Course Details

Program(s)	Subject Name	Academic Session, Semester	Subject Code & Credit	
B.Tech.	Software Engineering	Autumn, 2025 (5th Semester)	CS-31001	Cr-4, L – T – P 3 – 1 – 0

Note: 4 Credits = 15x4= 60 Hours (as per National Credit Framework, 1 credit = 15 Hours)

Subject Faculty: Dr. Hitesh Mohapatra

Activity 1

Sl. No	Questions	CO's	Bloom's Taxonomy
1.	List and briefly describe the key responsibilities of a software engineer in a typical software development project. (What roles does a software engineer play within a project team?)	CO1	Knowledge
2.	Identify four important characteristics of software that make it different from conventional physical hardware products. List each characteristic and provide a short explanation of what it means (for example, the intangibility of software).	CO2	Knowledge
3.	Draw a neat, labeled diagram of the classic Waterfall Model of software development. Clearly indicate the main phases in order (such as Requirements, Design, Implementation, etc.) and briefly state the primary activity or purpose of each phase in the model.	CO3	Knowledge
4.	Explain how software engineering processes are both similar to and different from conventional engineering processes (for example, those used in civil or mechanical engineering). Provide at least two similarities and two differences in your explanation.	CO1	Comprehension
5.	In the context of software development history, explain the term "software crisis." What problems or challenges did this crisis refer to, and how did recognition of the software crisis lead to changes or improvements in software engineering practices?	CO2	Comprehension
6.	Consider a project where the client is unsure of the exact requirements and these requirements are expected to evolve over time. Which software development life cycle (SDLC) model, would you choose as the best fit for this project, and why? Describe how using this model would help manage the uncertainty and changing requirements in the scenario.	CO3	Application

7.	Using a labeled diagram, illustrate how the Spiral Model would be applied to the development of a safety-critical software system (for example, an air traffic control system). Describe the activities that would take place in at least two of the spiral's cycles (e.g. one cycle focusing on risk analysis and another on prototyping) in the context of this project.	CO1	Application
8.	Compare and contrast the Waterfall Model with the Iterative Enhancement Model in terms of how each handles changing requirements during a project. Identify at least two key differences between these models, and discuss how those differences can impact the success of a project when requirements change in the middle of the development cycle.	CO2	Analysis
9.	Software quality attributes often interact in complex ways. Select one pair of potentially conflicting software quality attributes (for example, security vs. usability or performance vs. maintainability) and analyze why improving one of these attributes might negatively affect the other. How should a software engineer approach balancing this trade-off when designing a system?	CO3	Analysis
10.	Choose a current socially relevant problem (for example, public health tracking during a pandemic or urban traffic congestion) that could be addressed by a software application. Describe the software solution you would propose for this problem, and outline the major steps of its development life cycle (specify which SDLC model or combination of models you would follow for the project). Finally, explain why your chosen development approach is well-suited to tackle the problem and how it would ensure the resulting software meets the needs of the stakeholders.	CO1	Synthesis
11.	Design a hybrid software development approach by combining features of two existing SDLC models (for example, integrating elements of the Waterfall model with the Spiral model, or Prototype with Iterative development). Sketch a diagram of your hybrid model, clearly showing how you would sequence or integrate the stages from each of the two models, and describe how this hybrid process would work in practice. What advantages would this combined approach have over used one standard model alone?	CO2	Synthesis
12.	Over the past few decades, software engineering practices have evolved significantly with new methodologies (e.g. iterative development, agile methods, DevOps) and improved tools. Evaluate the extent to which modern	CO3	Evaluation

	software engineering practices have resolved the classic problems of the earlier “software crisis.” In your answer, discuss specific improvements that have emerged (for example, in managing project timelines, cost overruns, software quality, and stakeholder satisfaction) as well as any remaining challenges that software projects continue to face.		