**COURSE DESCRIPTION FORM: SL2002 – Software Design and Architecture**

**COURSE DESCRIPTION FORM**

**INSTITUTION**  FAST School of Computing, National University of Computer and Emerging Sciences, Karachi



**PROGRAM TO BE EVALUATED**

**Course Description**

| SL2002 |
| --- |
| Software Design and Architecture |
| 3+1 |
| SE1001 |
| Absolute grading |
| Retake of missed assessment items (other than midterm/ final exam) will not be held.  For a missed midterm/ final exam, an exam re-take/ pre-take application along with necessary evidence are required to be submitted to the department secretary. The examination assessment and retake committee will decide the exam re-take/ pre-take cases. |
| Plagiarism in project or midterm/ final exam may result in F grade in the course.  Plagiarism in an assignment will result in zero marks in the **whole assignments** category. |
| 75% Theory 25% Practical Assessment Items   | **Assessment Item** | **Weight (%)** | | --- | --- | | Lab Work | 20 | | Midterm Exam | 20 | | Project (Theory / Lab) | 10 | | Final Exam | 50 | |
| Ms. Syeda Rubab Manzar |
| Ms. Syeda Rubab Manzar, Ms Noureen Fatima |
| Ms. Syeda Rubab Manzar |
| **GCR: https://classroom.google.com/u/0/c/NTg1OTAyMzQ0Mjk0** |
| Object Oriented approach, at present, is the method of choice for the industry to develop different software. It is a marked shift, in the way a software solution is conceived and implemented, from the structured/procedural design paradigm. Instead of viewing the problem domain as a sequence or set of procedures, the emphasis in OOA/D is on entities that interact with one another while making a design closer to the problem domain and the way human beings think and understand the real world. |
| * Applying UML and Patterns 3rd Edition by Craig Larman * UML 2 Toolkit by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado * UML and the Unified Process, Practical object-oriented analysis and design by Jim Arlow, Ila Neustadt |
| * The Unified Modeling Language Reference Manual, 2nd edition by James Rumbaugh, Ivar Jacobson and Grady Booch * UML Distilled, 3rd Edition by Martin Flower * Internet |

| **AI Lab Learning Outcomes** | | 1. **Course Learning Outcomes (CLOs)** | | --- | | On successful completion of this course lab students will have to know how of:   | | CLO | Name | Domain | Taxonomy Level | PLO | Tools | | --- | --- | --- | --- | --- | --- | | 1 | Design and Implement OOD models and refine them to reflect implementation details | C, P | 3, 4 | 3 | LA, M, F, P | | 2 | Apply and use UML to visualize and document the design of software systems. | C, P | 3, 4, 5 | 5 | LA, M, F |   LA = Lab Activity, M = Mid Term, F = Final, P = Project  **B. Program Learning Outcomes** | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | For each attribute below, indicate whether this attribute is covered in this course or not. Leave the cell blank if the enablement is little or non-existent. | | | | 1. Computing Knowledge | Apply knowledge of mathematics, natural sciences, computing fundamentals, and a computing specialization to the solution of complex computing problems. | | --- | --- | |  | | | 2. Problem Analysis | Identify, formulate, research literature, and analyze complex computing problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and computing sciences. | | --- | --- | |  | | | 3. Design/ Develop Solutions | Design solutions for complex computing problems and design systems, components, and processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. | | --- | --- | |  | | | 4. Investigation & Experimentation | Conduct investigation of complex computing problems using research-based knowledge and research-based methods. | | --- | --- | |  | | | 5. Modern Tool Usage | Create, select, and apply appropriate techniques, resources and modern computing tools, including prediction and modeling for complex computing problems. | | --- | --- | |  | | | 6. Society Responsibility | Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues relevant to context of complex computing problems. | | --- | --- | |  | | | 7. Environment and Sustainability | Understand and evaluate sustainability and impact of professional computing work in the solution of complex computing problems. | | --- | --- | |  | | | 8. Ethics | Apply ethical principles and commit to professional ethics and responsibilities and norms of computing practice. | | --- | --- | |  | | | 9. Individual and Teamwork | Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings. | | --- | --- | |  | | | 10. Communication | Communicate effectively on complex computing activities with the computing community and with society at large. | | --- | --- | |  | | | 11. Project Management and Finance | Demonstrate knowledge and understanding of management principles and economic decision making and apply these to one’s own work as a member or a team. | | --- | --- | |  | | | 12. Lifelong Learning | Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes. | | --- | --- | |  | | | | **C. Mapping of CLOs on PLOs**  (CLO: Course Learning Outcome, PLOs: Program Learning Outcomes) | | | | | | | | | | | | | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | | **PLOs** | | | | | | | | | | | | | | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | | **CLOs** | 1 |  |  |  |  |  |  |  |  |  |  |  |  | | 2 |  |  |  |  |  |  |  |  |  |  |  |  | |  |  | **Topics to be covered** | | | | | | --- | --- | --- | --- | --- | --- | | **List of Topics** | | **Week** | **No. of Weeks** | **Contact Hours** | **CLO(s)** | | Java Basics | | **1** | **1** | **3** | **1,2** | | Introduction to Papyrus, use-case Model | | **2** | **1** | **3** | **1,2** | | Domain Model | | **3** | **1** | **3** | **1,2** | | Class Diagram | | **4** | **1** | **3** | **1,2** | | Robustness Diagram | | **5** | **1** | **3** | **1,2** | | **WEEK 6** | **MID -1 Exam** | | | | | | Activity Diagram | | **7** | **1** | **3** | **1,2** | | LAB MID TERM | | **8** | **1** | **3** |  | | Sequence Diagram | | **9** | **1** | **3** | **1,2** | | Communication Diagrams | | **10** | **1** | **3** | **1,2** | | State chart diagram | | **11** | **1** | **3** | **1,2** | | **Week 12** | **MID -2 Exam** | | | | | | Component Diagram | | **13** | **1** | **3** | **1,2** | | Deployment Diagram | | **14** | **1** | **3** | **1,2** | | Design Patterns | | **15** | **1** | **3** | **1,2** | | **Week 16** | **Final Exam** | | | | | | *Total* | |  | **16** | **48** |  | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

**Instructor Name: Rubab Manzar**

**Instructor Signature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: June 13, 2023**