

AC –
Item No. –

As per NEP 2020

**Tolani College of
Commerce
(Autonomous)**



Knowledge is Supreme

Title of the Course: Software Engineering

Programme: B.Sc. (Information Technology)

Semester-IV

Syllabus for 4 credits

From the academic year-2025-2026

Sr. No.	Heading	Particulars
1	Description the course :	Software engineering is the branch of computer science that deals with the design, development, testing, and maintenance of software applications.
2	Vertical :	Major
3	Type :	Theory and Practical
4	Credit:	4 credits
5	Hours Allotted :	60 Hours
6	Marks Allotted:	100 Marks Continuous Evaluation =40 Semester End =60
7	Course Objectives:	<ol style="list-style-type: none"> 1) To provide the idea of decomposing the given problem into Analysis, Design, Implementation, Testing and Maintenance phases. 2) To provide an idea of using various process models in the software industry according to given circumstances. 3) Equip students with the knowledge and practical skills needed to design, implement, test, and maintain software systems using industry-standard methodologies and tools 4) Encourage students to apply analytical thinking and problem-solving techniques to real-world software engineering challenges.
8	Course Outcomes:	<ol style="list-style-type: none"> 1) Learners should be able to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. 2) Learners should be able to communicate effectively with a range of audiences. 3) Students will demonstrate the ability to apply various software development methodologies 4) Students will be able to analyze complex software requirements and develop innovative solutions, evidenced by their ability to design, implement, and test software

9	Modules:-
	Module 1: Introduction, Software Requirements and Agile software development (15 hours)
	<ul style="list-style-type: none"> • What is software engineering? Software Development Life Cycle, Requirements Analysis, Software Design, Coding Testing, Maintenance etc. • Functional and Non-functional, requirements, User Requirements, System Requirements, Interface, Specification, Documentation of the software requirements. Software Development Process Models. Waterfall Model. Prototyping. Iterative Development. Rational Unified Process. The RAD Model. Time boxing Model. • Agile methods, Plan-driven and agile development, Extreme programming, Agile project management, Scaling agile methods.
	Module 2: Socio-technical system, Critical system , Requirements Engineering Processes, (15 hours)
	<ul style="list-style-type: none"> • Essential characteristics of socio technical systems, Emergent System Properties, Systems Engineering, Components of system such as organization, people and computers, Dealing Legacy Systems. • Types of critical system, A simple safety critical system, Dependability of a system, Availability and Reliability, Safety and Security of Software systems. • Feasibility study, Requirements elicitation and analysis, Requirements Validations, Requirements Management. • System Models: Models and its types, Context Models, Behavioral Models, Data Models, Object Models, Structured Methods.
	Module 3: Architectural Design, User Interface Design, Project Management, Quality Management (15 hours)
	<ul style="list-style-type: none"> • Architectural Design Decisions, System Organization, Modular Decomposition Styles, Control Styles, Reference Architectures. • UI Design issues, UI Design Process, UI Design principles • Software Project Management, Management activities, Project Planning, Project Scheduling, Risk Management. • Process and Product Quality, Quality assurance and Standards, Quality Planning, Quality Control
	Module 4: Verification and Validation, Software Testing, Software Measurement, Software Cost Estimation (15 Hours)
	<ul style="list-style-type: none"> • Planning Verification and Validation, Software Inspections, Automated Static Analysis, Verification and Formal Methods. • System Testing, Component Testing, Test Case Design, Test Automation. • Size-Oriented Metrics, Function-Oriented Metrics, Extended Function Point Metrics • Software Productivity, Estimation Techniques, Algorithmic Cost Modelling, Project Duration and Staffing

