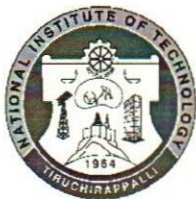


DEPARTMENT OF COMPUTER APPLICATIONS

COURSE PLAN – PART I			
Name of the programme and specialization	Master of Computer Applications		
Course Title	SOFTWARE ENGINEERING		
Course Code	CA 725	No. of Credits	4
Course Code of Pre-requisite subject(s)	CA711, CA712, CA716	Semester	III
Session	July 2023	Section (If, applicable)	A and B
Name of Faculty	Ghanshyam S. Bopche	Department	Computer Applications
Official Email	bopche@nitt.edu	Telephone No.	0431-2503735
Name of Course Coordinator(s) (if, applicable)	Dr. Sindhia Lingaswamy		
Official E-mail	sindhia@nitt.edu	Telephone No.	0431-250
Course Type	Core course		
<b>Syllabus (approved in BoS)</b>			
<p>Introduction to Software Engineering, Software Life Cycle Models, Requirements Analysis and Specification: formal requirements specification and verification - axiomatic and algebraic specifications.</p> <p>Software Design Issues, Function Oriented Software Design, Object Modeling using UML: use case model, class and interaction diagrams, activity and state chart Diagrams, Object Oriented Software Development: design patterns, domain modeling, User Interface Design.</p> <p>Coding and Testing: code review, black box testing, white box testing, debugging, integration and system testing, Automation testing tools - Software Maintenance, Software Reuse.</p> <p>Software Project Planning: Project planning and estimation, cost and staffing level estimation, Software Project Monitoring and Control, Software Reliability and Quality Management, Risk Management and Software Quality Assurance.</p> <p>Agile Software Development - Agile Manifesto and Principles – Agile Project Management (Lean Software Management and DevOps) – Agile and Lean Frameworks: SCRUM, Crystal, Kanban, Feature Driven Development, Adaptive Software Development, and Extreme Programming: Method overview – lifecycle – roles, practices and Applicability.</p>			
<b>REFERENCES:</b>			
<ol style="list-style-type: none"> <li>1. Ian Sommerville, Software Engineering, 10th Edition, Pearson, 2017</li> <li>2. Roger Pressman, Software Engineering: A Practitioner's Approach, 8th Edition, McGraw Hill, 2014.</li> <li>3. Rajib Mall, Fundamentals of Software Engineering, 5th Edition, PHI Learning, 2018.</li> </ol>			



4. Craig Larman, Agile and Iterative Development: A Manager's Guide, 1st Edition, Addison- Wesley, 2003
5. David J. Anderson, Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results, Prentice Hall, 2003.

**COURSE OBJECTIVES**

To impart concepts of a comprehensive study on the theories, processes, methods, and techniques of building high-quality software in cost-effective ways.

**MAPPING OF COs with POs**

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. Demonstrate a basic understanding of software engineering practices from vision to analysis, design, development, validation, deployment, and maintenance.	1, 2, 3, 4,5
2. Develop skills to create and use various software Engineering based techniques and tools to solve real world problems.	1, 2, 3, 4, 5
3. Estimate cost, effort and risk involved in a software project development.	1, 2, 3, 4, 5

**COURSE PLAN – PART II**

**COURSE OVERVIEW**

This course covers topics on Software Development Life Cycles Models, Software Process and Project Metrics, Software Project Planning, Software Project Cost Estimation Techniques, System Engineering, Risk Management, Software Contract Management, Procurement Management, Software Analysis and Design, Metrics for Software Quality Assessment, Software Testing and Maintenance, Use of formal methods for software engineering, software reengineering, software reverse engineering. Detailed knowledge about the different activities in the development of software is useful in practice.

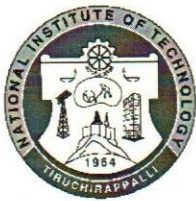
**COURSE TEACHING AND LEARNING ACTIVITIES**

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 (3 Classes)	Introduction to software engineering, characteristics of software, software application domains, software crisis.	Chalk and Talk
2	Week 2 (3 Classes)	Software quality attributes, activities common to software engineering projects, software engineering layers, Software process, process flow, software process models- Waterfall Model, Incremental Process Model.	Chalk and Talk
3	Week 3 (3 Classes)	Software process models- Evolutionary process models, Concurrent process model, Component-based development model, Formal process model, Unified process model, Personal and Team Process models, Capability Maturity Model (CMM), Software process and project metrics.	Chalk and Talk



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4	Week 4 (3 Classes)	Software measurement, Object-oriented metrics, WebApp project Metrics, Metrics for software quality, Project Planning, Software scope and feasibility analysis, Software project planning activities, estimation of the resources.	Chalk and Talk
5	Week 5 (3 Classes)	Software project estimation: problem-based decomposition, process-based decomposition.	Chalk and Talk
6	Week 6 (3 Classes)	Empirical estimation models: basic COCOMO, intermediate COCOMO, the software equation, The Make/Buy decision.	Chalk and Talk
7	Week 7 (3 Classes)	Software Scheduling – CPM and PERT, System Engineering, Risk management	Chalk and Talk
8	Week 8 (3 Classes)	Analysis and Design, Design concept and Principles.	Chalk and Talk
9	Week 9 (3 Classes)	Real time of object-oriented systems, Comparisons, Metrics, Quality assurance.	Chalk and Talk
10	Week 10 (3 Classes)	Testing fundamentals, Test case design, White box testing, Basis path testing, Control structure testing.	Chalk and Talk
11	Week 11 (3 Classes)	Black box testing, strategies, unit testing, integration testing, validation Testing, system testing.	Chalk and Talk
12	Week 12 (3 Classes)	Art of debugging, Metrics, Testing tools.	Chalk and Talk
13	Week 13 (3 Classes)	Agile Software Development, Agile Manifesto and Principles, Agile Project Management (Lean Software Management and DevOps)	Chalk and Talk
14	Week 14 (3 Classes)	Agile and Lean Frameworks: SCRUM, Crystal, Feature Driven Development, Adaptive Software Development, and Extreme Programming:s Method overview – lifecycle – roles, practices, and Applicability.	Chalk and Talk



**COURSE ASSESSMENT METHODS**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test 1	As per academic calendar	60 Minutes	20%
2	Cycle Test 2	As per academic calendar	60 Minutes	20%
3	Lab Assignment	9 <sup>th</sup> week	-	10%
CPA	Compensation Assessment*	As per academic calendar	60 Minutes	20%
4	Final Assessment *	As per academic calendar	180 Minutes	50%

\*mandatory; refer to guidelines on page 5

**COURSE EXIT SURVEY** (mention the ways in which the feedback about the course shall be assessed)

- The students, through the class representative, may give their feedback at any time to the course coordinator which will be duly addressed.
- The students may give their feedback during class committee meetings.

**COURSE POLICY** (including compensation assessment to be specified)

**MODE OF CORRESPONDENCE**

By Email: bopche@nitt.edu

**COMPENSATION ASSESSMENT POLICY**

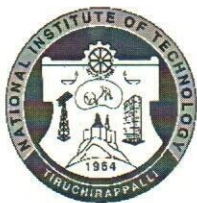
Compensation assessment will be conducted for absentees in cycle test I or cycle test II only after the submission of medical or On-Duty certificates signed by competent authority.

**ATTENDANCE POLICY** (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

**ACADEMIC DISHONESTY & PLAGIARISM**

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC



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chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

- The above policy against academic dishonesty shall be applicable for all the programmes.

### ADDITIONAL INFORMATION, IF ANY

### FOR APPROVAL

Course Faculty   
(Dr. Ghanshyam S. Bopche)

CC- Chairperson   
(Dr. Sindhia Lingaswamy)

HOD   
(Prof. Michael Arock)