



605.601— Foundations of Software Engineering

Fall 2020

Instructor

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Dr. Tushar Hazra is a Senior IT Executive with several years of experience in the industry. He is a successful and recognized thought leader, and an expert in delivering enterprise-level business solutions, strategy, blueprint, roadmap, strategic planning and in implementing effective customer-facing digital transformation initiatives.

Dr. Hazra has been actively involved in delivering mission-critical, innovative, and cost-effective IT solutions across multiple US federal, state, and local government agencies as well as in private sector healthcare (payers and providers), financial services and insurance businesses. Tushar has demonstrated C-level executive partnership, technical thought leadership, program management, P&L responsibility and system as well as software engineering domain expertise. He is an industry recognized educator, communicator, author, innovator, and speaker with 150+ publications and 100+ conference appearances. Dr. Hazra has 25+ years of experience in teaching graduate-level courses.

Course Overview

Fundamental software engineering techniques and methodologies commonly used during software development are studied. Topics include various life cycle models, project planning and estimation, requirements analysis, program design, construction, testing, maintenance and implementation, software measurement, and software quality. Emphasized are structured and object-oriented analysis and design techniques, use of process and data models, modular principles of software design, and a systematic approach to testing and debugging. The importance of problem specification, programming style, periodic reviews, documentation, thorough testing, and ease of maintenance are covered.

Course Prerequisites

No prerequisites. However, basic knowledge of software is preferred.

Course Goals & Objectives

The goal of this course is to provide an overview of the fundamental concepts of software management as well as the design and implementation of software systems. Various organizational structures and life cycle processes are covered. This course provides hands-on software development activities that emphasize the importance of design, code review, testing, and maintenance.

By the conclusion of this course, students are expected to:

- have a thorough understanding of software management fundamentals, particularly software development processes;
- use version control to manage changes to software and to deliverables; create software abstractions that facilitate testing;
- write thorough unit and integration tests for software; and
- document the end products developed along with software (e.g., requirements, source code, and end-user documentation).

Course Schedule

This course is divided into separate modules. Each module typically comprises reading to prepare for the class meeting, in-class discussions and lecture, and a homework assignment (when appropriate).

Week 1: August 31, 2020

Module 00: Introduction

Module 01: An Overview of Software and Software Engineering

Week 2: September 07, 2020 No Class – Labor Day

Week 3: September 14, 2020

Module 01A: Evolution of Software Development

Module 02: Software Project Management

Week 4: September 21, 2020

Module 03: Requirements and Specification

Quiz 1

Week 5: September 28, 2020

Module 04: Object-Orientation & UML

Module 05: Software Design Foundation

Module 05A: Use Case Modeling with UML

Assignment 01 Submission Due

Week 6: October 05, 2020

Module 05: Software Design Foundation I

Week 7: October 12, 2020

Module 05: Software Design Foundation II
Quiz 2

Week 8: October 19, 2020 Mid Term Examination**Week 9: October 26, 2020**

Module 06: Software Design Advanced Concepts
Assignment 02 Submission Due

Week 10: November 02, 2020

Module 07: Software Testing
Quiz 3

Week 11: November 09, 2020

Module 08: Process Models

Week 12: November 16, 2020

Guest Lecture on Agile Development

Week 13: November 23, 2020 - No class - Thanksgiving**Week 14: November 30, 2020**

Quiz 4
Module 07A: Software Maintenance
Module 09: Estimation

Week 15: December 07, 2020

Module 10: Software Quality
Assignment 03 Submission Due by December 07, 2020 Midnight
Case study & Assignment 04 – [A Software Project on Hospital Management system](#)

Week 16: December 14, 2020 Final Examination**Office Hours (via Phone and Zoom)**

During this course, we will have a weekly office hour: using Zoom (and the meeting will be recorded). Students are encouraged to attend and participate in discussion during

the session.

I will respond to any urgent question within 24 hours. If an issue needs immediate attention, the student must indicate the urgency and I will respond as soon as possible. Students may call at (443)540-2230 for Dr. Hazra if necessary.

Textbook

Software Engineering – Ian Sommerville – 10th Edition

Suggested Readings:

- Beginning Software Engineering – Rod Stephens
- Software Engineering – A Practitioner's Approach – Roger Pressman and Bruce Maxim
- Software Engineering with UML – Bhuvan Unhelkar
- The Mythical Man Month – Fredrick Brooks, Jr.

Grading and Evaluation Criteria

A grade of A indicates achievement of consistent excellence and distinction throughout the course—that is, conspicuous excellence in all aspects of assignments and discussion in every week.

A grade of B indicates work that meets all course requirements on a level appropriate for graduate academic work. These criteria apply to both undergraduates and graduate students taking the course.

100 - 90 = A

<90 - 80 = B

<80 - 70 = C

<70 = F

The evaluation of this course will be based on the following criteria:

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|------------------------|-----|
| ▪ Assignments | 30% |
| ▪ Quizzes | 20% |
| ▪ Mid-term Examination | 20% |
| ▪ Final Examination | 20% |
| ▪ Participation | 10% |

Class Participation

Class participation is important and essential to discuss various principles and concepts of Software Engineering taught in this class.

Assignments, Projects, and Quizzes

Three assignments, one project and a set of four quizzes are planned for this course. Students must perform assignments and projects in teams – and take quizzes as an individual.