



### 17-443: Quality Management

TR 10:40am-12:00 pm, 3SC 265

A4, Spring 2021, 6 Units

Instructor	Email	Office Location & Hours
Prof. Jeff Gennari	jgennari@andrew.cmu.edu	SEI & Zoom, by appointment

Teaching Assistants		
Ami Vipin Kotia	akotia@andrew.cmu.edu	Zoom, TBD

**Course Description.** Managing software quality is a critical part of all software projects. Software engineers must consider quality during every phase of a project from inception to delivery and beyond. This class will introduce students to the managerial challenges of developing high quality software systems.

**Prior Knowledge.** Knowledge of quality assurance techniques and basic project management.

**Learning Objectives.** After completing this course, you will be able to:

- Define a quality management process in the context of a software project.
- Understand the costs associated with achieving quality goals and not achieving them.
- Understand the tradeoffs required to implement quality assurance techniques.
- Gain experience using collected quality metrics to inform project-level decisions.
- Learn to handle the practical considerations of quality when executing a software project.

**Learning Resources.** Prior to each class session, students will be required to read selected papers, various short articles, and/or short videos. Many optional supplemental readings are provided, too, if a student wants to learn more and for future reference.

**Assessments.** Students learn more by applying and explaining ideas to others, thus, the course requires the following activities:

- **Individual Assignments**, the course includes individual assignments that are due on more or less a weekly basis. These assignments are intended to complement and integrate the material we cover in class and readings. Students will be expected to install and use various software quality tools and then analyze your results. Some individual assignments ask you

to reflect upon your own development experience in the context of specific course material. Good reflections are specific and concrete and go beyond mere recitation of facts to draw insight from past experiences.

- **Reading Quizzes**, Various readings throughout the course will be assigned and made available online on Canvas or through the CMU library. We will have regular quizzes, posted on Canvas, to accompany these readings. These are to be completed *before* the associated class begins. We will teach class assuming you have read the material. These quizzes are to be completed (and will be graded) individually. There are no late days for readings; late submissions will receive feedback but no credit. Students can expect a reading quiz to be assigned before every lecture.
- **Course Project: Quality Plan**, The capstone project for this course is to develop an actionable quality plan for a software project. The goals of the quality plan project are for the students to learn how to:
  - Document the quality objectives for a project
  - Combine verification techniques in a project
  - Develop an operational profile for a project
  - Schedule, estimate the effort, and assign responsibility for the execution of quality assurance and quality control activities.

Assessment	Final Grade %	Grade	Percentage Interval
Individual Assignments	50%	A	90-100%
Quality Plan	30%	B	80-89%
Reading Quizzes	10%	C	70-79%
Class Participation	10%	D	60-69%
		R (F)	59% or below

### Course and Grading Policies

**Late-work policy:** All work is expected to be handed in at the indicated due date and time. Our philosophy is that our late work policy includes built-in flexibility but that the policy will be uniformly applied to all students in all circumstances. For most homework deadlines, you may turn in your work up to two days late using (1) free late days (see below) or (2) 10% per day penalties. **Work turned in more than two days late will receive feedback but no credit (i.e., a 100% penalty).** Some homework deadlines explicitly disallow late work, and you are responsible for correctly understanding the late policy for each homework assignment and its sub-parts.

**Late days:** Each student starts the semester with **three free late days** which will automatically be applied to your assignments until you have used all three free late days. A late day is automatically applied when your work is late; you may not defer a free late day to be used on a later assignment.

**Participation policy.** Class participation will be graded by in-class engagement, including asking relevant questions based on a critical review of required readings, lectures, and comments made by your peers. The lack of attendance, and the use of mobile devices, including phones and laptops, will count against your participation grade.

**Course Schedule.** The following schedule provides a general overview of topics and assignments. Please refer to the syllabus online in Canvas for specific lecture topics, reading assignments and due dates.

Class	Topic and Readings	Assignments
1	Introduction	
2	Quality planning	
3	Quality in the SDLC	Healthcare.gov case study
4	Dependable & safety critical systems	
5	Managing SQA in practice I: Testing	Giant Eagle SDLC case study
6	Managing SQA in practice II: Analysis	
7	Technical debt	Test operations
8	Software security management	Technical debt assessment
9	Guest Lecture: Cyber-physical systems	
10	Defect management	Threat modeling
11	Guest Lecture: Model-based testing	
12	Legacy systems, software maintenance and evolution	
13	Process improvement	
14	Software security management	Quality plan

**Accommodations for Students Disabilities.** If you have a disability and have an accommodations letter form the Disability Resources office, I encourage you to discuss your accommodations and needs with me as early in the semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at [access@andrew.cmu.edu](mailto:access@andrew.cmu.edu).

**Academic Integrity.** Honesty and transparency are important to good scholarship. Plagiarism and cheating, however, are serious academic offenses with serious consequences. If you are discovered engaging in either behavior in this course, you will earn a failing grade on the assignment in question, and further disciplinary action may be taken.

For a clear description of what counts as plagiarism, cheating, and/or the use of unauthorized sources, please see the [University's Policy on Academic Integrity](#).

If you have any questions regarding plagiarism or cheating, please ask me as soon as possible to avoid any misunderstandings. For more information about Carnegie Mellon's standards with respect to academic integrity, you can also check out the [Office of Community Standards & Integrity](#) website.

**Student Wellness.** As a student, you may experience a range of challenges that can interfere with learning, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. CMU services are available, and treatment does work. You can learn more about confidential mental health services available on campus at the [Counseling and Psychological Services](#) website. Support is always available (24/7) from Counseling and Psychological Services: 412-268-2922.

**Respect for Diversity.** [Please refer to the [Eberly Center's page on Diversity Statements](#) for other examples, if this one does suit your needs.] It is my intent that students from all diverse backgrounds and perspective be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength, and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know if any of our class meetings conflict with your religious observations so that I can make alternate arrangements for you.