COURSE DESCRIPTION FORM: CS-2004: Fundamentals of Software Engineering

INSTITUTION FAST School of Computing, National University of Computer and Emerging Sciences, Lahore Campus

PROGRAM(s) TO BE EVALUATED BS-DS: **Spring-2024**

Course Description

Course Code	CS-2004
Course Title	Fundamentals of Software Engineering
Credit Hours	3
Course Instructors	Ansa Liaqat
Grading Policy	Absolute Grading
Policy about missed assessment items in the course	Retake of missed assessment items (other than sessional/ final exam) will not be held. Student who misses an assessment item (other than sessional / final exam) is awarded zero marks in that assessment item i.e., late submission will not be accepted. For missed sessional/ final exam, exam retake/ pretake application along with necessary evidence are required to be submitted to the department secretary. The examination assessment and retake committee decides the exam retake/ pretake cases.
Course Plagiarism Policy	Plagiarism in project or sessional/ final exam will result in F grade in the course. Plagiarism in an assignment will result in zero marks in the whole assignments category.
Prerequisites by Course(s) or Topics	
Assessment Instruments with Weights (homework, quizzes, sessional exams, final exam, assignments, etc.)	Assessment with the weight.

Assessment Type	**Weight**
Quiz and in-class activities	15
Sessional Exams 1	12.5
Sessional Exams 2	12.5
Project	20
Final Exam	40

Course Coordinator	Ansa Liaqat
URL (if any)	
Course Catalog Description	This course introduces students to the Overview of Software Engineering, Professional software development, Software engineering practice, Software process structure, Software process models, Agile software Development, Agile process models and Agile development techniques. Course will also cover Requirements Engineering, Design,

architecture, testing, and project management in detail.

Textbook(s) **Software Engineering (10th Edition) by Sommerville, Ian Addison Wesley**

Reference Material Software Engineering: A Practitioner's Approach, Pressman, R.S. & Maxim B., 8th Edition (2015), McGraw-Hill.

Course Goals

A. Course Learning Outcomes (CLOs)

After course completion, the students shall be able to:

1. Students will learn the basics of software process models and will learn to choose the best fit for variable nature of projects in industry.
2. Discover both functional and non-functional requirements for a medium sized software system.
3. Students will learn to design and test their software.
4. Students will able to choose the appropriate architecture for their projects.
5. Students will be able to learn basic project management skills along with costing and estimation.
6. Students will learn to carry out a medium size project from scratch to end on their own using Iterative method.

B. Program Learning Outcomes (PLOs)

PLO 1	Computing and Artificial Intelligence Knowledge	Apply knowledge of mathematics, natural sciences, computing fundamentals, and a computing specialization to solve complex computing problems using artificial intelligence techniques.
PLO 2	Problem Analysis	Identify, formulate, research literature, and analyze complex computational problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, computing, and artificial intelligence.
PLO 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.
PLO 4	Investigation & Experimentation	Conduct investigation of complex computing problems using research based knowledge and research based methods
PLO 5	Modern Tool Usage	Create, select, and apply appropriate techniques, resources and modern computing and artificial intelligence tools, including prediction and modelling for complex computing problems.
PLO 6	Society Responsibility	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues relevant to context of

		1	2	3	4	5	6	7	8	9	10	11	12
		✔	✔	✔	✔					✔	✔		✔
		✔	✔	✔	✔	✔			✔	✔	✔	✔	✔
		✔	✔	✔	✔	✔							✔
			✔	✔	✔	✔							
		✔	✔	✔					✔	✔	✔	✔	✔
	6	✔	✔	✔		✔				✔	✔	✔	✔

Topics covered in the course
(assume 15-week instruction and 3 contact hours per week)

List of Topics	No. of Weeks	Contact Hours	CLO(s)
Introduction to Software Engineering	1	3	1
Software Process Models (traditional models)	2	6	1,2,6
Software Process Models (non-traditional models)	2	6	1,2,6
Requirement Engineering	2	6	2
Software Architecture design	2.5	7.5	1,3,4,6
Software Testing Basics	2	6	1,3,6
Software Quality Assurance and Processes	1.5	4.5	3
Software Project Management	2	6	1,5
Total	**15**	**45**	

Programming Language for Assignments (if any)

C++, JAVA, Python

Class Time Spent (in percentage)

Theory	Problem Analysis	Solution Design	Social and Ethical Issues
50	25	20	5

Oral and Written Communications

Every student is required to submit at least __4___ written reports of typically _4_ pages and make __1___ oral presentation of typically ____10___ minutes' duration.