CVM UNIVERSITY
Aegis: Charutar Vidya Mandal (Estd.1945)

FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2020-21

Programme: **Bachelor of Engineering (Information Technology)**

Semester: **V**

Course Code: **102045602**

Course Title: **Software Engineering**

Course Group: **Professional Core Course**

Course Objectives: This course provides the fundamental knowledge of Software Development Life Cycle, Development models and Agile Software development. It also embraces fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods. It also elaborates various software testing issues and solutions in software unit test; integration, regression, and system testing & express to gain the techniques and skills on how to use modern software testing tools to support software testing projects. The course is driven from the engineering perspective.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	0	2	4	40 / 14	60 / 21	20 / 07	30 / 10	150 / 52

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction to Software and Software Engineering:** The Evolving Role of Software, Software: A Crisis on the Horizon and Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Component-Based Development, Process, Product and Process, Agile Process Model &Development.	08
2	**Requirement Analysis and Specification:** Understanding the Requirement, Requirement Modelling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.	05
3	**Managing Software Project:** Software Metrics (Process, Product and Project Metrics), Software Project Estimations, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis & Management (Risk Identification, Risk Projection, Risk Refinement, Risk Mitigation).	05

4	**Software Design:** UML Diagrams – (Class Diagram, Use Case, state Diagram, Activity Diagram, Sequence Diagram). Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design), User Interface Design, Web Application Design.	**05**
5	**Software Coding & Testing:** Coding Standard and coding Guidelines, Code Review, Software Documentation, Testing Strategies, Testing Techniques and Test Case, Test Suites Design, Testing Conventional Applications, Testing Object Oriented Applications, Testing Web and Mobile Applications, Testing Tools (Win runner, Load runner).	**05**
6	**Quality Assurance and Management:** Quality Concepts and Software Quality Assurance, Software Reviews (Formal Technical Reviews), Software Reliability, The Quality Standards: ISO 9000, CMM, Six Sigma for SE, SQA Plan, Software Maintenance and Configuration Management.	**06**
7	**DevOps:** Overview, Problem Case Definition, Benefits of Fixing Application Development Challenges, DevOps Adoption Approach through Assessment, Solution Dimensions, What is DevOps?, DevOps Importance and Benefits, DevOps Principles and Practices, 7 C's of DevOps Lifecycle for Business Agility, DevOps and Continuous Testing, How to Choose Right DevOps Tools, Challenges with DevOps Implementation, Must Do Things for DevOps, Mapping My App to DevOps - Assessment, Definition, Implementation, Measure and Feedback.	**06**
	Total	**40**

List of Practicals / Tutorials:

1	An introduction to software engineering & Studying Various phases of Water-Fall Model. For each SDLC phase, identify the objectives and summaries outcomes. Assume yourself as Software Analyst / Project developer/ / Manager and complete following practical 2, 3, 4,5,6,7,8,9,10 based on selected project. Choose any one project like: 1. Library Information System 2. Villager Telephone System 3. Waste Management Inspection Tracking System (WMITS) 4. Flight Control System 5. Ambulance Dispatching System /108 6. Suraksha Setu project system
2	Define requirement Gathering and technical requirement specification for selected project.
3	Development of DFD and E-R diagram for the software domain problem.
4	Draw Use case and Activity Diagrams for the project definition.
5	Draw the Sequence Diagram for the project definition.
6	Development of State Transition Diagram for Software project definition.
7	Design Class & Object Diagrams for software domain problem.
8	Prepare a data dictionary for Software project definition.
9	Draw the Deployment Diagram for the project definition.
10	Design the Test Cases for software domain problem.
11	Generate SRS Document as per given format.

12	Why Agile process models with DevOps are recommended in big companies like Infosys. Justify with one of the case studies (You can explore it with any tool like JIRA). Write a report of 3-5 pages on case study.

Reference Books:

1	Roger S. Pressman, Software Engineering- A practitioner's Approach, McGraw-Hill International Editions
2	Ian Sommerville, Software engineering, Pearson education Asia
3	Pankaj Jalote, Software Engineering – A Precise Approach Wiley
4	Behhforoz & Frederick Hudson, Software Engineering Fundamentals, OXFORD
5	Rajib Mall, Fundamentals of software Engineering, Prentice Hall of India
6	Object-Oriented Modeling and Design by James R Rumbaugh

Supplementary learning Material:

1	NPTEL - Swayam Courses
2	www.onesmartclick.com/engsineering/software-engineering.html
3	www.en.wikipedia.org/wiki/Software_engineering
4	www.win.tue.nl
5	www.rspa.com/spi
6	www.sei.cmu.edus
7	www.edx.org/school/uc-berkeleyx
8	www.devops.com/most-popular-open-source-devops-tools/

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods
- Seminar/Poster Presentation
- Industrial/ Field visits
- Course Projects

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
15%	15%	25%	25%	20%	---	

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes (CO):

Sr.	Course Outcome Statements	%weightage
CO-1	To be able to learn various the process models apply the SDLC process for domain specific software project.	**15**
CO-2	To be able to gather technical and non-technical requirement and complete requirement engineering task for project.	**25**

CO-3	To apply various types of software design techniques to design software project.	**25**
CO-4	To be able to learn and apply testing techniques to various types of software project.	**20**
CO-5	To understand software development and operation management activities with DevOps.	**15**

Curriculum Revision:	
Version:	1.0
Drafted on (Month-Year):	June-2020
Last Reviewed on (Month-Year):	-
Next Review on (Month-Year):	June-2025