ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
M.E. SOFTWARE ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM

PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

1. Graduates will have a successful career in software industries, research and higher education.
2. Pursue life-long learning and will have the ability for adapting to evolving technological advancements

PROGRAM OUTCOMES (POS):

Engineering Graduates will be able to:

1. Apply knowledge of computing, mathematics, science and engineering for software systems
2. Demonstrate a basic understanding of software engineering practices from vision to analysis, design, development, validation, deployment and maintenance.
3. Identify and solve complex engineering problems and tasks using software engineering principles and methodologies with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
4. Develop skills to create and use various software Engineering based techniques and tools to solve complex Engineering problems.
5. Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary system.
6. Understand the best software practices and processes for a contemporary application domain and able to take decisions based on real world examples.
7. Demonstrate knowledge and understanding of effective management of software projects.
8. Conduct investigations for complex problems to get a broader perspective of the discipline through research by designing and conducting experiments as well as analyzing and interpreting the results.
9. Understand, reflect and commit to professional ethics and norms of software engineering practice for sustainable development of society.
10. Progress successfully in their profession and recognize the importance of self-education and life-long learning.
11. Communicate effectively on complex software engineering activities with domain-experts as well as non-experts through effective presentations, written forms and constructive documentation.

Program Specific Objectives (PSOs)

Graduates of M.E. Software Engineering will be able to

1) Apply software engineering principles and practices for designing and testing quality software and for scientific and business applications.
2) Adapt to emerging information and communication technologies to innovate ideas to solve the societal problems.
3) Analyze the real world problem to get a broader perspective of the discipline through research
MAPPING OF POS/PSOS TO PEOS FOR M.E. SOFTWARE ENGINEERING

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<td>Graduates will have a successful career in software industries, research and higher education.</td>
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<td>2. Demonstrate a basic understanding of software engineering practices from vision to analysis, design, development, validation, deployment and maintenance.</td>
<td>Pursue life-long learning and will have the ability for adapting to evolving technological advancements.</td>
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<td>3. Identify and solve complex engineering problems and tasks using software engineering principles and methodologies with appropriate consideration for public health and safety, cultural, societal and environmental considerations</td>
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# M.E. SOFTWARE ENGINEERING
## SEMESTER COURSE WISE PO MAPPING

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**1 Year SEMESTER III**

<p>| Course Description                              | Credits | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|-----------------------------------------------|---------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Web Design and Management                     | 1       | 2 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 1 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Social Network Mining and Analysis            | 3       | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| Test Driven Development                       | 3       | 3 | 3 | 3 | 3 | 2 | 1 | 2 | 1 | 1 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Personal Software Process                     | 1       | 1 | 1 | 1 | 3 | 2 | 1 | 2 | 1 | 2 | 3  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| Software Security                             | 1       | 2 | 2 | 1 | 3 | 1 | 1 | 2 | 1 | 1 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Enterprise Application Integration            | 3       | 3 | 3 | 3 | 1 | 2 | 1 | 1 | 1 | 1 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Managing Human Resource                       | -       | 2 | 3 | 1 | 1 | 3 | 3 | 2 | 1 | 2 | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| Principles of Supply Chain Management         | 2       | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 1 | 1 | 3  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| Software Agents                               | 2       | 2 | 3 | 2 | 2 | 2 | 1 | 2 | 1 | 1 | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| User Interface Design and Evaluation          | 1       | 1 | 2 | 1 | 3 | 3 | 2 | 1 | 1 | 2 | 1  | 2  | 1  | 2  | 1  | 2  | 1  | 2  | 1  | 2  | 1  | 2  |
| Service Oriented Architecture                 | 3       | 2 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 1 | 1  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  |
| Real Time Systems                             | 2       | 2 | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Security Practices                            | 3       | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |
| Information Retrieval Techniques              | 2       | 2 | 2 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  | 1  |</p>
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1: REASONABLE 2: SIGNIFICANT 3: STRONG
## ANNA UNIVERSITY, CHENNAI
AFFILIATED INSTITUTIONS
M.E. SOFTWARE ENGINEERING
REGULATIONS – 2017
CHOICE BASED CREDIT SYSTEM
I - IV SEMESTERS CURRICULA AND SYLLABI

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<td>6.</td>
<td>SE5201</td>
<td>Software Testing Methodologies and Quality Assurance</td>
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# Employability Enhancement Course (EEC)

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<td>1.</td>
<td>CP5281</td>
<td>Term Paper Writing and Seminar</td>
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# PROFESSIONAL ELECTIVES (PE)

## SEMESTER II

### ELECTIVE I

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<td>Cloud Computing Technologies</td>
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<td>SE5003</td>
<td>Software Test Automation</td>
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<td>Big Data Analytics</td>
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## SEMESTER II

### ELECTIVE II

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<td>SE5004</td>
<td>Knowledge Management</td>
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<td>Machine Learning Techniques</td>
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## SEMESTER III

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<td>SE5091</td>
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OBJECTIVES:

- To introduce the basic concepts of one dimensional and two dimensional Random Variables.
- To provide information about Estimation theory, Correlation, Regression and Testing of hypothesis.
- To enable the students to use the concepts of multivariate normal distribution and principle components analysis.

UNIT I PROBABILITY AND RANDOM VARIABLES


UNIT II TWO DIMENSIONAL RANDOM VARIABLE

Joint distributions – Marginal and conditional distributions – Functions of two dimensional random variables – Regression curve – Correlation.

UNIT III ESTIMATION THEORY


UNIT IV TESTING OF HYPOTHESIS

Sampling distributions - Type I and Type II errors - Small and large samples - Tests based on Normal, t, Chi-Square and F distributions for testing of mean, variance and proportions – Tests for independence of attributes and goodness of fit.

UNIT V MULTIVARIATE ANALYSIS

Random vectors and matrices - Mean vectors and covariance matrices - Multivariate normal density and its properties - Principal components - Population principal components - Principal components from standardized variables.

TOTAL : 60 PERIODS

OUTCOMES:

- The student will able to acquire the basic concepts of Probability and Statistical techniques for solving mathematical problems which will be useful in solving Engineering problems.

REFERENCES:

OBJECTIVES:
- To understand the usage of algorithms in computing.
- To learn and use hierarchical data structures and its operations.
- To learn the usage of graphs and its applications.
- To select and design data structures and algorithms that is appropriate for problems.
- To study about NP Completeness of problems.

UNIT I ROLE OF ALGORITHMS IN COMPUTING

UNIT II HIERARCHICAL DATA STRUCTURES

UNIT III GRAPHS

UNIT IV ALGORITHM DESIGN TECHNIQUES

UNIT V NP COMPLETE AND NP HARD

OUTCOMES:
Upon the completion of the course the students should be able to:
- Design data structures and algorithms to solve computing problems.
- Design algorithms using graph structure and various string matching algorithms to solve real-life problems.
- Apply suitable design strategy for problem solving

REFERENCES:
OBJECTIVES:
The student should be able to
- Understand the fundamentals of software architecture.
- Study the various software development methodologies.
- Learn the various software architecture design components.
- Relate software architecture and software quality.

UNIT I INTRODUCTION

UNIT II DESIGN METHODOLOGIES

UNIT III ARCHITECTURE DESCRIPTION, DOCUMENTATION AND EVALUATION
Early Architecture Description Languages – Domain and Style Specific ADLs – Extensible ADLs – Documenting Software architecture - Architecture Evaluation – ATAM.

UNIT IV ARCHITECTURE DESIGN

UNIT V CREATING AN ARCHITECTURE

OUTCOMES:
At the end of this course, the students should be able to:
- Develop Software applications starting from software architecture and design.
- Learn and evaluate existing software architectures.
- Design methods for improving software quality from the perspective of software architecture.

REFERENCES:
OBJECTIVES:
- To understand Software Engineering Lifecycle Models
- To do project management and cost estimation
- To gain knowledge of the System Analysis and Design concepts.
- To understand software testing approaches
- To be familiar with DevOps practices

UNIT I  INTRODUCTION  9

UNIT II  SOFTWARE REQUIREMENT SPECIFICATION  9

UNIT III  ARCHITECTURE AND DESIGN  9

UNIT IV  TESTING  9
Testing – Unit testing – Black box testing – White box testing – Integration and System testing – Regression testing – Debugging - Program analysis – Symbolic execution – Model Checking

UNIT V  DevOps  9

TOTAL: 45 PERIODS

OUTCOMES:
At the end of this course, the students will be able to:
- Understand the advantages of various Software Development Lifecycle Models
- Gain knowledge on project management approaches as well as cost and schedule estimation strategies
- Perform formal analysis on specifications
- Use UML diagrams for analysis and design
- Architect and design using architectural styles and design patterns
- Understand software testing approaches
- Understand the advantages of DevOps practices
REFERENCES:

SE5102 SOFTWARE REQUIREMENTS ENGINEERING L T P C
3 0 0 3
OBJECTIVES
The student should be able to
- Understand the basics of requirements engineering
- Learn different techniques used for requirements elicitation
- Know the role played by requirements analysis in requirement integration
- Appreciate the use of various methodologies for requirements development
- Study the current trends in requirements prioritization and validation.

UNIT I REQUIREMENTS ENGINEERING OVERVIEW

UNIT II REQUIREMENTS ELICITATION

UNIT III REQUIREMENTS ANALYSIS

UNIT IV REQUIREMENTS DEVELOPMENT
UNIT V REQUIREMENTS VALIDATION

Validation objectives – Analysis of requirements validation – Activities – Properties – Requirement reviews – Requirements testing – Case tools for requirements engineering.

TOTAL: 45 PERIODS

OUTCOMES

At the end of this course, the students should be able to:
- Prepare SRS including the details of requirements engineering
- Describe the stages of requirements elicitation
- Analyze software requirements gathering

REFERENCES:

CP5161 DATA STRUCTURES LABORATORY

OBJECTIVES:
- To acquire the knowledge of using advanced tree structures.
- To learn the usage of heap structures.
- To understand the usage of graph structures and spanning trees.

LIST OF EXPERIMENTS

Each student has to work individually on assigned lab exercises. Lab sessions could be scheduled as one contiguous four-hour session per week or two two-hour sessions per week. There will be about 15 exercises in a semester. It is recommended that all implementations are carried out in Java. If C or C++ has to be used, then the threads library will be required for concurrency. Exercises should be designed to cover the following topics:

EXPERIMENTS:
1. Implementation of Merge Sort and Quick Sort-Analysis
2. Implementation of a Binary Search Tree
3. Red-Black Tree Implementation
4. Heap Implementation
5. Fibonacci Heap Implementation
6. Graph Traversals
7. Spanning Tree Implementation
8. Shortest Path Algorithms (Dijkstra's algorithm, Bellmann Ford Algorithm)
9. Implementation of Matrix Chain Multiplication
10. Activity Selection and Huffman Coding Implementation.

TOTAL: 60 PERIODS
OUTCOMES:
Upon Completion of this course, the students should be able to:
- Design and implement basic and advanced data structures extensively.
- Design algorithms using graph structures
- Design and develop efficient algorithms with minimum complexity using design techniques.

CP5281 TERM PAPER WRITING AND SEMINAR L T P C 0 0 2 1

In this course, students will develop their scientific and technical reading and writing skills that they need to understand and construct research articles. A term paper requires a student to obtain information from a variety of sources (i.e., Journals, dictionaries, reference books) and then place it in logically developed ideas. The work involves the following steps:

1. Selecting a subject, narrowing the subject into a topic
2. Stating an objective.
3. Collecting the relevant bibliography (atleast 15 journal papers)
4. Preparing a working outline.
5. Studying the papers and understanding the authors contributions and critically analysing each paper.
6. Preparing a working outline
7. Linking the papers and preparing a draft of the paper.
8. Preparing conclusions based on the reading of all the papers.
9. Writing the Final Paper and giving final Presentation

Please keep a file where the work carried out by you is maintained.
Activities to be carried Out

<table>
<thead>
<tr>
<th>Activity</th>
<th>Instructions</th>
<th>Submission week</th>
<th>Evaluation</th>
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<tr>
<td>Selection of area of interest and Topic</td>
<td>You are requested to select an area of interest, topic and state an objective</td>
<td>2nd week</td>
<td>3% Based on clarity of thought, current relevance and clarity in writing</td>
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<tr>
<td>Stating an Objective</td>
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</tbody>
</table>
| Collecting Information about your area & topic | 1. List 1 Special Interest Groups or professional society  
2. List 2 journals  
3. List 2 conferences, symposia or workshops  
4. List 1 thesis title  
5. List 3 web presences (mailing lists, forums, news sites)  
6. List 3 authors who publish regularly in your area  
7. Attach a call for papers | 3rd week        | 3% (the selected information must be area specific and of international and national standard) |
<table>
<thead>
<tr>
<th>Task</th>
<th>Details</th>
<th>Week</th>
<th>Percentage</th>
</tr>
</thead>
</table>
| Collection of Journal papers in the topic in the context of the objective – collect 20 & then filter | - You have to provide a complete list of references you will be using. Based on your objective, search various digital libraries and Google Scholar  
  - When picking papers to read, try to:  
    - Pick papers that are related to each other in some ways and/or that are in the same field so that you can write a meaningful survey out of them,  
    - Favour papers from well-known journals and conferences,  
    - Favour “first” or “foundational” papers in the field (as indicated in other people’s survey paper),  
    - Favour more recent papers,  
    - Pick a recent survey of the field so you can quickly gain an overview,  
    - Find relationships with respect to each other and to your topic area (classification scheme/categorization)  
  - Mark in the hard copy of papers whether complete work or section/sections of the paper are being considered | 4th  | 6%         |
| Reading and notes for first 5 papers                                  | Reading Paper Process  
  - For each paper form a Table answering the following questions:  
    - What is the main topic of the article?  
    - What was/were the main issue(s) the author said they want to discuss? | 5th  | 8%         |

( the list of standard papers and reason for selection)
<p>| Reading notes for next 5 papers | Repeat Reading Paper Process | 6th week | 8% (the table given should indicate your understanding of the paper and the evaluation is based on your conclusions about each paper) |
| Reading notes for final 5 papers | Repeat Reading Paper Process | 7th week | 8% (the table given should indicate your understanding of the paper and the evaluation is based on your conclusions about each paper) |
| Draft outline 1 and Linking papers | Prepare a draft Outline, your survey goals, along with a classification / categorization diagram | 8th week | 8% (this component will be evaluated based on the linking and classification among the papers) |
| Abstract | Prepare a draft abstract and give a presentation | 9th week | 6% (Clarity, purpose and conclusion) 6% Presentation &amp; Viva Voce |</p>
<table>
<thead>
<tr>
<th>Introduction Background</th>
<th>Write an introduction and background sections</th>
<th>10th week</th>
<th>5% (clarity)</th>
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<tr>
<td>Sections of the paper</td>
<td>Write the sections of your paper based on the classification / categorization diagram in keeping with the goals of your survey</td>
<td>11th week</td>
<td>10% (this component will be evaluated based on the linking and classification among the papers)</td>
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<tr>
<td>Your conclusions</td>
<td>Write your conclusions and future work</td>
<td>12th week</td>
<td>5% (conclusions – clarity and your ideas)</td>
</tr>
<tr>
<td>Final Draft</td>
<td>Complete the final draft of your paper</td>
<td>13th week</td>
<td>10% (formatting, English, Clarity and linking) 4% Plagiarism Check Report</td>
</tr>
<tr>
<td>Seminar</td>
<td>A brief 15 slides on your paper</td>
<td>14th &amp; 15th week</td>
<td>10% (based on presentation and Viva-voce)</td>
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</table>

TOTAL : 30 PERIODS

**SE5201 SOFTWARE TESTING METHODOLOGIES AND QUALITY ASSURANCE**

**OBJECTIVES**
The student should be able to
- Know what is software and the usage of different types of softwares.
- Know the Quality Metrics of various Softwares.
- Know the methodologies in making Software.
- Test the product finally to check the product Quality.

**UNIT I INTRODUCTION**

**UNIT II TESTING METHODOLOGIES**

**UNIT III TEST STRATEGIES**
UNIT IV  TEST AUTOMATION AND MANAGEMENT  9
Test plan – Management – Execution and Reporting – Software Test Automation – Automated
Testing tools - Hierarchical Models of Software Quality – Configuration Management – Documentation
Control.

UNIT V  SQA IN PROJECT MANAGEMENT  9
Project progress control – costs – quality management standards – project process standards –
management and its role in SQA – SQA unit.

TOTAL : 45 + 30 :75 PERIODS

OUTCOMES
At the end of this course, the students should be able to:
- Analyze the product Quality.
- Use various testing methods.
- Assess Quality standards.

REFERENCES:
   2003.
   2009
4. Robert Furtell, Donald Shafer, and Linda Shafer, "Quality Software Project Management",
   Pearson Education Asia, 2002.
   Pearson Education, 2006

IF5251  SOFTWARE INDUSTRIALIZATION  L T P C
3 0 0 3

OBJECTIVES:
The student should be able:
- To point out the need for industrialization in software development
- To understand the non functional requirements in software engineering
- To carry out performance analyses
- To study the various types of scalability
- To acquire the art of capacity planning
- To Understand the techniques for infrastructure management

UNIT I  INDUSTRIALIZATION OF SOFTWARE DEVELOPMENT  9
The Fragile Hand Weaving – Features Vs Robustness – Components and Services Based
Development – Agile and Dev Ops - Software Factory – Automation

UNIT II  NON FUNCTIONAL REQUIREMENTS and ENGINEERING  9
NFRs - Cost of Quality – Business and System View – Industrialization Process in SDLC –
Performance and Scalability – Capacity Planning –Production Operations
UNIT III  PERFORMANCE and SCALABILITY ENGINEERING

UNIT IV  THE ART OF CAPACITY PLANNING

UNIT V  PRODUCTION SYSTEMS MANAGEMENT

TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students will be able to
- Understand SOA and DevOps
- Understand the non-functional requirements in software engineering
- Apply various performance analysis techniques
- Analyze software systems for scalability
- Apply capacity planning methods
- Apply infrastructure management techniques

REFERENCES:
OBJECTIVES
The student should be able to
- Learn different definitions of software quality
- Know different notions of defects and classify them
- Understand the basic techniques of data collection and how to apply them
- Learn software metrics that define relevant metrics in a rigorous way.
- Gain confidence in ultra-high reliability.

UNIT I INTRODUCTION TO SOFTWARE RELIABILITY
Basic Concepts – Failure and Faults – Environment – Availability –Modeling –uses – requirements
reliability metrics – design & code reliability metrics – testing reliability metrics.

UNIT II SOFTWARE RELIABILITY MODELING
Concepts – General Model Characteristic – Historical Development of models – Model
Classification scheme – Markovian models – General concepts – General Poisson Type Models –
Binomial Type Models – Poisson Type models – Fault reduction factor for Poisson Type models.

UNIT III COMPARISON OF SOFTWARE RELIABILITY MODELS
Comparison Criteria – Failure Data – Comparison of Predictive Validity of Model Groups –
Recommended Models – Comparison of Time Domains – Calendar Time Modeling – Limiting
Resource Concept – Resource Usage model – Resource Utilization – Calendar Time Estimation
and confidence Intervals.

UNIT IV FUNDAMENTALS OF MEASUREMENT
Measurements in Software Engineering – Scope of Software metrics – Measurements theory –

UNIT V MEASURING SOFTWARE PRODUCT
Measurement of Internet Product Attributes – Size and Structure – External Product Attributes –

TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
- Perform some simple statistical analysis relevant to software measurement data.
- Use from practical examples both the benefits and limitations of software metrics
  for quality control and assurance

REFERENCES:
  Measurement, Prediction, Application, Series in Software Engineering and
OBJECTIVES:

- To understand the design of databases.
- To acquire knowledge on parallel and distributed databases and its applications.
- To study the usage and applications of Object Oriented and Intelligent databases.
- To understand the emerging databases like Mobile, XML, Cloud and Big Data

UNIT I PARALLEL AND DISTRIBUTED DATABASES


UNIT II INTELLIGENT DATABASES


UNIT III XML DATABASES


UNIT IV MOBILE DATABASES

Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models -Concurrency Control - Transaction Commit Protocols

UNIT V MULTIMEDIA DATABASES


TOTAL :45 PERIODS

OUTCOMES:

Upon successful completion of this course, a student will be able to:

- To develop skills on databases to optimize their performance in practice.
- To analyze each type of databases and its necessity
- To design faster algorithms in solving practical database problem

REFERENCES:

OBJECTIVES:
To learn the stages of software development
To know about preparing software project documentation

LIST of EXERCISES:

Choose any one application for performing the following phases.

1. Program Analysis and Project Planning.
   Thorough study of the problem – Identify project scope, Objectives, Infrastructure. – PROJECT PLAN DOCUMENTATION
2. Software requirement Analysis
   Describe the individual Phases / Modules of the project, Identify deliverables. – SRS DOCUMENTATION
3. Data Modeling
   Use work products – Data dictionary, Use case diagrams and activity diagrams, build and test class diagrams, Sequence diagrams, add interface to class diagrams. – DESIGN DOCUMENTATION
4. Software Development and Debugging
   Use technology of your choice to develop and debug the application – CODE DOCUMENTATION
5. Software Testing
   Perform validation testing, Coverage analysis, memory leaks, develop test case hierarchy, Site check and Site monitor. – TEST CASE DOCUMENTATION

TOTAL : 60 PERIODS

SUGGESTED LIST OF APPLICATIONS:
Student Marks Analyzing System.
Quiz System.
Online Ticket Reservation System
Payroll System
Course Registration System
Stock Maintenance.

OUTCOMES:
At the end the student will be able to
• Prepare project plan, SRS, design document, code document and test case documentations at appropriate stages of software development.
OBJECTIVES
The student should be able to

- Understand the basic concept of project management.
- Learn the various costing and life cycle management.
- Understand the role played by risk in software project.
- Appreciate the use of metrics for software project management.
- Know the challenges in people management.

UNIT I | PROJECT MANAGEMENT & COSTING

UNIT II | PROCESS MODELS & LIFECYCLE MANAGEMENT

UNIT III | RISK MANAGEMENT

UNIT IV | METRICS

UNIT V | PEOPLE MANAGEMENT

TOTAL : 45 PERIODS

OUTCOMES
At the end of this course, the students should be able to:

- Identify the various elements of software management process framework
- Use available open source estimation tools for cost estimation
- Identify existing risk and perform risk assessment
- Design a software metric for software project management
- Modify the art of interviewing people for a given scenario.
REFERENCES:

SE5001 \ AGILE SOFTWARE ENGINEERING \ L T P C
\ 3 0 0 3

OBJECTIVES:
The student should be able to
- Understand agile software development practices
- Demonstrate Agile development and testing techniques
- Know the benefits and pitfalls of working in an Agile team
- Understand agile development and testing.

UNIT I \ AGILE METHODOLOGY
Theories for Agile management – agile software development – traditional model vs. agile model - classification of agile methods – agile manifesto and principles – agile project management – agile team interactions – ethics in agile teams - agility in design, testing – agile documentations – agile drivers, capabilities and values.

UNIT II \ AGILE PROCESSES

UNIT III \ AGILITY AND KNOWLEDGE MANAGEMENT

UNIT IV \ AGILITY AND REQUIREMENTS ENGINEERING
UNIT V  AGILITY AND QUALITY ASSURANCE  


TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:

- The know importance of interacting with business stakeholders in determining the requirements for a software system.
- Apply iterative software development process
- Apply the impact of social aspects on software development success.

REFERENCES:


SE5002  BUSINESS INTELLIGENCE  

OBJECTIVES:
The student should be able to

- Identify the enormous opportunities that currently exists in providing business intelligence services
- Gain a practical understanding of the key data mining methods of classification, prediction, data reduction and exploration
- Understand and help develop the strategies of modern enterprise decision makers
- Acquire knowledge in many scientific and technological fields including data warehouses, data mining, content analytics, business process management, visual analytics
- Gain competences in information systems, web science, decision science, software engineering, and innovation and entrepreneurship.

UNIT I  INTRODUCTION

UNIT II BI BIG PICTURE 9

UNIT III BI ARCHITECTURE 9

UNIT IV BI TECHNOLOGIES 9

UNIT V FUTURE OF BI 9
Knowledge Discovery for BI – Markov Logic Networks – BI Search and Text Analytics – Advanced Visualisation – Semantic Web Technologies for building BI - Service oriented BI – Collaborative BI - Evaluating BI – Stakeholder model of BI.

TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
- Assess the business intelligence potential of today’s data rich environment
- Plan how to decide when to use which technique
- Outline how to implement major techniques using Excel add-ins
- Gain the intellectual capital required to provide business analytics services.

REFERENCES:
OBJECTIVES:
- To understand the concepts of virtualization and virtual machines
- To gain expertise in server, network and storage virtualization.
- To understand and deploy practical virtualization solutions and enterprise solutions
- To gain knowledge on the concept of virtualization that is fundamental to cloud computing
- To understand the various issues in cloud computing
- To be able to set up a private cloud
- To understand the security issues in the grid and the cloud environment

UNIT I VIRTUALIZATION

UNIT II VIRTUALIZATION INFRASTRUCTURE

UNIT III CLOUD PLATFORM ARCHITECTURE

UNIT IV PROGRAMMING MODEL
Introduction to Hadoop Framework - Mapreduce, Input splitting, map and reduce functions, specifying input and output parameters, configuring and running a job – Developing Map Reduce Applications - Design of Hadoop file system – Setting up Hadoop Cluster - Cloud Software Environments - Eucalyptus, Open Nebula, Open Stack, Nimbus

UNIT V CLOUD SECURITY
Cloud Infrastructure security: network, host and application level – aspects of data security, provider data and its security, Identity and access management architecture, IAM practices in the cloud, SaaS, PaaS, IaaS availability in the cloud - Key privacy issues in the cloud – Cloud Security and Trust Management

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of this course, the students should be able to:
- Employ the concepts of storage virtualization, network virtualization and its management
- Apply the concept of virtualization in the cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Develop services using Cloud computing
- Apply the security models in the cloud environment
REFERENCES:

SE5003 SOFTWARE TEST AUTOMATION

OBJECTIVES
The student should be able to
- Understand the basics of test automation
- Appreciate the different aspects of test tool evaluation and test automation approach selection
- Understand the role played by test planning and design in test execution
- Appreciate the use of various testing tools for testing varied applications
- Understand test automation using case studies

UNIT I INTRODUCTION

UNIT II TEST FRAMEWORK AND AUTOMATION
Test Tool Evaluation and selection – organisations‘ system engineering environment – tools that support the testing life cycle – test process analysis – test tool consideration Test framework – Test Library Management –selecting the test automation approach - test team management

UNIT III TEST PLANNING AND DESIGN
Test planning – Test program scope – Test requirements management – Test Events, Activities and Documentation – Test Environment – Evolving a Test plan Test analysis and design – Test requirements analysis – Test program design – Test procedure design – Test development architecture – guidelines – automation infrastructure – test execution and review – test metrics

UNIT IV TESTING THE APPLICATIONS
UNIT V  CASE STUDIES


TOTAL : 45 PERIODS

OUTCOMES:

At the end of this course, the students should be able to:

- Identify the different test tools
- Use available testing tools to test some software applications
- Modify existing test metrics based on functionality or features used
- Design test cases and execute them
- Implement test scripts for automating test execution

REFERENCES:


CP5293  BIG DATA ANALYTICS

OBJECTIVES:

- To understand the competitive advantages of big data analytics
- To understand the big data frameworks
- To learn data analysis methods
- To learn stream computing
- To gain knowledge on Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics

UNIT I  INTRODUCTION TO BIG DATA

UNIT II  
HADOOP FRAMEWORK  
9
Distributed File Systems - Large-Scale FileSystem Organization – HDFS concepts - MapReduce Execution, Algorithms using MapReduce, Matrix-Vector Multiplication – Hadoop YARN

UNIT III  
DATA ANALYSIS  
13
Statistical Methods: Regression modelling, Multivariate Analysis - Classification: SVM & Kernel Methods - Rule Mining - Cluster Analysis, Types of Data in Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density Based Methods, Grid Based Methods, Model Based Clustering Methods, Clustering High Dimensional Data - Predictive Analytics – Data analysis using R.

UNIT IV  
MINING DATA STREAMS  
7

UNIT V  
BIG DATA FRAMEWORKS  
9

OUTCOMES:
At the end of this course, the students should be able to:
• Understand how to leverage the insights from big data analytics
• Analyze data by utilizing various statistical and data mining approaches
• Perform analytics on real-time streaming data
• Understand the various NoSql alternative database models

REFERENCES:
2. David Loshin, "Big Data Analytics: From Strategic Planning to Enterprise Integration with Tools, Techniques, NoSQL, and Graph", 2013.
OBJECTIVES
The student should be able to
- Learn knowledge engineering basics
- Know the knowledge models
- Know the techniques of knowledge management and implementation
- Learn the knowledge elicitation techniques
- Learn scope of knowledge management in project management.

UNIT I INTRODUCTION

UNIT II KNOWLEDGE MODELS

UNIT III TECHNIQUES OF KNOWLEDGE MANAGEMENT
Knowledge Elicitation Techniques – Modeling Communication Aspects – Knowledge Management and Organizational Learning.

UNIT IV KNOWLEDGE SYSTEM IMPLEMENTATION

UNIT V ADVANCED KNOWLEDGE MANAGEMENT

TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
- Apply knowledge engineering basics.
- Design the knowledge models.
- Apply the techniques of knowledge management and implementation.

REFERENCES:
OBJECTIVES
The student should be able to

- Understand the principles of verification and validation
- Appreciate the different verification and validation techniques
- Understand the various stages of testing
- Appreciate the use of tools for verification and validation
- Appreciate the benefits of using metrics for verification and validation

UNIT I INTRODUCTION
9

UNIT II METHODS OF SOFTWARE VERIFICATION
9

UNIT III TESTING
9

UNIT IV TOOLS FOR SOFTWARE VERIFICATION
9

UNIT V ADVANCED APPROACHES
9
Automatic approach for verification and validation – validating UML behavioral diagrams – probabilistic model checking of activity diagrams in SysML – metrics for verification and validation

OUTCOMES:
At the end of this course, the students should be able to:

- Identify the different techniques for verification and validation
- Use available traceability analysis tools on sample requirements
- Modify existing coverage analysers in terms of functionality or features used
- Design system test cases
- Use test case generators and test management tools
REFERENCES:
2. ESA Board for Software Standardisation and Control (BSSC), “Guide to software verification and Validation”, European Space Agency ESA PSS-05-10 Issue 1 Revision 1, 1995

CP5191 MACHINE LEARNING TECHNIQUES

OBJECTIVES:
• To introduce students to the basic concepts and techniques of Machine Learning.
• To have a thorough understanding of the Supervised and Unsupervised learning techniques
• To study the various probability based learning techniques
• To understand graphical models of machine learning algorithms

UNIT I INTRODUCTION

UNIT II LINEAR MODELS

UNIT III TREE AND PROBABILISTIC MODELS

UNIT IV DIMENSIONALITY REDUCTION AND EVOLUTIONARY MODELS
OUTCOMES:
At the end of this course, the students should be able to:
- Distinguish between, supervised, unsupervised and semi-supervised learning
- Apply the apt machine learning strategy for any given problem
- Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
- Design systems that uses the appropriate graph models of machine learning
- Modify existing machine learning algorithms to improve classification efficiency

REFERENCES:

OBJECTIVES
- To understand the concepts of virtualization and virtual machines
- To understand the implementation of process and system virtual machines
- To explore the aspects of high level language virtual machines
- To gain expertise in server, network and storage virtualization.
- To understand and deploy practical virtualization solutions and enterprise solutions

UNIT I                OVERVIEW OF VIRTUALIZATION 9

UNIT II              PROCESS VIRTUAL MACHINES 9

UNIT III            HIGH LEVEL LANGUAGE VIRTUAL MACHINES AND SERVER VIRTUALIZATION 9
HLL virtual machines: Pascal P-Code – Object Oriented HLLVMs - Java VM architecture - Java Native Interface - Common Language Infrastructure. Server virtualization: Partitioning techniques - virtual hardware - uses of virtual servers - server virtualization platforms
UNIT IV NETWORK AND STORAGE VIRTUALIZATION

UNIT V APPLYING VIRTUALIZATION

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student should be able to
- Deploy legacy OS on virtual machines.
- Analyze the intricacies of server, storage and network virtualizations
- Design and develop applications on virtual machine platforms

REFERENCES:

CP5292 INTERNET OF THINGS L T P C
3 0 0 3

OBJECTIVES:
- To understand the fundamentals of Internet of Things
- To learn about the basics of IOT protocols
- To build a small low cost embedded system using Raspberry Pi.
- To apply the concept of Internet of Things in the real world scenario.

UNIT I INTRODUCTION TO IoT
Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels & Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology

UNIT II IoT ARCHITECTURE
M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture
OBJECTIVES
The student should be able to
- Know the importance of web technologies for the real world applications
- Learn appropriate scripting languages
- Know the testing techniques to test the product
- Gain the skills and project-based experience needed for entry into web design and development careers.
- To use a variety of strategies and tools to create websites.

OUTCOMES:
Upon completion of the course, the student should be able to:
- Analyze various protocols for IoT
- Develop web services to access/control IoT devices.
- Design a portable IoT using Raspberry Pi
- Deploy an IoT application and connect to the cloud.
- Analyze applications of IoT in real time scenario

REFERENCES:

SE5007 WEB DESIGN AND MANAGEMENT

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UNIT I    SITE ORGANIZATION AND NAVIGATION  9

UNIT II   ELEMENTS OF PAGE DESIGN  9

UNIT III SCRIPTING LANGUAGES  9

UNIT IV   PRE-PRODUCTION MANAGEMENT  9

UNIT V  PRODUCTION, MAINTENANCE AND EVALUATION  9

TOTAL : 45 PERIODS

OUTCOMES:

At the end of this course, the students should be able to:
• Apply various scripting languages for the development of web applications
• Follow Web design standards
• Develop websites for local community organizations.

REFERENCES:

OBJECTIVES

- To gain knowledge about the current web development and emergence of social web
- To study about the modeling, aggregating and knowledge representation of semantic web
- To appreciate the use of machine learning approaches for web content mining
- To learn about the extraction and mining tools for social networks
- To gain knowledge on web personalization and web visualization of social networks

UNIT I
INTRODUCTION TO SOCIAL NETWORK ANALYSIS AND KNOWLEDGE REPRESENTATION


UNIT II
SOCIAL MEDIA MINING


UNIT III
EXTRACTION AND MINING COMMUNITITES IN WEB SOCIAL NETWROKS

Extracting evolution of Web Community from a Series of Web Archive - Detecting Communities in Social Networks - Definition of Community - Evaluating Communities - Methods for Community Detection & Mining - Applications of Community Mining Algorithms - Tools for Detecting Communities Social Network Infrastructures and Communities - Decentralized Online Social Networks- Multi- Relational Characterization of Dynamic Social Network Communities

UNIT IV
HUMAN BEHAVIOR ANALYSIS AND PRIVACY ISSUES


UNIT V
VISUALIZATION AND APPLICATIONS OF SOCIAL NETWORKS


TOTAL : 45 PERIODS
OUTCOMES:
At the end of this course, the students should be able to:

- Apply knowledge for current Web development in the era of social Web
- Model, aggregate and represent knowledge for Semantic Web
- Use machine learning approaches for Web Content Mining
- Design extraction and mining tools for Social networks
- Develop personalized web sites and visualization for Social networks

REFERENCES:


SE5009 TEST DRIVEN DEVELOPMENT

OBJECTIVES
The student should be able to

- Understand TDD and MDD
- Learn fundamentals of refactoring
- Perform unit testing in TDD
- Apply TDD
- Appreciate the emphasis of TDD in extreme programming.

UNIT I BACKGROUND

UNIT II REFACTORING
UNIT III  UNIT TESTING


UNIT IV  PATTERNS FOR TEST DRIVEN DEVELOPMENT

Test Driven Development Patterns – Red Bar Patterns – Testing Patterns – Green Bar Patterns – xUnit Patterns – Design Patterns – Mastering TDD.

UNIT V  EXTREME PROGRAMMING


TOTAL : 45 PERIODS

OUTCOMES:

At the end the student will be able to
- Differentiate Test Driven Development and Model Driven Development
- Apply Refactoring for improving code
- Use Test Driven Development patterns in project development.

REFERENCES:
3. Fowler, Martin, “Refactoring: improving the design of existing code”, Pearson Education India, 2002

SE5010  PERSONAL SOFTWARE PROCESS

OBJECTIVES
The student should be able to
- Understand the nature of PSP
- Apply PSP principles in measuring software
- Appreciate the role of PSP in assessing software quality
- Relate PSP and TSP in software development.
- Learn to use PSP in Software engineering.
UNIT I  INTRODUCTION

UNIT II  PSP SIZE ESTIMATION

UNIT III  PSP QUALITY MANAGEMENT

UNIT IV  PSP DESIGN TEMPLATE

UNIT V  TEAM SOFTWARE PROCESS

TOTAL : 45 PERIODS

OUTCOMES
At the end of this course, the students should be able to:
- Analyse software using PSP
- Use PSP tools to measure software quality
- Use PSP in software design

REFERENCES:
2. Watts S Humphrey, “PSP (SM): a self-improvement process for software engineers”, Addison-Wesley Professional, 2005
OBJECTIVES
The student should be able to
- Know the importance and need of software security
- Know about various attacks
- Learn about secure software design
- Understand risk management in secure software development
- Know the working of tools related to software security

UNIT I        INTRODUCTION
Need for software security – Memory based attacks – low level attacks against heap and stack -stack smashing – format string attacks – stale memory access attacks – ROP (Return oriented programming) – malicious computation without code injection. Defense against memory based attacks – stack canaries – non-executable data - address space layout randomization (ASLR), memory-safety enforcement, control-flow Integrity (CFI) – randomization

UNIT II        SECURE DESIGN

UNIT III       SECURITY RISK MANAGEMENT

UNIT IV        SECURITY TESTING
Traditional software testing – comparison - secure software development life cycle - risk based security testing – prioritizing security testing with threat modeling – shades of analysis: white, grey and black box testing.

UNIT V        ADVANCED SOFTWARE SECURITY

TOTAL : 45 PERIODS

OUTCOMES:
At the end the student will be able to
- Use tools for securing software
- Apply security principles in software development
- Involve selection of testing techniques related to software security in testing phase of software development
REFERENCES:

SE5012 ENTERPRISE APPLICATION INTEGRATION

OBJECTIVES
The student should be able to
- Create a Business Data Catalog Application Definition file
- Discuss the most important topics and technologies related to enterprise application integration
- Practice implementation strategies.
- Know the Integration facilities for an application.
- To appreciate the current trends in Enterprise Application Integration.

UNIT I INTRODUCTION

UNIT II ENTERPRISE INTEGRATION ARCHITECTURE

UNIT III SERVICE AND INFORMATION INTEGRATION ARCHITECTURE

UNIT IV PROCESS AND APPLICATION INTEGRATION ARCHITECTURE
UNIT V PATTERNS OF ENTERPRISE APPLICATION INTEGRATION


TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
- Use object-oriented concepts for developing web applications
- Demonstrate the enterprise application integration
- Deploy the components of EIA with solutions

REFERENCES:
1. David S. Linthicum, —Enterprise Application Integration, Addison-Wesley Professional, 2000

SE5013 MANAGING HUMAN RESOURCE

OBJECTIVES:
The student should be able to
- Know the importance of resources for a task.
- Compare all the resources with Human resources so the employee constraints are checked to meet the completion of the task.
- Study Training types
- Forecast Human Resource requirement.
- Know the selection procedures.

UNIT I PERSPECTIVES IN HUMAN RESOURCE MANAGEMENT

UNIT II THE CONCEPT OF BEST FIT EMPLOYEE

UNIT III TRAINING AND EXECUTIVE DEVELOPMENT

UNIT IV SUSTAINING EMPLOYEE INTEREST
UNIT V   PERFORMANCE EVALUATION AND CONTROL PROCESS  

OUTCOMES:
At the end the student will be able to

- Apply recruitment techniques in employee selection process.
- Apply appropriate training process
- Motivate employees by sustaining employee Interests.

REFERENCES:

SE5014   PRINCIPLES OF SUPPLY CHAIN MANAGEMENT  
OBJECTIVES
The student should be able to

- Learn about the E-business environment driven by the Automation Software in quick movement of supply of products
- Study the fundamentals of supply chain management comprising of Inventory management and warehousing etc as co parts of entire business
- Learn the cost management for the supply of products
- Improve the overall organization performance and customer satisfaction by improving product or service delivery to consumer.

UNIT I   FUNDAMENTALS OF SUPPLY CHAIN MANAGEMENT  
Supply chain networks, Integrated supply chain planning, Decision phases in supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

UNIT II   SCM STRATEGIES, PERFORMANCE  
Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.
UNIT III  PLANNING AND MANAGING INVENTORIES  9
Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multi echelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

UNIT IV  DISTRIBUTION MANAGEMENT  9
Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning.

UNIT V  STRATEGIC COST MANAGEMENT IN SUPPLY CHAIN  9
The financial impacts, Volume leveraging and cross docking, global logistics and material positioning, global supplier development, target pricing, cost management enablers, Measuring service levels in supply chains, Customer Satisfaction/Value/Profitability/Differential Advantage.

TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
- Learn about the e-business for supply of products managed with the appropriate methodologies and management techniques
- Know Supply Chain Management consisting of all parties (Including Manufacturer, Marketer, Suppliers, transporters, Warehouses, Retailers and even customers) directly or indirectly involved in fulfilment of a customer
- Ensure that the supply chains deliver varying degrees of six outcomes — the traditional cost-related benefit plus responsiveness, security, sustainability, resilience and innovation — depending on key customers’ needs
- Know automated back office software systems
- Know basic business process.

REFERENCES:
OBJECTIVES:
The student should be able to
• Have an overview of the agent systems and software agents.
• Understand the basic concepts of intelligent software agents.
• Design and build a multiagent system.
• Have a basic understanding about software agent technology and to be familiar with some of the communicating languages, standardization and applications.
• Learn the use of software agents to represent and share information to coordinate activities of the agents for the purpose of group problem solving.

UNIT I

AGENTS – OVERVIEW
Agent Definition – Agent Programming Paradigms – Agent Vs Object – Aglet – Mobile Agents – Agent Frameworks – Agent Reasoning.

UNIT II

JAVA AGENTS

UNIT III

MULTIAGENT SYSTEMS

UNIT IV

INTELLIGENT SOFTWARE AGENTS
Interface Agents – Agent Communication Languages – Agent Knowledge Representation – Agent Adaptability – Belief Desire Intension – Mobile Agent Applications.

UNIT V

AGENTS AND SECURITY

TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
• Create / develop an agent based system for a particular task.
• Design an application that uses different security issues for intelligent agents.
• Effectively apply agent-based technologies in the development and application of distributed information systems that use software agents.

REFERENCES:
OBJECTIVES
The student should be able to

- Understand how to study the tasks that the user needs to accomplish with the software system.
- Learn the constraints that affect the UI design.
- Study the importance of human-computer interaction.
- Identify the various facilities provided in WINDOWS including multimedia.

UNIT I  INTRODUCTION

UNIT II  HUMAN COMPUTER INTERACTION

UNIT III  WINDOWS

UNIT IV  MULTIMEDIA

UNIT V  EVALUATION

TOTAL : 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:

- Design a more user friendly software.
- Utilize the existing functionalities provided and develop a better design.
- Predict the need of the end user and design the interface accordingly.

REFERENCES:
2. Carol M. Barnum, “Usability Testing Essentials: Ready, Set...Test”, Elsevier, 2010
OBJECTIVES

- To understand the SOA architecture
- To understand the service oriented analysis and design
- To understand the development of deployment of web services
- To understand the security issues of SOA

UNIT I  SOA FUNDAMENTALS  9

UNIT II  SOA AND WEB SERVICES  9

UNIT III  SERVICE ORIENTED ANALYSIS AND DESIGN  9
Design principles - Business Centric SOA - Deriving Business services - Service Modeling - Coordination - Atomic Transaction - Business activities - Web Service Orchestration Business Process Execution Language (BPEL) - Choreography - Metadata Management - Entity centric business service design - Application Service design - Task centric business service design

UNIT IV  WEB SERVICES DEVELOPMENT AND DEPLOYMENT  9
XML and Web Services - WSDL basics - SOA support in J2EE - Java API for XML-based Web Services (JAX-WS) - Java Architecture for XML Binding (JAXB) - Java API for XML Registries (JAXR) - Web Services Interoperability Technologies - SOA support in .NET - Common Language Runtime - ASP.NET - Web forms - ASP.NET Web Services - Web Services Enhancements

UNIT V  SOA APPLICATIONS AND SECURITY  9

OUTCOMES:
Upon completion of this course, the student should be able to
- Develop and deploy simple and composite web services with SOA design principles considering the security issues
- Use the standards and technologies of modern web service implementations
- Efficiently use leading development tools to create and consume web services
- Implement a service oriented application

TOTAL : 45 PERIODS
REFERENCES:

UNIT V EVALUATION TECHNIQUES AND CLOCK SYNCHRONIZATION


OUTCOMES:
Upon completion of this course, the students should be able to:

- Apply principles of real time system design techniques to develop real time applications.
- Make use of database in real time applications.
- Make use of architectures and behaviour of real time operating systems.
- Apply evaluation techniques in application.

REFERENCES:

CP5291 SECURITY PRACTICES

OBJECTIVES:
- To learn the core fundamentals of system and web security concepts
- To have through understanding in the security concepts related to networks
- To deploy the security essentials in IT Sector
- To be exposed to the concepts of Cyber Security and encryption Concepts
- To perform a detailed study of Privacy and Storage security and related Issues.

UNIT I SYSTEM SECURITY
Building a secure organization- A Cryptography primer- detecting system Intrusion- Preventing system Intrusion- Fault tolerance and Resilience in cloud computing environments- Security web applications, services and servers.

UNIT II NETWORK SECURITY
UNIT III  SECURITY MANAGEMENT  9

UNIT IV  CYBER SECURITY AND CRYPTOGRAPHY  9
Cyber Forensics- Cyber Forensics and Incidence Response - Security e-Discovery - Network Forensics - Data Encryption- Satellite Encryption - Password based authenticated Key establishment Protocols.

UNIT V  PRIVACY AND STORAGE SECURITY  9

TOTAL :  45  PERIODS

OUTCOMES:
Upon completion of this course the students should be able to
- Understand the core fundamentals of system security
- Apply the security concepts related to networks in wired and wireless scenario
- Implement and Manage the security essentials in IT Sector
- Able to explain the concepts of Cyber Security and encryption Concepts
- Able to attain a through knowledge in the area of Privacy and Storage security and related Issues.

REFERENCES:

CP5094  INFORMATION RETRIEVAL TECHNIQUES  L T P C
3 0 0 3

OBJECTIVES:
- To understand the basics of information retrieval with pertinence to modeling, query operations and indexing
- To get an understanding of machine learning techniques for text classification and clustering.
- To understand the various applications of information retrieval giving emphasis to multimedia IR, web search
- To understand the concepts of digital libraries
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<th>UNIT I</th>
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<tr>
<th>UNIT III</th>
<th>INDEXING</th>
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<tr>
<td>Static and Dynamic Inverted Indices – Index Construction and Index Compression. Searching - Sequential Searching and Pattern Matching. Query Operations - Query Languages – Query Processing - Relevance Feedback and Query Expansion - Automatic Local and Global Analysis – Measuring Effectiveness and Efficiency</td>
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<th>UNIT IV</th>
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<td>Text Classification and Naïve Bayes – Vector Space Classification – Support vector machines and Machine learning on documents. Flat Clustering – Hierarchical Clustering – Matrix decompositions and latent semantic indexing – Fusion and Meta learning</td>
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<th>UNIT V</th>
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**TOTAL : 45 PERIODS**

**OUTCOMES:**
Upon completion of this course, the student should be able to
- Build an Information Retrieval system using the available tools
- Identify and design the various components of an Information Retrieval system
- Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval
- Design an efficient search engine and analyze the Web content structure

**REFERENCES:**
OBJECTIVES:
The students should be made to:
- Learn design challenges and design methodologies
- Study general and single purpose processor
- Understand bus structures

UNIT I EMBEDDED SYSTEM OVERVIEW
Embedded System Overview, Design Challenges – Optimizing Design Metrics, Design Methodology, RT-Level Combinational and Sequential Components, Optimizing Custom Single-Purpose Processors.

UNIT II GENERAL AND SINGLE PURPOSE PROCESSOR
Basic Architecture, Pipelining, Superscalar and VLIW architectures, Programmer’s view, Development Environment, Application-Specific Instruction-Set Processors (ASIPs) Microcontrollers, Timers, Counters and watchdog Timer, UART, LCD Controllers and Analog-to-Digital Converters, Memory Concepts.

UNIT III BUS STRUCTURES

UNIT IV STATE MACHINE AND CONCURRENT PROCESS MODELS

UNIT V EMBEDDED SOFTWARE DEVELOPMENT TOOLS AND RTOS

TOTAL: 45 PERIODS

OUTCOMES:
At the end of this course, the students should be able to:
- Explain different protocols
- Discuss state machine and design process models
- Outline embedded software development tools and RTOS

REFERENCES: