

**City University of Hong Kong  
Course Syllabus**

**offered by Department of Computer Science  
with effect from Semester B 2020/21**

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**Part I Course Overview**

**Course Title:** Software Quality Engineering

**Course Code:** CS5348

**Course Duration:** One semester

**Credit Units:** 3 credits

**Level:** P5

**Medium of Instruction:** English

**Medium of Assessment:** English

**Prerequisites:**  
(Course Code and Title) CS5351 Software Engineering

**Precursors:**  
(Course Code and Title) Nil

**Equivalent Courses:**  
(Course Code and Title) Nil

**Exclusive Courses:**  
(Course Code and Title) Nil

## Part II Course Details

### 1. Abstract

This course aims to equip students with the engineering principles and professional practices in software testing and quality management activities. It prepares students to assess the quality of software products and processes using systematic and methodical techniques in software testing and established standards in software quality assurance, management and engineering.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

| No. | CILOs  | Weighting<br>(if applicable) | Discovery-enriched curriculum related learning outcomes (please tick where appropriate) |    |    |
|-----|--|------------------------------|---|----|----|
|     |  |                              | A1  | A2 | A3 |
| 1.  | Critically analyze software process and quality models for assessing software products and processes.                                      |                              | ✓   |    |    |
| 2.  | Describe and apply engineering principles and professional practices and techniques in software testing, quality assurance and management. |                              |   | ✓  |    |
| 3.  | Describe, evaluate and critique quality management principles, systems and established standards for software products and processes.      |                              | ✓   |    |    |
|     |  | 100%                         |   |    |    |

**A1: Attitude**

*Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.*

**A2: Ability**

*Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.*

**A3: Accomplishments**

*Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.*

### 3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

Teaching pattern:

Suggested lecture/tutorial/laboratory mix: 3 hours lecture/tutorial.

| TLA                          | Brief Description   | CILO No. |   |   | Hours/week<br>(if applicable) |
|------------------------------|---|----------|---|---|-------------------------------|
|                              |   | 1        | 2 | 3 |                               |
| Lecture and class discussion | Explain key subject knowledge and background. Require students to participate actively in class to discuss and critically reflect on their software development practices and experiences in light of the subject materials presented in class. | ✓        | ✓ | ✓ |                               |
| Tutorial                     | Provide short exercises for students to work on different techniques and consolidate key concepts, models, principles and issues in software testing, processes and quality management.   | ✓        | ✓ | ✓ |                               |
| Assignment or project        | Require students to practise software testing and quality assurance and management activities, such as design of testing strategies, test case generation, development of quality plans or review/inspection.                                   |          | ✓ |   |                               |

### 4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

| Assessment Tasks/Activities                               | CILO No. |   |   | Weighting | Remarks |
|---|----------|---|---|-----------|---------|
|   | 1        | 2 | 3 |           |         |
| Continuous Assessment: <u>40%</u>                         |          |   |   |           |         |
| Assignment  |          | ✓ |   | 20%       |         |
| Project or quiz   |          | ✓ |   | 20%       |         |
| Examination <sup>^</sup> : <u>60%</u> (duration: 2 hours) | ✓        | ✓ | ✓ | 60%       |         |
|   |          |   |   | 100%      |         |

<sup>^</sup> For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

## 5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

| Assessment Task    | Criterion  | Excellent<br>(A+, A, A-) | Good<br>(B+, B, B-) | Fair<br>(C+, C, C-) | Marginal<br>(D) | Failure<br>(F)                    |
|--------------------|--|--------------------------|---------------------|---------------------|-----------------|-----------------------------------|
| 1. Assignment      | 1.1 ABILITY to DESCRIBE and APPLY professional and engineering practices and techniques in software quality assurance and management | High                     | Significant         | Moderate            | Basic           | Not even reaching marginal levels |
| 2. Project or quiz | 1.1 ABILITY to DESCRIBE and APPLY professional and engineering practices and techniques in software quality assurance and management | High                     | Significant         | Moderate            | Basic           | Not even reaching marginal levels |
| 3. Examination     | 3.1 ABILITY to ACHIEVE the respective CILOs  | High                     | Significant         | Moderate            | Basic           | Not even reaching marginal levels |

## Part III Other Information (more details can be provided separately in the teaching plan)

### 1. Keyword Syllabus

(An indication of the key topics of the course.)

Software testing principles and approaches. Specification-based testing. Category-partition testing. Combinatorial testing. Random testing. Code-based analysis. Control flow and predicate testing. Software quality concepts, models principles and standards. Software quality assurance and management. Software product, process and project. Quality and risk management. Software reviews and inspection.

### 2. Reading List

#### 2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

|    |  |
|----|--|
| 1. | Myers, G.J., Badgett, T. & Sandler, C. (2012). <i>The Art of Software Testing</i> . 3rd Ed. Wiley.             |
| 2. | Galín, D. (2018). <i>Software Quality: Concepts and Practice</i> . 1st Ed. IEEE Computer Society Press.        |
| 3. | Selected documents from international standards: accessible online via CityU library.                          |
| 4. | Selected professional/research articles from <i>IEEE</i> and <i>ACM</i> : accessible online via CityU library. |

#### 2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

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|----|--|
| 1. | Pressman R.S. and Maxim B.R. (2015). <i>Software Engineering: A Practitioner's Approach</i> . 8th Ed. McGraw-Hill. |
| 2. | Sommerville, I. (2016). <i>Software Engineering</i> . 10th Ed. Addison Wesley.                                     |