**University of Asia Pacific (UAP)**

**Department of Computer Science and Engineering (CSE)**

**Course Outline**

**Program:** Computer Science and Engineering (CSE)

**Course Title:** Software Engineering Lab

**Course Code:** CSE 322

**Semester: Fall 2022**

**Level:** 6th Semester

**Credit Hour: 0.75**

**Name & Designation of Teacher:** Fahad Ahmed, Lecturer.

**Office/Room:** Online

**Class Hours: Section A:** Wednesday (09.30– 12.20) **Section B:** Wednesday (2.00– 4.20)

**Consultation Hours:** Lab hours

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**Rationale:** Software Engineering lab course helps the implementation of the current trends in software industries. This course enhances the ability to design, practical implementation, and analyze a software-based solution and use engineering judgment to draw conclusions about the software application system.

**Pre-requisite** (if any)**: CSE 306**

**Course Synopsis:** Continued from CSE 306, the course focuses on the principles of System development, implementation and maintenance. Therefore, this lab emphasizes on the SystemTesting and Design pattern, architecture, which the students will be learning lab by lab.

**Course Objectives:** The objectives of this course are to:

1. **Develop d**istributed and collaborative software development, maintenance and appraise project operating cost, financial analysis for complex software-intensive systems
2. **Ensure** industrial state of the practice methods of verifying and validating high-assurance software-intensive system**.**
3. **Provide** the knowledge to design and implement of different software process models in different systems and ensure good quality software.
4. **An Ability** to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global.

**Course Outcomes (CO) and their mapping with Program outcomes (PO) and Teaching-Learning Assessment methods:**

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| CO  No. | **CO Statements:**  **Upon successful completion of the course, students should be able to:** | Corresponding  POs  (Appendix-1) | Bloom’s taxonomy domain/level  (Appendix-2) | Delivery methods and activities | Assessment  Tools |
| CO1 | **Apply** the Engineering knowledge to provide a working solution on a complex engineering problemand submit a mapping of the solution. | (a) | 1/Apply | Lecture, multimedia | Report |
| CO2 | **Identify** functional and non-functional requirements of the proposed solution consideringbased on requirement analysis. | (b) | 1/Apply | Lecture, multimedia | Presentation on project idea |
| CO3 | **Develop** a working solution for proposed software-intensive systems and verify, validate the solution using the industrial state of the practice, which indicates a high-quality software-intensive system. | (c) | 1/Apply | Lecture, multimedia | Continuous Project Evaluation(UML, ERD, Code Review), project demonstrationon , Report |
| CO4 | **Use** a modern/popular IDE to test complex software-intensive systems. | (e) | 1/Apply | Lecture, multimedia | Continuous Project Evaluation |
| CO5 | **Assess** societal, health, safety, legal and cultural issues related to the project. | (f) | 1/Analyze | Lecture, multimedia | Presentation on project idea, Project Report |
| CO6 | **Practice** professional ethics and  Responsibilities and norms of engineering practice. | (h) | 3/Valuing | Lecture, multimedia | Project Report, Viva |
| CO7 | **Work** as a team and fulfil individual responsibility. | (i) | 1/Apply | Lecture, multimedia | Continuous Project Evaluation,  Viva |
| CO8 | **Communicate** effectively through presentation and write effective reports and documentation on the project. | (j) | 1/Apply | Lecture, multimedia | Presentation,  Project Report, Viva |
| CO09 | **Apply** project management principles using Version Control System, and predict project operating cost, and financial risk analysis for complex software-intensive systems. | (k) | 1/Apply | Lecture, multimedia | Presentation on project idea, Project Report |
| CO10 | **Recognize** the need for, and have the preparation and ability to engage in independent and life-long learning for art of project management, distributed and collaborative software development and risk analysis for developing complex software-intensive systems. | (l) | 1/Apply | Lecture, multimedia | Report, Viva |

**Weighting COs with Assessment methods:**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Type** | **% weight** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** | **CO6** | **CO7** | **CO8** | **CO9** | **CO10** |
| Presentation | 10% |  | 5 |  |  |  |  |  | 5 |  |  |
| Report (video+ word/pdf)+ CEP Mapping | 50% | 5 mapping | 5 | **5**  (video demo)+  **15** report  Testing |  | 5 | 5 |  | 5 | 3 | 2 |
| Viva | 18% | 5 |  |  |  |  | 5 | 5 |  |  | 3 |
| Continuous Project Evaluation | 22% |  |  | **10** | **5** ide use |  |  | 5 |  | 2 |  |
| Total | 100% | 10 | 10 | 30 | 5 | 5 | 10 | 10 | 10 | 5 | 5 |

**Course Content Outline and mapping with COs**

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| --- | --- | --- | --- | --- |
| **Weeks** | **Topics / Content** | **Course Outcome** | **Delivery methods and activities** | **Reading Materials** |
| **1** | Basic concept of complex engineering problem, characteristic and activities, and introduction to software quality assurance.  **Project Group Formation (2-3 members)** | CO1, CO4,CO5, CO9,CO10 | Lectures, Individual Tasks | PPT Slides,  Reference links |
| **2** | **Project Proposal (Presentation)**: explain key issues and solutions of complex software-intensive systems.  Introduction to Testing, how to write test case, Manual testing  Introduction to **Jira.** | CO1,CO2, CO3,CO6,CO7,CO8,CO9 | Lectures, Group Presentation | PPT Slides,  Reference links |
| 3 | Introduction to automated Testing, **Selenium platform**, Installing Selenium and Pycharm,WebDriver installation; Synching project repository.  **Submit final Project Proposal**  **(Report) + Project Update-01 through Version control system** | CO2, CO3,CO6,CO7,CO8,CO9 | Lectures, Group Tasks | PPT Slides,  Reference links |
| 4 | Demonstrating WebDriver Commands with python and Selenium, Explicit & Implicit Wait, WebDriver Input Box and Test Box.; Working with Radio Buttons, Check Boxes, Drop Down list, Links etc. Scrolling Web Pages, Working with Links | CO2,CO3,CO10 | Lecture, Online Demonstration, | PPT Slides,  Reference links |
| 5 | Concept of Integration Testing; Unit Testing Framework and Methods with Selenium, Assertions, Creating and Running Test Suites Running Multiple Tests, Generating Log/Report File from multiple tests | CO2,CO3,CO10 | Lecture, Online Demonstration, | PPT Slides,  Reference links |
| 6 | **Project update-02** : **Generate automated testing report** (at least up to login system)  Concept of system testing , functional and non-functional, introduction to **load testing, performance testing, regression testing,** Integrate Selenium with Jira. | CO2, CO3,CO6,CO7,CO8,CO9,C010 | Lecture, Demonstration, Individual Tasks | PPT Slides,  Reference links |
| 7 | Final Project Demonstration, Report submission & Viva | CO1 to CO10 | Demonstration, Group viva |  |

**Minimum attendance:** 70% class attendance is mandatory for a student in order to appear at the final examination.

**Textbook: No textbook Required**

# **Required References: Will be provided during lectures**

**Grading System:** As per the approved grading scale of University of Asia Pacific (Appendix-3).

**Special Instructions: Assignment**: **Unfinished** work should be submitted as assignment. **Additional** assignments may be given as needed. Late submission will result a 50% deduction in score.

**Student’s responsibilities:** Students must attend the class prepared for the course material covered in the previous class (es). They must submit their assignments on time.

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| **Prepared by**  **(**Course Teacher**)** | **Checked by**  **(**Chairman, PSAC committee**)** | **Approved by**  **(**Head of the Department**)** |
| Fahad Ahmed (FMD) |  |  |

**Appendix-1:**

**Washington Accord Program Outcomes (PO) for engineering programs:**

(a) Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in K1 to K4 respectively to the solution of complex engineering problems.

(b) Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (K1 to K4)

(c) Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (K5)

(d) Conduct investigations of complex problems using research-based knowledge (K8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

(e) Create, select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modeling, to complex engineering activities with an understanding of their limitations.

(f) Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (K7)

(g) Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (K7)

(h) Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (K7)

(i) Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

(j) Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

(k) Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

(l) Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**Knowledge Profile**

K1 A systematic, theory-based understanding of the natural sciences applicable to the discipline

K2 Conceptually based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline

K3 A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline

K4 Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline

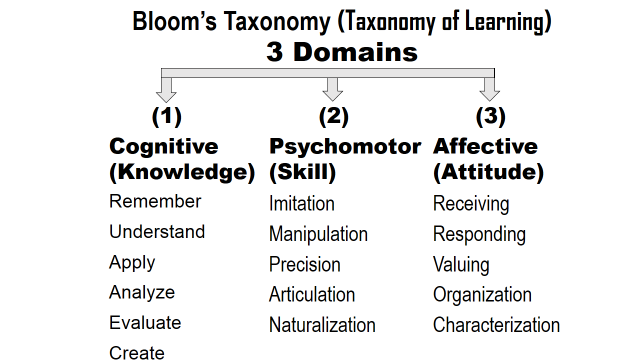
K5 Knowledge that supports engineering design in a practice area

K6 Knowledge of engineering practice (technology) in the practice areas in the engineering discipline

K7 Comprehension of the role of engineering in society and of the identified issues in engineering practice in the discipline: ethics and the engineer’s professional responsibility to public safety; the impacts of engineering activity in economic, social, cultural, environmental and sustainability terms

K8 Engagement with selected knowledge in the research literature of the discipline

**Appendix-2**



**Appendix-3**

**UAP Grading Policy:**

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| **Numeric Grade** | **Letter Grade** | **Grade Point** |
| 80% and above | A+ | 4.00 |
| 75% to less than 80% | A | 3.75 |
| 70% to less than 75% | A- | 3.50 |
| 65% to less than 70% | B+ | 3.25 |
| 60% to less than 65% | B | 3.00 |
| 55% to less than 60% | B- | 2.75 |
| 50% to less than 55% | C+ | 2.50 |
| 45% to less than 50% | C | 2.25 |
| 40% to less than 45% | D | 2.00 |
| Less than 40% | F | 0.00 |