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COMP3090 Software Engineering

1. **COURSE TITLE**

SOFTWARE ENGINEERING

2. **COURSE CODE**

COMP3090

3. **PRE-REQUISITES**

COMP2020 Object-Oriented Programming

4. **CO-REQUISITE**

Nil

5. **NO. OF CREDITS**

3.0

6. **CONTACT HOURS**

42

7. **OFFERING UNIT**

DST/CST

8. **SYLLABUS PREPARED & REVIEWED BY**

Prepared by Dr. Xin Feng and Reviewed by Dr. Weifeng SU

9. **AIMS & OBJECTIVES**

This course studies the methodology of software design and development as well as the organisation, planning and management of the development process so that students will appreciate the challenges involved in a large system development project and the importance of a disciplined approach to the problem.

10. **COURSE CONTENT**

Topics

Hours

I. Introduction

4

A. The Systems Life Cycle



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|   |    |
|---|----|
| B. Players in the Software Projects         |    |
| C. Process Models                           |    |
| II. Requirements Analysis and Specification | 12 |
| A. Requirements Capture                     |    |
| B. Data Flow Diagrams                       |    |
| C. State Transition Diagrams                |    |
| D. Object-Oriented Analysis                 |    |
| III. Architectural Design                   | 10 |
| A. Design Principles                        |    |
| B. System Decomposition                     |    |
| C. Object-Oriented Design                   |    |
| IV. Detailed Design                         | 4  |
| A. Restructuring                            |    |
| B. Module Interface Design                  |    |
| V. Systems Implementation and Validation    | 6  |
| A. Mapping Design to Programmes             |    |
| B. Testing Strategies                       |    |
| C. Testing Tools                            |    |
| VI. Project Management                      | 4  |
| A. Change Management                        |    |
| B. Version Control                          |    |
| C. Cost Estimation                          |    |

## 11. COURSE INTENDED LEARNING OUTCOMES (CILOS) WITH MATCHING TO PILOS

### Programme Intended Learning Outcomes (PILOs)

| Programme Title: <i>Bachelor of Science (Honours) in Computer Science and Technology</i> |  |
|--|--|
| PILO   | Upon successful completion of the Programme, students should be able to:               |
| PILO 1   | <b>analyse</b> the basic principles of computer science and technology;                |
| PILO 2   | <b>translate</b> real world problems into IT requirements;                             |
| PILO 3   | <b>design</b> and <b>develop</b> complex software;                                     |
| PILO 4   | <b>apply</b> up-to-date technology to <b>solve</b> general problems in specific areas; |
| PILO 5   | <b>communicate</b> effectively and <b>collaborate</b> in a team.                       |

### CILOs-PILOs Mapping Matrix



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| Course Code & Title: COMP3090- Software Engineering |   |                         |
|---|---|-------------------------|
| CILO  | Upon successful completion of the course, students should be able to:                         | PILO(s) to be addressed |
| CILO 1  | <b>explain</b> software development life cycle and key activities in each phase of the cycle, | PILO 1                  |
| CILO 2  | <b>apply</b> UML to OO software development   | PILO 2, 3               |
| CILO 3  | <b>plan</b> a test in unit, module and system levels  | PILO 2, 3               |
| CILO 4  | <b>manage</b> a project through configuration management and cost estimation                  | PILO 2, 3               |

## 12. TEACHING & LEARNING ACTIVITIES (TLAS)

| CILO No. | TLAs   |
|----------|--|
| CILO 1   | <ul style="list-style-type: none"><li>● <b>Lecture:</b> The instructor will explain the course materials in detail.</li><li>● <b>Assignment:</b> Each student is required to independently work on some assignments.</li></ul>   |
| CILO 2   | <ul style="list-style-type: none"><li>● <b>Lecture:</b> The instructor will explain the course materials in detail.</li><li>● <b>Project:</b> Each student is required to join a group to implement a project using the software development process and models introduced in the lectures.</li></ul>  |
| CILO 3   | <ul style="list-style-type: none"><li>● <b>Lecture:</b> The instructor will explain the course materials in detail.</li><li>● <b>Assignment:</b> Each student is required to independently work on some assignments.</li><li>● <b>Project:</b> Each student is required to join a group to implement a project using the software development process and models introduced in the lectures.</li></ul> |
| CILO 4   | <ul style="list-style-type: none"><li>● <b>Lecture:</b> The instructor will explain the course materials in detail.</li><li>● <b>Project:</b> Each student is required to join a group to implement a project using the software development process and models introduced in the lectures.</li></ul>  |

## 13. ASSESSMENT METHODS (AMS)



| Type of Assessment Methods | Weighting | CILOs to be addressed | Description of Assessment Tasks   |
|----------------------------|-----------|-----------------------|---|
| Assignments                | 10%       | 1, 3                  | The assignments will evaluate if students are able to use diagrams in specifications and design the software structure from the specifications. |
| Project                    | 50%       | 2-4                   | The project will evaluate if students are able to apply the principles and the methods in software development                                  |
| Final Examination          | 40%       | 1-4                   | The final examination will check how well the students understand the methods and principles in software development                            |

#### 14. **TEXTBOOKS / RECOMMENDED READINGS**

- [1] Sommerville, Software Engineering, 9<sup>th</sup> Ed., Addison-Wesley, 2011
- [2] R.S. Pressman, Software Engineering: A Practitioner's Approach, 6<sup>th</sup> Ed. McGraw-Hill, 2005.
- [3] Bruegge and A. Dutoit, Object-Oriented Software Engineering Using UML, Patterns, and Java, 2<sup>nd</sup> Ed. Prentice Hall, 2004.
- [4] P.C. Jorgensen, Software Testing: A Craftsman's Approach, 2<sup>nd</sup> Ed, 2002
- [5] T. Quatrani, Visual Modeling with Rational Rose 2002 and UML, 3<sup>rd</sup> Ed. Addison-Wesley, 2002.
- [6] S.L. Pfleeger, Software Engineering: Theory and Practice, 3<sup>rd</sup> Ed., Prentice Hall, 2005.

**Revised on: <2012-09-13>**