**JSS MAHAVIDYAPEETHA**
**JSS SCIENCE AND TECHNOLOGY UNIVERSITY**
**SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING**

- Constituent College of JSS Science and Technology University
- Approved by A.I.C.T.E
- Governed by the Grant-in-Aid Rules of Government of Karnataka
- Identified as lead institution for World Bank Assistance under TEQIP Scheme

| | |
|---|---|
| *Course title: Software Engineering* | *Course Code: 20CS440* |
| *Credits: 4* | *Contact Hours (L: T: P): 52: 0: 0* |
| *Type of Course: Theory* | *Category: Professional Core course* |
| *CIE Marks: 50* | *SEE Marks:100* |

**Pre-requisite:** Nil

**Course Objectives:** The course should enable the students to:

| Sl. No. | Course Objectives |
|---|---|
| 1 | Give insight into basics of software engineering methods, practices, models and their appropriate applications. |
| 2 | Provide an idea of building requirement model and managing requirement analysis. |
| 3 | Furnish knowledge on design concepts and various forms of software architectural styles. |
| 4 | Emphasize on software testing approaches, levels and art of debugging. |
| 5 | Understanding the project management activities such as planning, estimation and scheduling. |

| Unit No. | Course Content | No. of Hours |
|---|---|---|
| 1 | **Software Process:** Software and Software engineering: The Nature of Software, Defining the discipline, The software Process, Software Engineering Practice. Software Process structure: A Generic Process Model, Defining Framework activity, identifying a task set. Process Models: Prescriptive Process Models. | 8 |
| 2 | **Software Analysis:** Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Developing Use Cases, and Elements of analysis model, Negotiating Requirements, Validating Requirements. Requirements Analysis: overall objectives and philosophy, analysis rules of thumb, domain analysis, Requirement modeling approaches. | 12 |
| 3 | **Software Design:** Design Concepts:- Design within the Context of Software, The Design Process, Abstraction, architecture, modularity, information hiding, functional independence, Refinement, Refactoring; The Design Model. Architectural Design: Software Architecture, Architectural Styles. Component Level Design: Component Views, Designing class based components, Conducting component level design. | 12 |
| 4 | **Software Testing:** Quality Concepts:- Introduction to quality, McCall's Quality factors; Testing conventional applications: Software Testing Fundamentals, White-Box Testing v/s Black box testing, Basis Path Testing, Control Structure Testing; Software Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging. | 12 |

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|---|---|---|
| 5 | **Agile Development:**<br>Quick Look: What it is, Who does it, Why it is important; What Is Agility, Agility and the Cost of Change, What Is an Agile Process, Agility Principles, The Politics of Agile Development, Extreme Programming, The XP Process, Industrial XP, Other Agile Process Models, Scrum, Dynamic Systems Development Method, Agile Modeling, Agile Unified Process, Tool Set for the Agile Process. Software Team, Team Structure, Agile Team: The Generic Agile Team, The XP Team. | 8 |

**Text Books:**

| Sl. No. | Author/s | Title | Publisher Details |
|---|---|---|---|
| 1 | Roger S Pressman | Software Engineering- A Practitioners approach | 8th edition, McGraw-Hill Publication, 2017 |

**Reference Books:**

| Sl. No. | Author/s | Title | Publisher Details |
|---|---|---|---|
| 1 | Pankaj Jalote | An Integrated Approach to Software Engineering | 3$^{rd}$ edition, 2019Reprint, Narosa Publications |
| 2 | Ian Sommerville | Software Engineering | 10th edition, Person Education Ltd, 2016 |
| 3 | Rajib Mall | Fundamentals of Software Engineering | 4$^{th}$ edition PHI Publications, 2014 |
| 4 | Hitesh Mohapatra, Amiya Kumar Rath | Fundamentals of Software Engineering | BPB Publications 2010 |

**Web Resources:**

| Sl. No. | Web Link |
|---|---|
| 1 | http://nptel.ac.in/courses/106101061 |
| 2 | https://nptel.ac.in/courses/106/105/106105182/ |

**Course Outcomes:**

| | |
|---|---|
| CO1 | Explain concepts of software engineering and software process models. |
| CO2 | Analyze the software requirements. |
| CO3 | Explain system design concepts and process. |
| CO4 | Apply software testing strategies. |
| CO5 | Demonstrate an ability to use the Agile techniques and tools necessary for engineering practices. |

**Mapping Course Outcomes with Program outcomes & Program Specific outcomes:**

| Course Outcomes | Program Outcomes | | | | | | | | | | | | PSO's | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | PSO4 |
| CO1 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | 3 | - | 2 | - |
| CO2 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | 3 | - | 2 | - |
| CO3 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | 3 | - | 2 | - |
| CO4 | 3 | 3 | 3 | - | - | - | - | - | - | - | - | - | 3 | - | 2 | - |
| CO5 | 3 | 3 | 3 | - | 3 | - | - | - | - | - | - | - | 3 | - | 2 | - |

1-Low association, 2- Moderate association, 3-High association