BCSC009: SOFTWARE ENGINEERING

Objective: *Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility.*

Credits:03   **L-T-P-J:3-0-0-0**

Module No.	Content	Teaching Hours
I	**Introductory Concepts**: The evolving role of software – characteristics, components and applications. **Process Models:** Waterfall Model, Prototyping, Incremental, Spiral, RAD. **Software Requirement Specification**: Requirement Process, SRS Components, Requirement Specifications with Use Cases Diagram, Requirements Validation. **Software Project Planning:** Project Planning Objectives. **Software Metrics:** Size, Function Point, Staffing, Project Estimation Methods–Decomposition Techniques; Empirical Estimation Models – COCOMO Model.	13
II	**Function-Oriented Design**: Problem Partitioning, Abstraction, Top Down and Bottom Up Design. **Module-Level Concepts:** Coupling, Cohesion, Design Notation and Specification - Structure Charts; Structured Design Methodology - Data Flow Diagram. **OO Analysis and OO Design:** OO Concepts, Introduction to UML Design Patterns. **Design Verifications:** Design Walkthroughs, Critical Design Review, Consistency Checkers. **Coding:** Coding Process, Verification - Code Inspections, Static Analysis, Proving Correctness; Metrics- Size Measures and Complexity Metrics.	13
III	**Testing Fundamentals**: Test Case Design, White Box Testing, Basis Path Testing, Control Structure Testing, Black Box Testing Strategies, Unit Testing, Integration Testing, Validation Testing, Reliability Estimation, Basic Concepts and Definitions, Reliability Model. Software Quality, ISO 9000 Certification for Software Industry, SEI Capability Maturity Model. **Software Configuration Management:** Introduction to SCM, Version Control and Change Management. **Risk Management:** Risk Mitigation, Monitoring, and Management. **Software Maintenance**: Models, Cost of Maintenance, Re-engineering, Reverse Engineering.	14

Text Books:
- R. S. Pressman (2010), "*Software Engineering: A Practitioners Approach*", 7thEdition, McGraw Hill.

Reference Books:
- K. K. Aggarwal and Yogesh Singh (2008), "*Software Engineering*", 3rd Edition, New Age International Publishers.
- Rajib Mall (2009), "*Fundamentals of Software Engineering*", 3rd Edition, PHI Publication.
- R.E Fairley (2004), "*Software Engineering*", McGraw Hill.
- Sommerville (2010), "*Software Engineering*", 9th Edition, Pearson Education.

Outcome:
- The ability to apply software engineering theory, principles, tools and processes, as well as the theory and principles of computer science and mathematics, to the development and maintenance of complex software systems.
- The ability to design and experiment with software prototypes and to select and use software metrics.
- Effective communications skills through oral and written reports and software documentation evaluated by both peers and faculty.
- The ability to elicit, analyze and specify software requirements through a productive working relationship with project stakeholders.