



# TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Moradabad (U.P.)

## PhD PROGRAMME

### SYLLABUS FOR DISCIPLINE-SPECIFIC COURSE

#### COMPUTER APPLICATIONS/

#### COMPUTER SCIENCE & ENGINEERING

Course Code: PDS240140	SOFTWARE ENGINEERING	L	T	P	C
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<b>Objective:</b>	The primary objective of this course is to provide a comprehensive understanding of software engineering principles, methodologies, and tools. It aims to equip students with the skills necessary to design, develop, test, and maintain high-quality software systems.				
<b>Course Outcomes:</b>					
<b>CO 1:</b>	<b>Apply</b> fundamental software engineering principles and methodologies to real-world projects.				
<b>CO 2:</b>	<b>Analyze</b> software requirements and translate them into detailed design specifications.				
<b>CO 3:</b>	<b>Design</b> robust and scalable software architectures using appropriate design patterns and techniques.				
<b>CO 4:</b>	<b>Implement</b> software solutions using appropriate programming languages and tools.				
<b>CO 5:</b>	<b>Test</b> software effectively to ensure quality and reliability.				
<b>Course Content:</b>					
<b>Unit 1:</b>	Software Engineering Fundamentals: Definition of software product and process, Software Characteristics, Components, Applications, Layered Technologies, Processes and Product, Methods and Tools, Generic View of Software Engineering, Software Crisis, Software development paradigms, Techniques of Process Modeling, Software Process and lifecycle models: Build & Fix Model, Waterfall Model, Prototyping Model, Iterative Enhancement Model, Evolutionary Development Model and Spiral Model, Incremental, and Concurrent Development Model.				
<b>Unit 2:</b>	Software Requirements Analysis & Specification: System specification, Software requirements specification (SRS) standards, Formal specification methods, Specification tools, Requirements validation and management. Problem Recognition, Evaluation and Synthesis, Modeling, Specifications and Review Techniques. Analysis Modeling: Difference between Data and Information, ER Diagram, Dataflow Model, Control Flow Model, Control and Process Specification, Data Dictionary.				
<b>Unit 3:</b>	Software Design: Software architecture, Modular Design-cohesion and coupling, Process-oriented design, Process and Optimization, Data-oriented design, User-interface design, Real-time software design, Architectural Designing, Interface Design, Procedural Design, Object Oriented Design. CASE Tools: Computer-aided software engineering, Introduction to CASE, Building Blocks of CASE, Relevance of CASE tools, High-end and low-end CASE tools, automated support for data dictionaries, DFD, ER diagrams,				

	Integrated Case Environment, CASE workbenches.
<b>Unit 4:</b>	Coding and Testing: Choice of Programming languages, Coding standards, Introduction to Testing Process, Functional & Structural Testing, Testing Activities like Unit, Integration & System Testing, Testing tools and workbenches. User Interface Design: Concepts of UI, Interface Design Model, Internal and External Design, Evaluation, Interaction and Information Display.
<b>Unit 5:</b>	Configuration Management: Concepts in Configuration Management, The Configuration Management Process: Planning and Setting up Configuration Management, Perform Configuration Control, Status Monitoring and Audits. Software Maintenance: What is software maintenance, Maintenance Process & Models, Reverse Engineering, Software re-engineering, Configuration Management issues and concepts, Configuration planning & techniques, Software versions and change control process, Documentation.
<b>Text Books:</b>	<ol style="list-style-type: none"> <li>1. R. Pressman, "Software Engineering", 7th Edition, 2002, McGraw-Hill.</li> <li>2. W.S. Jawadekar, Software Engineering – A Primer, TMH-2008</li> </ol>
<b>Reference Books:</b>	<ol style="list-style-type: none"> <li>1. Software Engineering, Yogesh Singh, New Age Publications, Delhi.</li> <li>2. Shari Pfleeger, "Software Engineering", 2001, Pearson Education</li> </ol>
<b>Additional Electronic Reference Material:</b>	<ol style="list-style-type: none"> <li>1. <a href="#">Curriculum - Software Engineering Ph.D. Program - Software and Societal Systems Department - Carnegie Mellon University</a></li> </ol>