| Course Code | PCA20D03J | Course Name | SOFTWARE ENGINEERING | Course Category | D | *Discipline Elective* Course | L | T | P | C |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 3 | 0 | 2 | 4 |

| Pre-requisite Courses | Nil | Co-requisite Courses | Nil | Progressive Courses | Nil |
|---|---|---|---|---|---|
| Course Offering Department | Computer Applications | Data Book / Codes/Standards | Nil | | |

| Course Learning Rationale (CLR): | The purpose of learning this course is to, | Learning | | | Program Learning Outcomes (PLO) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLR-1 : | Familiarize the software lifecycle models and software development process | | | | | | | | | | | | | | | | | | |
| CLR-2 : | Understand the various techniques for requirements, planning and managing a technology project | | | | | | | | | | | | | | | | | | |
| CLR-3 : | Examine basic methodologies for software design, development, testing, closure and implementation | | | | | | | | | | | | | | | | | | |
| CLR-4 : | Understand manage users expectations and the software development team | | | | | | | | | | | | | | | | | | |
| CLR-5 : | Acquire the latest industry knowledge, tools and comply to the latest global standards for project management | | | | | | | | | | | | | | | | | | |

| Course Learning Outcomes (CLO): | At the end of this course, learners will be able to: | Level of Thinking (Bloom) | Expected Proficiency (%) | Expected Attainment (%) | Disciplinary Knowledge | Critical Thinking | Problem Solving | Analytical Reasoning | Research Skills | Team Work | Scientific Reasoning | Reflective Thinking | Self-Directed Learning | Multicultural Competence | Ethical Reasoning | Community Engagement | ICT Skills | Leadership Skills | Life Long Learning |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLO-1 : | Identify the process of life cycle model and process project | 3 | 80 | 70 | L | H | - | H | L | - | - | - | L | L | - | H | - | - | - |
| CLO-2 : | Analyze and specify software requirements through a productive working Relationship with project stakeholders | 3 | 85 | 75 | M | H | L | M | L | - | - | - | M | L | - | H | - | - | - |
| CLO-3 : | Design the system based on Functional Oriented and Object Oriented Approach for Software Design. | 3 | 75 | 70 | M | H | M | H | L | - | - | - | M | L | - | H | - | - | - |
| CLO-4 : | Develop the correct and robust code for the software products | 3 | 85 | 80 | M | H | M | H | L | - | - | - | M | L | - | H | - | - | - |
| CLO-5 : | Perform by applying the test plan and various testing techniques | 3 | 85 | 75 | H | H | M | H | L | - | - | - | M | L | - | H | - | - | - |

| Duration (Hour) | | 15 | 15 | 15 | 15 | 15 |
|---|---|---|---|---|---|---|
| S-1 | SLO-1 | Introduction to software Engineering | System Engineering | Introduction to Testing | Project Management Spectrum | Risk Management |
| | SLO-2 | Characteristics of software | Components of System Engineering | Definition , Characteristics of Testing | Four P's | Reactive and Proactive Risk Strategies |
| S-2 | SLO-1 | The Changing Nature of software | Requirements Engineering Tasks | Testing Strategies for Conventional Software | The People and the Product | Software Risks |

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|  | SLO-2 | Legacy Software and Software myths | Process, Initiating and Eliciting requirements. | Unit testing and Integration testing | Role of People | Risk Identification and Risk Projection |
| S-3 | SLO-1 | A Generic view of process Software Engineering | Building the Analysis Model | Validation Testing | The Process and the Project | Risk refinement |
|  | SLO-2 | A layered Technology | Analysis Modeling Approaches | Verification Vs Validation | Role of Process | Risk Mitigation |
| S-4 to S-5 | SLO-1 | Lab 1:Identifing Project Objective and Scope | Lab 4:Project Planning | Lab 7: Function Oriented Diagram | Lab 10:Test Case design for unit testing | Lab 13: Preparation of Timeline charts and Tracking the Scheduling |
| S-6 | SLO-1 | A process framework | Data Modeling Concepts | System Testing | Metrics for Process and Projects-Estimation | Monitoring and Management |
|  | SLO-2 | Capability Maturity Model Integration | Example Diagram | Non-Functional testing | LOC, FP, Object Oriented. | Example |
| S-7 | SLO-1 | Process Models | Scenario based Modeling | Debugging Process | Estimation | Quality Concepts |
|  | SLO-2 | Water fall , RAD model | USE-CASE Diagram | Testing Tactics | Estimation models | SQA Activities |
| S-8 | SLO-1 | Iterative Process Models | Flow Oriented Modeling | White Box Testing, Basic-Path testing | The Project Planning Process | Software Reviews and FTR |
|  | SLO-2 | Incremental ,Prototype and Spiral | Data Flow Diagram | Cyclomatic complexity calculation | Resources | Statistical Quality Assurance |
| S-9 to S-10 | SLO-1 | Lab2:Selection of Suitable software process Model of the suggested system | Lab 5:Performing Various Requirement Analysis | Lab 8:User's View Analysis | Lab 11:Test Case design for Integration testing | Lab 14: Estimation of Effort and Risk Identification |
| S-11 | SLO-1 | Prescriptive models | Design Engineering | Black Box Testing | Decomposition Techniques | The Software Configuration Management |
|  | SLO-2 | Phases of the model | Example | Equivalence Partitioning | calculations of Decomposition techniques | SCM Repository |
| S-12 | SLO-1 | Specialized Process Models | Software Design Concepts | BVA , Error Guessing | Empirical Estimation Models | Business Process Reengineering |
|  | SLO-2 | The Unified Process Model | Example Diagrams | Cause-Effect Graphing | COCOMO model | Reengineering Diagram and Example. |
| S-13 | SLO-1 | An agile view of Process | The Design Model | Testing for Specialized Environments | Project Scheduling Concepts | Reverse Engineering |
|  | SLO-2 | Case study on Best SDLC selection based on the Scenario | Examples for all designs | Preparation of Test case Plan and Report | Examples | Forward Engineering |
| s-14 to s-15 | SLO-1 | Lab3:Problem Statement Preparation | Lab 6 :Develop Software Requirement Specification Sheet (SRS) | Lab 9:Structure view diagram | Lab 12:Perforing Testing and Debugging for a sample code | Lab 15:Software Quality Assurance Components. |

| Learning Resources | 1. Roger, S. Pressman (2004), Software Engineering: A Practitioner Approach, McGraw Hill International Edition, Sixth Edition, New Delhi<br>2. Waman, S Jawadekar (2004), Software Engineering: Principles and Practice, McGraw Hill Education Pvt. Limited, New Delhi. | 3. Rohit Khurana (2011), Software Engineering-Principles and Practices, Vikas Publishing House Pvt. Ltd., Second Edition, New Delhi.<br>4. Chairperson, Counting Practices Committee, Valerie Marthaler, EDS, Troy, Michigan, Function Point Counting Practices Manual Release 4.1.1, The International Function Point User Group, April 2000.<br>5. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli (1991), Fundamentals of Software Engineering, Prentice Hall of India, New Delhi. |

## Learning Assessment

| Level | Bloom's Level of Thinking | Continuous Learning Assessment (50% weightage) | | | | | | | | Final Examination (50% weightage) | |
| | | CLA – 1 (10%) | | CLA – 2 (10%) | | CLA – 3 (20%) | | CLA – 4 (10%)# | | | |
| | | Theory | Practice | Theory | Practice | Theory | Practice | Theory | Practice | Theory | Practice |
| Level 1 | Remember | 20% | 20% | 15% | 15% | 15% | 15% | 15% | 15% | 20% | 20% |
| | Understand | | | | | | | | | | |
| Level 2 | Apply | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 20% |
| | Analyze | | | | | | | | | | |
| Level 3 | Evaluate | 10% | 10% | 15% | 15% | 15% | 15% | 15% | 15% | 10% | 10% |
| | Create | | | | | | | | | | |
| | Total | 100 % | | 100 % | | 100 % | | 100 % | | 100 % | |

# CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

## Course Designers

| Experts from Industry | Experts from Higher Technical Institutions | Internal Experts |
| --- | --- | --- |
| Mr.G.Muruganandam, Group Project Manager, HCL Technologies, Chennai | Dr.S.Gopinathan, Professor, University of Madras, Chennai | Mrs.J.Shobana, SRMIST |
| Mr.M. Hemachandar, Tech Lead, Wipro Limited, Chennai | | |