

NEP - B.Sc. (Hons.) Computer Science
Guidelines for DISCIPLINE SPECIFIC CORE COURSE (DSC-15) - Software Engineering
Sem V (July 2024 Onwards)

Units	Topic covered	Content	Reference	No. of Lectures
Unit 1: Introduction	Software Engineering– A Layered Approach	Ch 1 - 1.2	[1]	9
	Software Process– Process Framework, Umbrella Activities	Ch 1- 1.3 (excluding 1.3.3)		
	Process Models – Waterfall Model, Evolutionary process Model (Prototyping, Spiral Model)	Ch 2 - 2.1, 2.5.1, 2.5.2, 2.5.3		
	Introduction to Agile, Agile Model– Scrum	Ch 3- 3.1, 3.4		
	Incremental Model	Ch 2 – 2.3.1	[2]	
Unit 2: Software Requirements Analysis and Specifications	Use Case Approach	Ch 3 - 3.4.1, 3.4.2	[3]	6
	SRS Document	Ch 3 - 3.1, 3.3.1, 3.3.2 * Ch. 3 – 3.3.4		
	Flow oriented Modeling - Data Flow Modeling	3.2.2 (excluding The Structured Analysis Method)		
Unit 3: Design Modeling	Translating Requirements model into Design Model, The Design Process, Design Concepts - Abstraction, Modularity, Functional Independence; Structure Charts	Ch 5 - 5.1 to 5.4.1	[2]	8
Unit 4: Software Metrics and Project Estimations	Software Measurement	Ch 23 - 23.1.1	[1]	7
	Metrics for Software Quality	Ch 23 - 23.8		
	Software Project Estimation (FP based estimation), Function based Metrics	Ch 25- 25.6.1, 25.6.4		
	Project Scheduling (Timeline charts, tracking the schedule)	Ch 25 - 25.10		
Unit 5: Quality Control and Risk Management	Quality Control and Quality Assurance	Ch 15 -15.4 Ch 17 -17.2	[1]	5
	Software Process Assessment and Improvement	Ch 28 - 28.3		
	Software Risks, Risk Identification, Risk Projection, Risk Mitigation, Monitoring and Management	Ch 26 – 26.1. 26.2, 26.3.1, 26.4.1, 26.6		
Unit 6: Software Testing	Strategic Approach to Software Testing, Unit Testing, Integration Testing, System Testing; Black-Box and White Box Testing, Basis Path Testing Validation Testing,	Ch 8 - 8.1, 8.2, 8.5 8.3-8.3.2, 8.4 upto 408, 8.4.2, 8.6	[2]	10
			Total	45

* To be covered in Practical only

References

1. Pressman, R.S., & Maxim, B.R. (2020). *Software Engineering: A Practitioner's Approach*. 9th ed. McGraw-Hill
2. Aggarwal, K. K., & Singh, Y. (2007). *Software Engineering*. 3rd ed. New Age International Publishers.
3. Jalote, P. *An Integrated Approach to Software Engineering*, 3rd ed., Narosa Publishing House, 2005.

Practicals

The students document, design and code a module of a Software Project using an appropriate Software Process model. Software Project should address the following concepts of Software Engineering.

1. Problem Statement, Process Model
2. Requirement Analysis: Create Data Flow, Data Dictionary, Use Cases, Sequence Diagram, Software Requirement Specification Document
3. Project Management: Timeline Chart, Compute FP, Effort, Cost, Risk Table.
4. Design Engineering: Architectural Design, Pseudocode of a small module.
5. Coding: Develop at least a single module using any programming Language
6. Testing: Compute Basis path set for at least a single module from the project, Generate test cases.

Some of the Sample Projects are given below though they are not limited to this.

1. Criminal Record Management: Implement a criminal record management system for jailers, police officers and CBI officers
2. DTC Route Information: Online information about the bus routes and their frequency and fares.
3. Car Pooling: To maintain a web-based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
4. Patient Appointment and Prescription Management System
5. Organized Retail Shopping Management Software
6. Online Hotel Reservation Service System
7. Examination and Result computation System
8. Automatic Internal Assessment System
9. Parking Allocation System
10. Wholesale Management System