Course Title: Advanced Software Engineering Principles Course Code: IT612

Course Objectives:

- Acquaint students with the concepts and methods available for software development in industrial environments.
- Students will be exposed to a variety of topics such as design notations, costing techniques, and testing methods.
- To provide an advanced understanding and knowledge of the software engineering techniques, techniques to collect software requirements from client and CASE tools and to understand the importance of these case tools in software development.

Learning Outcomes:

- Analyze the software life cycle models;
- Identify the importance of the software development process;
- Analyze the importance of CASE tools;
- Design and develop correct and robust software products using advanced software engineering techniques;
- Able to understand business requirements pertaining to software development.

Module I: Life Cycle Models

Waterfall Model, Prototyping Models, Incremental Development, Spiral Model, Rapid Application Development. Component Model, Agile Software Development, Selection of appropriate development process

Module II: Formal Methods

Basic concepts, Mathematical Preliminaries, Mathematical notations for Formal Specification, Formal Specification Languages, Z-Notations, Ten commandments of formal methods, Formal Methods- The Road Ahead

Module III: Component-Based Software Engineering

Component-Based Software Engineering, Engineering of Component-based Systems, CBSE Process, Domain Engineering, Component-based Development, Classifying and Retrieving Components, Economics of CBSE, Cleanroom Software Engineering, The Cleanroom Approach, Functional Specification, Cleanroom Design, Cleanroom Testing

Module IV: Client/Server Software Engineering

Client/Server Software Engineering, The Structure of Client/Server Systems, Software Engineering for Client Server Systems, Analysis Modeling Issues, Design for Client Server Systems Testing Issues. Web Engineering, The Attributes of Web-based Applications, Webbe Process, Framework for Webbe, Formulating/Analyzing Web-based Systems, Design for Web- based Applications, Testing Web-based Applications, Management Issues., Service Oriented Software Engineering, Services as Reusable Components, Service Engineering, Software Development with Services

Module V: Reengineering and CASE

Reengineering, Business Process Reengineering, Software Reengineering, Reverse Reengineering, Restructuring, Forward Reengineering, Economics of Reengineering., Computer- Aided Software Engineering, Introduction, Building Blocks for CASE, Taxonomy of CASE Tools, Integrated CASE

Environments, Integration Architecture, CASE Repository, Case Study of Tools like TCS Robot.