)
   - Read Rational Robot Tutorial


