**Syllabus**

**CSE 5320-002:** Special Topics in Software Engineering

Techniques for Success with Large Software Projects

Fall 2014

**Instructor:** Dr. Dennis J. Frailey

**Office Number:** ERB 402

**Office Telephone Number:** c/o CSE office – 817-272-3605

**Email Address:** Dennis.Frailey@uta.edu

**Faculty Profile:** PhD and MS, Computer Science, Purdue University; BS, Mathematics, U. of Notre Dame. Adjunct Professor, SMU and UTA; Principal Fellow, Raytheon (retired); Board of Governors, IEEE Computer Society; former Vice President, ACM; distinguished lecturer, ACM and IEEE Computer Society; former president, Association for Software Engineering Excellence; program evaluator in software engineering, computer engineering and computer science for ABET. Dr. Frailey recently retired after a 40+ year career in software engineering and computer design at Ford Motor Co, Texas Instruments and Raytheon. He proposed, planned and led software development activities for many projects; taught software development, software management and project management for internal training organizations; and also taught as an adjunct professor at SMU and several other universities for 40+ years. He has over 150 publications -- specialties include compiler optimization, real-time operating systems, software development for large projects, software quality engineering, software safety, cycle time reduction, and six sigma techniques for software.

**Office Hours:** By appointment before and after class on Fridays

**Section Information:** CSE 5320 Section 002 - Techniques for Success with Large Software Projects

**Time and Place of Class Meetings:** 1:00pm – 3:50pm, Fridays, WH 208

**Description of Course Content:** As their careers advance, most software developers will take on responsibility for team leadership and will later progress to management of increasingly larger and more complex software development projects. This course is focused on the skills and techniques required for managing medium-to-large-sized software projects. The course delves into topics beyond those covered in CSE5324 and CSE5325 -- those courses and/or experience on realistic software development projects will provide helpful background but they are not mandatory prerequisites. Each student will have an opportunity to probe a software project management-related subject in depth. The course structure requires each student to prepare a professional quality business or research report, to give a presentation on their work, and to provide feedback on the presentations of other students. Students may work individually or, if enrollment dictates, may pair up in teams.

**Student Learning Outcomes:**

* Each student (or team of two) will explore a topic in depth and prepare a report and a presentation to the class. The report and presentation will take the form of either a business report or a research report, as selected by the student. Thus each student will develop in-depth expertise on his or her topic of choice. Students will also evaluate each others’ presentations and make suggestions for improvement so that their final reports and presentations can be improved. Topics must be approved by the instructor (instructor will provide a list of suggested topics), must be related to software project management, and must be addressed at an advanced level.
* Each student will learn about the topics presented by the other students as well as the topics presented by the instructor (first portion of the course), will be able to explain those topics to others, and will be able to apply that knowledge to realistic software projects. The instructor’s topics (subject to revision based on class size and student topic choice) will include: characteristics of large, complex software projects; the project management process; the work breakdown structure; software measurement and tracking (including earned value analysis and other methods of project tracking, quantitative project management, and statistical process control); risk management; software quality engineering (including six sigma, cycle time reduction and productivity enhancement); software procurement and supplier management; and management review techniques.

**Required Textbooks and Other Course Materials:**

None are required. The following may be helpful, depending on the specific topics chosen by the students. A list of other suggested books and references, tied to specific research topics, will be provided by the instructor.

***Textbooks:***

Andersen, Bjorn and Tom Fagerhaug, ***Root Cause Analysis***, 2nd Edition, Quality Press, Milwaukee, WI, 2006. ISBN 13: 978-0-87389-692-4. (Addresses a key technique for quality improvement that will be helpful in some students’ problem analysis efforts.)

Weinberg, Gerald M. ***Quality Software Management, Volume 1, Systems Thinking***, Dorset House, New York, 1992. ISBN: 0-932633-22-6. (Explores quality improvement with many insights from a psychological and cultural point of view.)

***References:***

IEEE Std 1045-1992.  ***IEEE Standard for Software Productivity Metrics***. New York, Institute of Electrical and Electronics Engineers, Inc. (Describes more than 30 software measures that can be used to manage software projects and measure productivity in a consistent manner.)

***SWEBOK – The Guide to the Software Engineering Body of Knowledge***, available from the IEEE Computer Society and also at [www.swebok.org](http://www.swebok.org). (This compendium of what a professional software engineer should know includes sections on software project management, software process, software quality assurance, and several other topics of relevance to software project managers).

***SWX – The Software Extension to the Project Management Body of Knowledge***, available from the Project Management Institute ([www.pmi.com](http://www.pmi.com)). (This joint effort of the IEEE Computer Society and the Project Management Institute (PMI) extends includes topics that a project manager needs to know about managing projects with significant software content.)

**Descriptions of major assignments and examinations:**

1. There will be a midterm examination based on the topics presented by the instructor. This will count 1/3 of the final grade. Exact date will depend on class enrollment.
2. Each student (or team) will prepare a presentation and report, as described above, based on their individual research efforts. This will count ½ of the final grade. The final presentation (in PowerPoint format) and the final report (in MS Word format) will be due by December 6.
3. Students will suggest improvements to each others’ presentations and will copy the instructor on these suggestions via MavMail or Blackboard. These suggestions will be communicated within a few days of each presentation. The quality of these suggestions and other class participation will count 1/6 of the final grade.

**Attendance:** At The University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students’ academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I will not take attendance. However, due to the once-a-week nature of the course, missing a class will cause the student to miss a lot of material. Attendance is particularly important in the last portion of the course (when other students are giving their presentations) in order to have the required degree of class participation. Each student attending a presentation will be graded, in part, on the quality of their feedback to the student(s) giving the presentation.

**Other Requirements:**

* CSE5324, CSE5325, and/or prior experience on a realistic software development project will be valuable but are not mandatory
* Students must use PowerPoint® and MS Word® (or similar products whose output can be produced in these formats).
* Ability to use a spreadsheet will be helpful for some topics.

**Grading**:

1/3 of grade from midterm examination

¼ of grade from student presentation

¼ of grade from student paper

1/6 of grade from class participation and feedback to other students on their presentations

**Make-up Exams**: The only exam is the midterm exam. Students unable to take it at the scheduled time may discuss options for make-up exams with the instructor. In lieu of a final exam, each student or team will turn in a report and a final presentation by the end of the semester.

**Expectations for Out-of-Class Study**: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend, on average, an additional 9 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

**Grade Grievances**: see <http://catalog.uta.edu/academicregulations/grades/#graduatetext>.

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

**Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability) or by calling the Office for Students with Disabilities at (817) 272-3364.

**Title IX:** The University of Texas at Arlington is committed to upholding U.S. Federal Law “Title IX” such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit [www.uta.edu/titleIX](http://www.uta.edu/titleIX).

**Academic Integrity:** Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule* 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

**Lab Safety Training:**  **Not Applicable**

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

**Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

**Final Review Week:** A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. There are two nearby exits – to the West of the classroom (turn left upon exit) about 150 yards down and to the East of the classroom (turn right upon exit) about the same distance. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities. For further information see UT Arlington Procedure 7-6: Emergency/Fire Evacuation Procedures ([https://www.uta.edu/policy/procedure/7-6)](https://www.uta.edu/policy/procedure/7-6%29).

**Student Support Services**:UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at [www.uta.edu/resources](http://www.uta.edu/resources).

**Writing Center.** **:** The Writing Center, 411 Central Library, offers individual 40 minute sessions to review assignments, *Quick Hits* (5-10 minute quick answers to questions), and workshops on grammar and specific writing projects. Visit [https://uta.mywconline.com/](https://owa.uta.edu/owa/luket%40exchange.uta.edu/redir.aspx?C=jqplelmmw0KcvkWv1pRv_rHS8ofUUtFIXl_CWZTLffEmCPyZf3x4ncUbBmD9p3gSPROCbhSJj7U.&URL=https%3a%2f%2futa.mywconline.com%2f) to register and make appointments. For hours, information about the writing workshops we offer, scheduling a classroom visit, and descriptions of the services we offer undergraduates, graduate students, and faculty members, please visit our website at [www.uta.edu/owl/](http://www.uta.edu/owl/).

**Librarian to Contact:** Since this course requires student research, the library will be a valuable resource. Here is some relevant contact information.

Library Home Page <http://www.uta.edu/library>

Subject Guides <http://libguides.uta.edu>

Subject Librarians <http://www.uta.edu/library/help/subject-librarians.php>

Database List <http://www.uta.edu/library/databases/index.php>

Course Reserves <http://pulse.uta.edu/vwebv/enterCourseReserve.do>

Library Tutorials <http://www.uta.edu/library/help/tutorials.php>

Connecting from Off- Campus <http://libguides.uta.edu/offcampus>

Ask A Librarian [http://ask.uta.edu](http://ask.uta.edu/)

The following URL houses a page where we have gathered many commonly used resources needed by students in online courses: <http://www.uta.edu/library/services/distance.php>.

The subject librarian for your area can work with you to build a customized course page to support your class if you wish. For examples, visit <http://libguides.uta.edu/os> and <http://libguides.uta.edu/pols2311fm> . If you have any questions, please feel free to contact Suzanne Beckett, at sbeckett@uta.edu or at 817.272.0923.

**Course Schedule:**

* See next page for initial draft of course schedule,
* Schedule will be updated after individual student topics and presentation schedules have been determined,
* Schedule may be updated from time to time to best serve the educational needs of the students in the class.

Dennis J. Frailey

**COURSE SCHEDULE – Draft 1**

| **Module** | **Day** | **Date of Lecture** | **Topics** |  | **Assignment Due** |
| --- | --- | --- | --- | --- | --- |
| 0 | 1 | 8/22 | Course Overview |  |  |
| 1 | Characteristics of Large Software Projects |  |
| 2 | The Management Process |  |
| 3 | 2 | 8/29 | The Work Breakdown Structure |  |  |
| 4 | Work Breakdown Structure - II |  |
| 5 | Tracking and Oversight |  |
| 6 | 3 | 9/05 | Selecting Measures |  |  |
| 7 | Earned Value |  |
| 8 | Managing with Earned Value |  |
| 9 | 4 | 9/12 | Value-Added Analysis |  |  |
| 10 | Cost of Quality Analysis |  |
| 11 | Analyzing the Net Cost of a Process |  |
| 15 | 5 | 9/19 | Six Sigma and Zero Defects - Overview |  |  |
| 16 | Six Sigma Principles and Applications |  |
| 17 | Statistical Process Control |  |
| 18 | 6 | 9/26 | Cycle Time Reduction, Part 1 |  |  |
| 19 | Cycle Time Reduction, Part 2 |  |
| 20 | Productivity Improvement, Part 1 |  |
| 21 | 7 | 10/3 | Productivity Improvement, Part 2 |  |  |
| 22 | Principles of Measurement, Pt. 1 |  |
| 23 | Principles of Measurement, Pt. 2 |  |
| 27 | 8 | 10/10 | Recommended Measures for SW Engineers |  |  |
| 28 | More Recommended Measures & Special Issues |  |
| 29 | Measuring and Improving the SW Process |  |
| 33 | 9 | 10/17 | Quantitative Process Management |  |  |
| 34 | Statistical Process Control for QPM |  |
| 35 | Advanced Defect Measurement Techniques |  |
| 27 | 10 | 10/24 | Supplier Management – part 1  |  |  |
| 28 | Supplier Management – part 2 |  |
| 29 | Risk Management  |  |
|  | 11 | 10/31 | Student Presentations |  | Draft Presentation |
|  | Student Presentations |  |
|  | Student Presentations |  |
|  | 12 | 11/7 | Student Presentations |  | Draft Presentation |
|  | Student Presentations |  |
|  | Student Presentations |  |
|  | 13 | 11/14 | Student Presentations |  | Draft Presentation |
|  | Student Presentations |  |
|  | Student Presentations |  |
|  | 14 | 11/21 | Student Presentations |  | Draft Presentation |
|  | Student Presentations |  |
|  | Student Presentations |  |
|  | (15) | 12/6 | ***all work due***  |  | Final Report and Presentation |

**Emergency Phone Numbers**: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911.

**For non-emergencies, contact the UTA PD at 817-272-3381.]**