**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:** R701

**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 (System Design and Analysis)**

**Course Synopsis:** Continued from CSE 306, **the** course emphasize to learn different principles and practices of modern software engineering and the challenges faced in the industry and their resolutions. This course enhances the skills of using different modern tools and languages to analyze, design and testing a real-life complex software system.

**Complex Engineering Problem Statement:** Develop a solution for a real life software engineering problem using standard software process model.

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

1. **Provide** the knowledge to design and implementation of different software process models in different systems and ensure good quality software.
2. **Ensure** industrial state of the practice methods of verifying high-assurance software-intensive system**.**
3. **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:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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** | **Ks** | **Ps** | **As** |
| CO1 | **Develop** a solution for complex engineering problem using industrial state software engineering methodologies. | (l) | 1/Create | Lecture | Report | K3 or  K4,  **K5,K6** | **P1,**  **P3,**  **P7** | **A1,A4** |
| CO2 | **Identify** the requirements of that complex engineering problem by applying principles of software engineering. | (b) | 1/Apply | Lecture | Report +  Presentation on project idea |
| CO3 | **Implement** a working solution for the proposed software-intensive systems and verify the solution using testing. | (c) | 1/Apply | Practice | Continuous Project Evaluation  project demonstration(Video), Report |
| CO4 | **Use** a modern/popular IDE to implement complex software-intensive system solution. | (e) | 1/Apply | Practice | Continuous Project Evaluation |
| CO5 | **Assess** societal, health, safety, legal and cultural issues related to the project. | (f) | 1/Understand | Lecture | Report |
| CO6 | **Recognize** ethical and professional responsibilities in engineering situations. | (h) | 3/Valuing | Lecture | Viva |
| CO7 | **Working** effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. | (i) | 3/Characterizing | Group practice | Continuous Project Evaluation,  Viva |
| CO8 | **Communicate** effectively, in both oral and written documents on the project. | (j) | 1/Apply | Lecture (report format) | Report, Viva |
| CO09 | **Apply** project management principles using Version Control System, and predict project operating cost and time for complex software-intensive systems. | (k) | 1/Apply | Lecture | Report |

**Weighting COs with Assessment methods:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Assessment Type** | **% weight** | **CO1** | **CO2** | **CO3** | **CO4** | **CO5** | **CO6** | **CO7** | **CO8** | **CO9** |
| Presentation | **10%** |  | 5  Project idea | **5**  (video demo.) |  |  |  |  |  |  |
| Technical Report (word/pdf) | **50%** | 10 | 10 | Source Code: Design pattern **(5) +**  Testing **(5)** + Process Model **(5)** |  | 5 |  |  | 5 (report quality +  Mapping) | 5 |
| Viva | **20%** | 5 |  |  |  |  | 5 | 5 | 5 |  |
| Continuous Project Evaluation with Class performance | **20%** |  |  | **10** | **5** |  |  | 5  (VCS) |  |  |
| **Total** | **100%** | **15** | **15** | **30** | **5** | **5** | **5** | **10** | **10** | **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 Project requirement, Discussion on societal, health, safety, legal and cultural issues related to the project, Project management principles, Ethical and professional responsibilities  **Project Group Formation**  **(Up to 6 members)** | CO1,  CO2,  CO6,  CO9 | Lectures, Individual Tasks (Instant idea sharing) | PPT Slides,  Reference links |
| **2** | **Project Idea Sharing (Presentation)**,  Introduction to Testing, introduction to software quality assurance, how to write test case, Manual testing. | CO2, CO7 | Lectures, Group Presentation | PPT Slides,  Reference links |
| 3 | Introduction to automated Testing, **Selenium platform**, Installing Selenium and Pycharm, WebDriver installation; Synching project repository.  **Project Update-01** | CO3,CO4,CO7 | 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.**Project Update-02** | CO3,CO4,CO7 | Lecture, Group Tasks | 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 | CO3,CO4 | Lecture, Demonstration, | PPT Slides,  Reference links |
| 6 | **Project update-03** :  **Generate automated testing report** (at least up to login system)  Concept of system testing, functional and non-functional, introduction to load testing, performance testing | CO3,CO4,CO7 | Lecture, Demonstration, Individual Tasks | PPT Slides,  Reference links |
| 7 | Final Project Demonstration, Report submission & Viva | CO1-9 | Demonstration, viva |  |

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

**Textbook:** Head First Design Patterns (A Brain Friendly Guide)

Advanced Selenium Web Accessibility Testing: Software Automation Testing Secrets Revealed by Narayanan Palani

# **Required References: Will be provided during lab class.**

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

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

**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

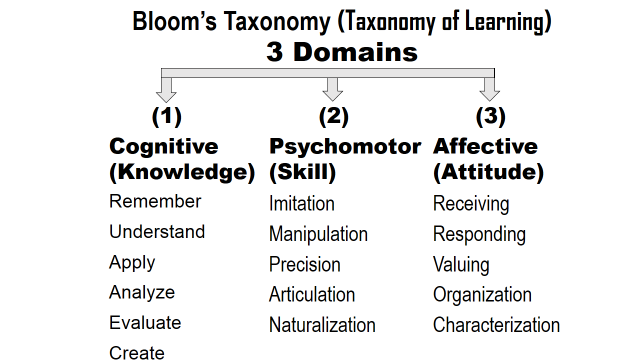
K5 Knowledge that supports engineering design in a practice area

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 |