TEXAS TECH UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE
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CS 5332 – SOFTWARE RELIABILITY ENGINEERING

SUMMER 2011

COURSE DESCRIPTION

This course is an introduction to software reliability engineering. The course intends to be an introductory course to make familiar the reliability engineering concepts and in particular the reliability of software to the graduate students with engineering and CS majors.

Software quality is an important part of software development life cycle. Many well established companies such as CISCO, AT&T, IBM, etc. have already invested on reliability research to assess the fault tolerance, mean time to failure, and the number of faults remaining in their software products. This course is beneficial to all software practitioners and graduate students who intend to estimate the reliability of their software.

This course explores reliability engineering in general and software reliability engineering in particular. As a graduate level course, there will be both theoretical and practical topics.

Topics covered by this course (tentative):

- Basic vocabulary of software quality
- Basic vocabulary of reliability engineering
- Basic vocabulary of software reliability engineering
- Differences between software and hardware reliability
- Basic knowledge of statistical data analysis
- Basic knowledge of distribution theory
- Software reliability models
- Criteria for selecting software reliability models
- development of operational profiles
- Estimation vs. prediction of software reliability
- Industrial examples of best practices of software reliability engineering
- Overview of software reliability engineering tools

PREREQUISITES

- Knowledge of programming languages, in particular C or Java.
- Knowledge of software engineering practices.
- Knowledge of undergraduate math and statistics and in particular probabilistic theory.

INSTRUCTOR

- Name: Akbar S. Namin
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- Office Hours: TBA
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TEXTBOOK AND LECTURE NOTES

The course will be based on lecture notes (to be made available on the course website). The following book will be used as the primary book for teaching this course:

- Handbook of software reliability engineering, Michael R. Lyu, McGraw-Hill, 1996.

- The secondary text book is the following book. This book is appropriate for more general reliability engineering course. Nevertheless, some parts of the book are necessary to any reliability courses including distribution theory.

  Reliability engineering handbook, Bryan Dodson and Dennis Nolan, CRC, 2002.

Course Website

Refer to the Blackboard system for lecture notes.

Student Evaluation

Students will be graded based on short exams, and the a project (tentative).
- Three short exams, each 10%
- Project: 70%

Project

Students are asked to work on an individual or group projects. Students are asked to select a software product and develop operational profiles and estimate its reliability using publicly available tools such as CASRE.

Students with Disabilities

Any student who because of a disability may require special arrangements in order to meet course requirements should contact the instructor as soon as possible to make any necessary accommodations. Student should present appropriate verification from Student Disability Services during the instructors office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification for Student Disability Services has been provided. For additional information, please contact Student Disability Services in West hall or call 806-742-2405.

Ethical Conduct

Although discussion about ideas and problems is one of the major learning methods, students must write their own assignments and essays. When taking ideas or sentences from another author, students must acknowledge their debt by citation. Plagiarism is the most serious academic offence and there will be zero-tolerance for academic dishonesty. Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, and falsifying academic record. For a detailed list of offenses, refer to Texas Tech University online resource for students, found in Part IX, pp. 21-30, available on line at:

http://www.depts.ttu.edu/studentaffairs/publications/2008_2009_Handbook_and_Code.pdf

All assignments are individual works. You may discuss approaches to problems among yourselves; however, the actual details of the work (assignment coding, answers to concept questions, etc.) must be an individual effort. The standard departmental penalty for assignments that are judged to be the result of academic dishonesty is, for the student's first offence, a mark of zero for the assignment, and possible consequences, possibly suspension from the university.

Learning Outcomes

The following are the expected learning outcomes of the course:
- Masters of Science Degree:
  (1) Communicate effectively orally and in writing (LO 1)
  (2) Engage in life-long learning and self-critique (LO 2)
  (3) Function independently on self-directed projects or research where appropriate (LO 4)
- Doctor of Philosophy Degree:
  (1) Graduates are expected to communicate effectively orally and in writing (LO 1)
  (2) Engage in life-long learning and self-critique (LO 2).
  (3) Function in a multi-disciplinary, and culturally diverse environment with cross-functional teams (LO 3).