Department of Computer Science and Electrical Engineering, WVU

SENG 691D/CS 791X
Software Reliability

Spring, 2009
Time: Tuesdays, 6:00 – 8:30PM
Room: SENG 691 lectures are broadcast on the Web, CS 791 will be held in ESB 801.

Instructor: Bojan Cukic  
Office: ESB 731  
Office Hours: Tuesdays 3-5PM  
Phone: 293-0405 ext. 2526  
E-mail: cukic@csse.wvu.edu  
Prerequisites: Graduate student status, undergraduate software engineering (equivalent to WVU CS 430)

Textbook:
The book is out of print but the 2nd edition can be obtained as a Print On Demand (POD) from AuthorHouse publishers with a considerable discount. Access the following Web site: http://members.aol.com/JohnDMusa/book.htm and follow appropriate links.

Supplements:
• “An Overview of Software Reliability Engineering” class notes.  
• A set of research papers will be provided.

1. Objectives
System reliability has been a major concern since the beginning of the computer age. As our dependence on computing systems continues to increase, the limits of our (in)ability to guarantee required levels of system reliability, availability, maintainability, etc, are being reached. The ability to quantify quality attributes of programs (systems) is becoming increasingly important. In recent years, the number of reliability assessment techniques has continued to expand. The objective of this course is to familiarize students with the concepts of reliability engineered software development and testing and understand practical techniques for achieving and evaluating the reliability of modern software systems.

2. Expected Learning Outcomes
Upon successful completion of this course, students should have:  
1. Ability to define necessary software reliability project goals.  
2. Ability to develop and deploy operational profiles.  
3. Ability to implement reliability testing procedures.  
4. Ability to apply software reliability models.  
5. Ability to build fault prediction models for large systems.

3. Topics Covered

<table>
<thead>
<tr>
<th>WEEK #</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>Overview of Software Reliability Engineering</td>
</tr>
<tr>
<td>3, 4</td>
<td>Defining Necessary Reliability</td>
</tr>
<tr>
<td>5</td>
<td>Developing Operational Profiles</td>
</tr>
<tr>
<td>6, 7</td>
<td>Preparing Software Testing Activities</td>
</tr>
<tr>
<td>8</td>
<td>Test execution</td>
</tr>
<tr>
<td>9</td>
<td>Applying Failure Data to Guide Decisions</td>
</tr>
<tr>
<td>10, 11</td>
<td>Project Presentations</td>
</tr>
<tr>
<td>12</td>
<td>Software Reliability Models</td>
</tr>
<tr>
<td>13, 14</td>
<td>Software Fault Prediction Modeling</td>
</tr>
</tbody>
</table>
2. Tests
There will be two tests; a midterm and a final exam, both administered as take-home tests. The final exam will be administered at the end of the semester. The final exam will be comprehensive, that is, it will cover all the material taught throughout the semester.

3. Presentation of Research Papers
Each student is expected to individually present one or two research papers in the class. The papers will form an overview of the current research topics in the field of software reliability engineering. These presentations will be evaluated, and will contribute approximately 25% of the final grade. Students will be required to post their presentations on the Web, so that other students can use them when preparing for tests.

4. Term Paper / Project
SENG 691D: Each student is expected to develop a term paper and submit it to the instructor during the first week of December. The theme of the term paper will usually emerge from the presented research paper. Students are expected to independently search for additional references, read them and summarize the topic in, typically 10 - 15 pages (font 12, 1.5 interline spacing). Alternatively, students may choose to develop a project in which the concepts taught in the class will be applied to a real-world software development effort. Project evaluation will be based on the demonstration (using Web resources) and a project report similar to (but possibly shorter than) the term paper. The topic and the scope are subject to an approval by the instructor.

CS 791X: Students will work on a research project. The topic of the project will be determined in discussion with the instructor. Research results will be reported in a research paper, due at the end of the semester.

5. Grading
The midterm test and the final exam will count for approximately 40% of the final grade. The remaining 60% will be derived from presentations (15%) and term papers/projects (35%) and participation in classroom discussions (10%). You must obtain a passing grade in both parts (the test and presentation/term paper/project) in order to receive a passing grade.

6. Academic Honesty
Students are encouraged to discuss class topics between themselves. However, each student should develop the presentation, the term paper and/or the project, individually.

7. Social Justice Statement
West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services (293-6700).