SYLLABUS: CEN 4072/6070
SOFTWARE TESTING AND VERIFICATION

Fall 2007

Description: Software Testing and Verification is a survey course on concepts, principles, and techniques related to software testing and formal program verification. Students will become acquainted with both the strengths and limitations of various functional and structural testing methods, as well as techniques for proving the functional correctness of sequential programs. Topics include: black-box and white-box test case design strategies, incremental integration testing techniques, inspections and reviews, axiomatic verification techniques, predicate transforms, and function-based verification. Students will have the opportunity to practice the techniques presented in class via optional exercises.

Prerequisites: Successful completion of an upper division undergraduate or graduate-level software engineering survey course (such as CEN 3031/5035) or permission of the instructor. Familiarity with programming using a high-level language (C, C++, Java, etc.) and basic knowledge of algorithms, data structures, object-oriented design principles, and discrete math is assumed.

A self-assessment pre-test will be made available to assist students in determining their preparedness for the course vis-a-vis coverage of a small subset of prerequisite knowledge.

Instructor:
Steve Thebaut, E314-A, Phone: (352) 392-1496, E-mail: smt AT cise DOT ufl DOT edu
Office Hours (on-campus students): M/W 9:30-10:30 or by appt.

Course Meeting Times and Place for On-Campus Students:
Tuesday: 5th and 6th (11:45-1:30)
Thursday: 6th (12:50-1:40)
Room: CSE 122

Course Web Site: Available via WebCT Vista at http://lss.at.ufl.edu You will need your GatorLink account and password to access the website.

Course Materials: Lecture notes will be made available on the course web site in PDF format. A collection of required readings may be purchased as a packet from University Copy & More, 1620 W. University Avenue, (352) 372-7436. An optional textbook, Pezze and Young’s Software Testing and Analysis, Wiley, 2008, is recommended for students who wish to have additional software testing and analysis reference material at their disposal.

Outline of Course Topics: The following topical areas will be covered in the order listed.

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Examinations and Grades: Course grades will be based SOLELY on two equally weighted 90-minute exams. A histogram of numeric scores will be provided with solution notes for each exam. Course letter grades will be determined at the end of the semester based on separate "curves" for CEN 4072 and CEN 6070 students.

On-Campus Exam schedule:
Exam 1: (topics through "Testing Tools" + associated readings) -- October 16 (tentative)
Exam 2: (remaining topics + associated readings) -- December 4

Exam Procedures for EDGE Students: Proctors will be instructed to schedule a single exam time during normal working hours convenient for all students at each site. If this is not possible, exams may be scheduled outside normal working hours (e.g., in the evening). Exams are made available to proctors the same day they are administered to on-campus students. Proctors should return ORIGINAL, completed exams directly to the instructor, preferably via overnight delivery.

Make-Up Exam Policy: Students are expected to make every effort to be available at scheduled exam times. If missing an exam is unavoidable, please contact the instructor as far in advance as possible. An oral make-up exam may be administered in cases of unavoidable absence.

Problem Sets: There will be 7 optional, non-graded take-home problem sets, covering the areas:

(1) Black-box testing
(2) Logic coverage
(3) Dataflow coverage
(4) Path conditions and Symbolic Evaluation
(5) Axiomatic verification
(6) Predicate transforms
(7) Functional verification

Some problems may be non-trivial and/or require the creative application of techniques presented in class. You may work on the problem sets alone or in groups. To receive feedback on your work, solutions must be submitted by the due date. Exams assume a thorough understanding of the problems and their solutions.

Class Attendance Policy: On-campus students are strongly encouraged -- but not required -- to attend all lectures. You will, however, be responsible for all announcements and course materials discussed in class regardless of whether or not you attend.

Computer Facilities: Access to e-mail and the WWW is required.

Academic Integrity: All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

You will be asked to sign the following statement on all exams in this course: On my honor, I have neither given nor received unauthorized aid on this examination.

Accommodation for Students with Disabilities: Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

– University Counseling Center, 301 Peabody Hall, 392-1575: personal and career counseling.
- SHCC Mental Health, Student Health Care Center, 392-1171: personal and counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161: sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601: career development assistance and counseling.

**Software Use:** All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

**Instructor Biography:** Steve Thebaut received the BA in Mathematics from Duke University in 1977, and the MS and PhD in Computer Science from Purdue University in 1979 and 1983, respectively. He is currently Associate Chair of the CISE Department and Director of the Software Engineering Research Center at the University of Florida. Dr. Thebaut’s research interests include software requirements engineering, testing and verification, and software engineering technology transfer. He has received funding from the National Science Foundation, IBM, the Florida Department of Education, the Florida High Technology and Industry Council, the Sino-Software Research Center at HKUST, the Software Engineering Research Center, and the Software Engineering Institute (SEI) at Carnegie Mellon University, where he was an invited lecturer in the SEI production of "Software Project Management," a nationally distributed video-based continuing education course. He has been a course developer and consultant for IBM’s IS&PG Technical Education program, and has served on the program committee of the Conference on Software Engineering Education. He was Associate Editor of the International Journal of Computer and Software Engineering from 1990-1996.