

SOFTWARE PROJECT PLANNING AND MANAGEMENT [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER - II			
Subject Code	16SSE21	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS - 04			
<p>Course objectives: This course will enable students to</p> <ul style="list-style-type: none"> • Define and highlight importance of software project management. • Formulate strategy in managing projects • Estimate the cost associated with a project • Plan, schedule and monitor projects for the risk management • Define the software management metrics 			
Module -1			Teaching Hours
<p>Metrics: Introduction, The Metrics Roadmap, A Typical Metrics Strategy, What Should you Measure?, Set Targets and track Them, Understanding and Trying to minimize variability, Act on data, People and Organizational issues in Metrics Programs, Common Pitfalls to watch out for in Metrics Programs, Matrices implementation checklists and tools, Software configuration management: Introduction, Some Basic Definitions and terminology, the processes and activities of software configuration management, configuration status accounting, configuration audit, software configuration management in geographically distributed teams, Metrics in software configuration management, software configuration management tools and automation.</p>			10Hours
Module -2			10 Hours
<p>Risk Management: Introduction, What is risk management and why is it important?, Risk management cycle, Risk identification: common tools and techniques, Risk Quantifications, Risk Monitoring, Risk Mitigation, Risks and Mitigation in the context of global project teams, some practical techniques risk management, Metrics in risk management. Project Planning and Tracking: Components of Project Planning and Tracking, The “What “ Part of a Project Plan, The “What Cost “ Part of a Project Plan, The “When “ Part of Project Planning, The “How “ Part of a Project Planning: Tailoring of Organizational Processes For the Project, The “ By Whom “ Part of the Project Management Plan : Assigning Resources, Putting it all together : The Software Management Plan, Activities Specific to Project Tracking, Interfaces to the Process Database. Project Closure: When Does Project Closure Happen?. Why Should We Explicitly do a Closure?, An Effective Closure Process, Issues that Get Discussed During Closure, Metrics for Project Closure, Interfaces to the Process Database.</p>			
Module – 3			10 Hours
<p>Software Requirements gathering: Inputs and start criteria for requirements gathering, Dimensions of requirements gathering, Steps to be followed during requirements gathering, outputs and quality records from the requirements phase, skill sets required during requirements phase, differences for a shrink-wrapped software, challenges during the requirements management phase, Metrics for requirements phase. Estimation: What is Estimation? when and why is Estimation done?, the three phases of Estimation, Estimation methodology, formal models for size Estimation, Translating size Estimate into effort Estimate, Translating effort Estimates into schedule Estimate, common challenges during Estimation , Metrics for the Estimation processes. Design and Development Phases: Some differences in our chosen approach, salient features of design, evolving an architecture/ blueprint, design for reusability, technology choices/ constraints, design to standards, design for portability, user interface issues, design for testability, design for diagnose ability, design for maintainability, design for install</p>			

ability, inter-operability design, challenges during design and development phases, skill sets for design and development, metrics for design and development phases.	
Module-4	
Project management in the testing phase: Introduction, What is testing?, what are the activities that makeup testing?, test scheduling and types of tests, people issues in testing, management structures for testing in global teams, metrics for testing phase. Project management in the Maintenance Phase: Introduction, Activities during Maintenance Phase, management issues during Maintenance Phase, Configuration management during Maintenance Phase, skill sets for people in the maintenance phase, estimating size, effort, and people resources for the maintenance phase, advantages of using geographically distributed teams for the maintenance phase, metrics for the maintenance phase.	10 Hours
Module-5	
Globalization issues in project management: Evolution of globalization, challenges in building global teams, Models for the execution of global projects, some effective management techniques for managing global teams. Impact of the internet on project management: Introduction, the effect of internet on project management, managing projects for the internet, Effect on the project management activities. People focused process models: Growing emphasis on people centric models, people capability maturity model(P-CMM), other people focused models in the literature, how does an organization choose the models to use?	10 Hours
Course outcomes:	
<p>At the end of this course students will be able to:</p> <ul style="list-style-type: none"> • Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities • Apply risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely effect of risk on project timescales • Identify the resources required for a project and to produce a work plan and resource schedule • Monitor the progress of a project and to assess the risk of slippage, revising targets counteract drift • Use appropriate metrics to management the software development outcome • Develop research methods and techniques appropriate to defining, planning and carrying out a research project within your chosen specialist area within the management of software projects. 	
Question paper pattern:	
<p>The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>	
Text Books:	
<ol style="list-style-type: none"> 1. Ramesh Gopaldaswamy: "Managing Global Projects ", Tata McGraw Hill, 2013. 	
Reference Books:	
<ol style="list-style-type: none"> 1. Watts Humphrey, "Managing the Software Process ", Pearson Education, New Delhi, 2000 2. Pankaj Jalote, "Software Project Management in practice", Pearson Education, New Delhi, 2002. 	

ENTERPRISE APPLICATION PROGRAMMING [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – II			
Subject Code	16SIT11 / 16SCE424 / 16SSE22	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Course objectives: This course will enable students to			
<ul style="list-style-type: none"> • Explain Web Application Development and related terminologies • Demonstrate persistent framework and other ORM tools. • Illustrate solutions using Design Patterns • Outline latest WEB frameworks 			
Module 1			Teaching Hours
Web application and java EE 6: Exploring the HTTP Protocol, Introducing web applications, describing web containers, exploring web architecture models, exploring the MVC architecture. Working with servlets 3.0 Exploring the features of java servlet, Exploring new features in servlet 3.0, Exploring the servlet API, explaining the servlet life cycle, creating a sample servlet, creating a servlet by using annotation, working with servlet config and servlet context objects, working with the HTTP servlet request and HTTP servlet response interfaces, Exploring request delegation and request scope, implementing servlet collaboration.			10 Hours
Module 2			
Handling sessions in servlet 3.0: Describing a session, introducing session tracking, Exploring the session tracking, mechanisms, using the java servlet API for session tracking, creating login application using session tracking. Implementing event handling Introducing events, Introducing event handling, working with the servlet events, developing the online shop web application. Working with java server pages: Introducing JSP technology, Exploring new features of JSP2.1, listing advantages of JSP over java servlet, Exploring the architecture of a JSP page, Describing the life cycle of a JSP page, working with JSP basic tags and implicit objects, working with the action tags in JSP, exploring the JSP unified EL, using functions with EL.			10 Hours
Module 3			
Implementing JSP tag extensions: Exploring the elements of tag extensions, Working with classic tag handlers, Exploring the tag extensions, Working with simple tag handlers. Implementing java server pages standard tag library 1.2: Introducing JSTL, Exploring the tag libraries JSTL, working with the core tag library. Implementing filters: Exploring the need of filters, exploring the working of filters, exploring filters API, configuring a filter, creating a web application using filters, using initializing parameter in filters.			10 Hours
Module 4			
Persistence Management and Design Patterns: Implementing java persistence using hibernate Introducing hibernate, exploring the architecture of hibernate, downloading hibernate, exploring HQL, understanding hibernate O/R mapping, working with hibernate, Implementing O/R mapping with hibernate. Java EE design patterns: Describing the java EE application architecture, Introducing a design patterns, discussing the role of design patterns, exploring types of patterns.			10 Hours
Module 5			
Web Frameworks: Working with struts 2 Introducing struts 2, understanding actions in struts 2. Working with java server faces 2.0: Introducing JSF, Explaining the			10 Hours

<p>features of JSF, Exploring the JSF architecture, describing JSF elements, Exploring the JSF request processing life cycle. Working with spring 3.0: Introducing features of the spring framework, exploring the spring framework architecture, exploring dependency injection & inversion of control, exploring AOP with spring, managing transactions. Securing java EE 6 applications: Introducing security in java EE 6, exploring security mechanisms, implementing security on an application server.</p>	
<p>Course Outcomes</p>	
<p>The students should be able to:</p> <ul style="list-style-type: none"> • Explain WEB basics and their functionalities • Develop JAVA support and API skills • Build a WEB application. • Build Security mechanisms 	
<p>Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>	
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Kogent learning solution: JAVA SERVER PROGRAMMING JAVA EE6(J2EE 1.6), Dreamtech press 2014 	
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. NIL 	

SOFTWARE DESIGN PATTERNS [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER - II			
Subject Code	16SSE23	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Course objectives: This course will enable students to <ul style="list-style-type: none"> • Develop functionality to designs while minimizing complexity. • What code qualities are required to maintain to keep code flexible? • Categorize the common design patterns. 			
Module -1			Teaching Hours
Introduction: what is a design pattern? describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern. What is object-oriented development? , key concepts of object oriented design other related concepts, benefits and drawbacks of the paradigm			10Hours
Module -2			
Analysis a System: overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further reading.			10 Hours
Module – 3			
Design Pattern Catalog: Structural patterns, Adapter, bridge, composite, decorator, facade, flyweight, proxy.			10 Hours
Module-4			
Interactive systems and the MVC architecture: Introduction , The MVC architectural pattern, analyzing a simple drawing program , designing the system, designing of the subsystems, getting into implementation , implementing undo operation , drawing incomplete items, adding a new feature , pattern based solutions.			10 Hours
Module-5			
Designing with Distributed Objects: Client server system, java remote method invocation, implementing an object oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.			10 Hours
Course outcomes:			
The student should be able to <ul style="list-style-type: none"> • Design and implement codes with higher performance and lower complexity • Discover code qualities needed to keep code flexible • Assess the quality of a design with respect to these principles. • Apply principles in the design of object oriented systems. • Demonstrate an understanding of a range of design patterns. • Comprehending a design presented using this vocabulary. • Select and apply suitable patterns in specific contexts 			
Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.			

Text Books:

1. Object-oriented analysis, design and implementation, brahma dathan, sarnath rammath, universities press,2013.
2. Design patterns, Erich Gamma, Richard Helan, Ralph Johman , John Vlissides, PEARSON Publication,2013.

Reference Books:

1. Frank Bachmann, RegineMeunier, Hans Rohnert “Pattern Oriented Software Architecture” – Volume 1, 1996.
2. William J Brown et al., "Anti-Patterns: Refactoring Software, Architectures and Projects in Crisis", John Wiley, 1998.

SOFTWARE METRICS AND QUALITY ASSURANCE
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2016 -2017)
SEMESTER - II

Subject Code	16SSE24	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS - 04			
<p>Course objectives: This course will enable students to</p> <ul style="list-style-type: none"> • Define metrics, measurement theory and related Terminologies • Assess the quality level of internal and external attributes of the software product • Explain of software reliability and to illustrate how to perform planning, executing and testing for software reliability • Evaluate various metrics and models of software reliability • Compare various models of software reliability based on its application 			
Module -1			Teaching Hours
<p>What Is Software Quality: Quality: Popular Views, Quality Professional Views, Software Quality, Total Quality Management and Summary. Fundamentals Of Measurement Theory: Definition, Operational Definition, And Measurement, Level Of Measurement, Some Basic Measures, Reliability And Validity, Measurement Errors, Be Careful With Correlation, Criteria For Causality, Summary. Software Quality Metrics Overview: Product Quality Metrics, In Process Quality Metrics, Metrics for Software Maintenance, Examples For Metrics Programs, Collecting Software Engineering Data.</p>			10Hours
Module -2			
<p>Applying The Seven Basic Quality Tools In Software Development : Ishikawa’s Seven Basic Tools, Checklist, Pareo Diagram, Histogram, Run Charts , Scatter Diagram, Control Chart, Cause And Effect Diagram. The Rayleigh Model: Reliability Models, The Rayleigh Model Basic Assumptions, Implementation, Reliability And Predictive Validity.</p>			10 Hours
Module – 3			
<p>Complexity Metrics And Models: Lines Of Code, Halstead’s Software Science , Cyclomatic Complexity Syntactic Metrics, An Example Of Module Design Metrics In Practice .Metric And Lessons Learned For Object Oriented Projects: Object Oriented</p>			10 Hours

Concepts And Constructs, Design And Complexity Metrics, Productivity Metrics, Quality And Quality Management Metrics, Lessons Learned For object oriented Projects.	
Module-4	
Availability Metrics: Definition And Measurement Of System Availability, Reliability Availability And Defect Rate, Collecting Customer Outage Data For Quality Improvement, In Process Metrics For Outage And Availability . Conducting Software Project Assessment : Audit Ad Assessment , Software Process Maturity Assessment And Software Project Assessment , Software Process Assessment A Proponed Software Project Assessment Method.	10 Hours
Module-5	
Dos And Don'ts Of Software Process Improvement : Measuring Process Maturity, Measuring Process Capability, Staged Versus Continuous Debating Religion, Measuring Levels Is Not Enough, Establishing The Alignment Principle , Take Time Getting Faster, Keep it Simple Or Face Decomplexification, Measuring The Value Of Process Improvement , Measuring Process Compliance , Celebrate The Journey Not Just The Destination. Using Function Point Metrics to Measure Software Process Improvement: Software Process Improvement Sequences, Process Improvement Economies, Measuring Process Improvement at Activity Levels	10 Hours
Course outcomes:	
Upon completion of the course, students shall be able to <ul style="list-style-type: none"> • Identify and apply various software metrics, which determines the quality level of software • Identify and evaluate the quality level of internal and external attributes of the software product • Compare and Pick out the right reliability model for evaluating the software • Evaluate the reliability of any given software product • Design new metrics and reliability models for evaluating the quality level of the software based on the requirement 	
Question paper pattern:	
The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.	
Text Books:	
1. Stephen H Khan: Metrics and Models in Software Quality Engineering, Pearson 2 nd edition 2013.	
Reference Books:	
<ol style="list-style-type: none"> 1. Norman E-Fentor and Share Lawrence Pflieger.” Software Metrics”. International Thomson Computer Press, 1997. 2. S.A.Kelkar,”Software quality and Testing, PHI Learning, Pvt, Ltd., New Delhi 2012. 3. Watts S Humphrey, “Managing the Software Process”, Pearson Education Inc, 2008. 4. Mary Beth Chrissis, Mike Konrad and Sandy Shrum, “CMMI”, Pearson Education(Singapore) Pte Ltd, 2003 5. Philip B Crosby, " Quality is Free: The Art of Making Quality Certain ", Mass Market, 1992. 	

(Effective from the academic year 2016 -2017)			
SEMESTER – II			
Subject Code	16SCE251 /16SSE251/16SIT24	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
Course objectives: This course will enable students to <ul style="list-style-type: none"> • Define Data warehousing Architecture and Implementation • Explain Data mining principles and techniques and Introduce DM as a cutting edge business intelligence • Interpret association rule mining for handling large data • Classification for the retrieval purposes • Explain clustering techniques in details for better organization and retrieval of data 			
Module -1			Teaching Hours
Introduction and Data Preprocessing :Why data mining, What is data mining, What kinds of data can be mined, What kinds of patterns can be mined, Which Technologies Are used, Which kinds of Applications are targeted, Major issues in data mining .Data Preprocessing: An overview, Data cleaning, Data integration, Data reduction, Data transformation and data discretization.			8 Hours
Module -2			Teaching Hours
Data warehousing and online analytical processing: Data warehousing: Basic concepts, Data warehouse modeling: Data cube and OLAP, Data warehouse design and usage, Data warehouse implementation, Data generalization by attribute-oriented induction,			8 Hours
Module – 3			Teaching Hours
Classification: Basic Concepts: Basic Concepts, Decision tree induction, Bays Classification Methods, Rule-Based classification, Model evaluation and selection, Techniques to improve classification accuracy			8 Hours
Module-4			Teaching Hours
Cluster Analysis: Basic concepts and methods: Cluster Analysis, Partitioning methods, Hierarchical Methods, Density-based methods, Grid-Based Methods, Evaluation of clustering.			8 Hours
Module-5			Teaching Hours
Data mining trends and research frontiers: Mining complex data types, other methodologies of data mining, Data mining applications, Data Mining and society.			8 Hours
Course outcomes:			
The students shall able to: <ul style="list-style-type: none"> • Demonstrate Storing voluminous data for online processing, Preprocess the data for mining applications • Apply the association rules for mining the data • Design and deploy appropriate classification techniques • Cluster the high dimensional data for better organization of the data • Discover the knowledge imbibed in the high dimensional system 			
Question paper pattern:			
The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.			
Text Books:			
1. Jiawei Han, Micheline Kamber, Jian Pei: Data Mining Concepts and Techniques, ELSEVIER(MK) 3 rd edition 2012.			

Reference Books: NIL

INFORMATION RETRIEVAL [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – II			
Subject Code	16SSE252	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
Course objectives: This course will enable students to <ul style="list-style-type: none"> • Define Information Retrieval with pertinence to modeling, query operations and indexing • Explain machine learning techniques for text classification and clustering • Contrast various applications of Information Retrieval giving emphasis to Multimedia IR, Web Search • Interpret the concepts of queries specification judgment and search engines 			
Module -1			Teaching Hours
Introduction: Motivation, Basic concepts, Past, present, and future, The retrieval process. Modeling: Introduction, A taxonomy of information retrieval models, Retrieval: Adhoc and filtering, A formal characterization of IR models, Classic information retrieval, Alternative set theoretic models, Alternative algebraic models, Alternative probabilistic models, Structured text retrieval models, Models for browsing.			8 Hours
Module -2			
Retrieval Evaluation: Introduction, Retrieval performance evaluation, Reference collections. Query Languages: Introduction, keyword-based querying, Pattern matching, Structural queries, Query protocols. Query Operations: Introduction, User relevance feedback, Automatic local analysis, Automatic global analysis.			8 Hours
Module – 3			
Text and Multimedia Languages and Properties: Introduction, Metadata, Text, Markup languages, Multimedia. Text Operations: Introduction, Document preprocessing, Document clustering, Text compression, Comparing text compression techniques.			8 Hours
Module-4			
User Interfaces and Visualization: Introduction, Human-Computer interaction, The information access process, Starting pints, Query specification, Context, Using relevance judgments, Interface support for the search process. Searching the Web: Introduction, Challenges, Characterizing the web, Search engines, Browsing, Meta searchers, Finding the needle in the haystack, Searching using hyperlinks.			8 Hours
Module-5			

Indexing and Searching: Introduction; Inverted Files; Other indices for text; Boolean queries; Sequential searching; Pattern matching; Structural queries; Compression. Parallel and Distributed IR: Introduction, Parallel IR, Distributed IR.	8 Hours
Course outcomes:	
<ul style="list-style-type: none"> • Upon completion of the course, the students will 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 • Analyze the Web content structure • Design an efficient search engine 	
Question paper pattern:	
<p>The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>	
Text Books:	
1. Ricardo Baeza-Yates, Berthier Ribeiro-Neto: Modern Information Retrieval, Pearson, 1999.	
Reference Books:	
1. David A. Grossman, Ophir Frieder: Information Retrieval Algorithms and Heuristics, 2nd Edition, Springer, 2004	

ADVANCED ALGORITHMS [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – II			
Subject Code	16SCS23/ 16SSE253	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
Course objectives: This course will enable students to			
<ul style="list-style-type: none"> • Define the graph search algorithms. • Explain network flow and linear programming problems. • Interpret hill climbing and dynamic programming design techniques. • Develop recursive backtracking algorithms. • Define NP completeness and randomized algorithms 			
Module -1			Teaching Hours
Review of Analysis Techniques: Growth of Functions: Asymptotic notations; Standard notations and common functions; Recurrences and Solution of Recurrence equations- The substitution method, The recurrence – tree method, The master method; Amortized Analysis: Aggregate, Accounting and Potential Methods.			8 Hours

Module -2	
Graph Algorithms: Bellman - Ford Algorithm; Single source shortest paths in a DAG; Johnson's Algorithm for sparse graphs; Flow networks and Ford-Fulkerson method; Maximum bipartite matching. Polynomials and the FFT: Representation of polynomials; The DFT and FFT; Efficient implementation of FFT.	8 Hours
Module – 3	
Number -Theoretic Algorithms: Elementary notions; GCD; Modular Arithmetic; Solving modular linear equations; The Chinese remainder theorem; Powers of an element; RSA cryptosystem; Primality testing; Integer factorization	8 Hours
Module-4	
String-Matching Algorithms: Naïve string Matching; Rabin - Karp algorithm; String matching with finite automata; Knuth-Morris-Pratt algorithm; Boyer – Moore algorithms.	8 Hours
Module-5	
Probabilistic and Randomized Algorithms: Probabilistic algorithms; Randomizing deterministic algorithms, Monte Carlo and Las Vegas algorithms; Probabilistic numeric algorithms.	8 Hours
Course outcomes:	
Upon completion of the course, the students will be able to <ul style="list-style-type: none"> • Design and apply iterative and recursive algorithms. • Design and implement optimization algorithms in specific applications. • Design appropriate shared objects and concurrent objects for applications. 	
Question paper pattern:	
The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.	
Text Books:	
1. T. H Cormen, C E Leiserson, R L Rivest and C Stein: Introduction to Algorithms, 3rd Edition, Prentice-Hall of India, 2010. 2. Kenneth A. Berman, Jerome L. Paul: Algorithms, Cengage Learning, 2002.	
Reference Books:	
1. Ellis Horowitz, Sartaj Sahni, S.Rajasekharan: Fundamentals of Computer Algorithms, 2nd Edition, Universities press, 2007	

CLOUD COMPUTING [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – II			
Subject Code	16SCS12/16SCE12 16SIT22/ 16SSE254	IA Marks	20

	16SCN22/16LNI151		
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
Course objectives: This course will enable students to			
<ul style="list-style-type: none"> • Define and Cloud, models and Services. • Compare and contrast programming for cloud and their applications • Explain virtualization, Task Scheduling algorithms. • Apply ZooKeeper, Map-Reduce concept to applications. 			
Module 1			Teaching Hours
Introduction, Cloud Infrastructure: Cloud computing, Cloud computing delivery models and services, Ethical issues, Cloud vulnerabilities, Cloud computing at Amazon, Cloud computing the Google perspective, Microsoft Windows Azure and online services, Open-source software platforms for private clouds, Cloud storage diversity and vendor lock-in, Energy use and ecological impact, Service level agreements, User experience and software licensing. Exercises and problems.			8 Hours
Module 2			
Cloud Computing: Application Paradigms.: Challenges of cloud computing, Architectural styles of cloud computing, Workflows: Coordination of multiple activities, Coordination based on a state machine model: The Zookeeper, The Map Reduce programming model, A case study: The Gre The Web application, Cloud for science and engineering, High-performance computing on a cloud, Cloud computing for Biology research, Social computing, digital content and cloud computing.			8 Hours
Module 3			
Cloud Resource Virtualization: Virtualization, Layering and virtualization, Virtual machine monitors, Virtual Machines, Performance and Security Isolation, Full virtualization and paravirtualization, Hardware support for virtualization, Case Study: Xen a VMM based paravirtualization, Optimization of network virtualization, vBlades, Performance comparison of virtual machines, The dark side of virtualization, Exercises and problems			8 Hours
Module 4			
Cloud Resource Management and Scheduling: Policies and mechanisms for resource management, Application of control theory to task scheduling on a cloud, Stability of a two-level resource allocation architecture, Feedback control based on dynamic thresholds, Coordination of specialized autonomic performance managers, A utility-based model for cloud-based Web services, Resourcing bundling: Combinatorial auctions for cloud resources, Scheduling algorithms for computing clouds, Fair queuing, Start-time fair queuing, Borrowed virtual time, Cloud scheduling subject to deadlines, Scheduling MapReduce applications subject to deadlines, Resource management and dynamic scaling, Exercises and problems.			8 Hours
Module 5			
Cloud Security, Cloud Application Development: Cloud security risks, Security: The top concern for cloud users, Privacy and privacy impact assessment, Trust, Operating system security, Virtual machine Security, Security of virtualization, Security risks posed by shared images, Security risks posed by a management OS, A trusted virtual machine monitor, Amazon web services: EC2 instances, Connecting clients to cloud instances through firewalls, Security rules for application and transport layer protocols in EC2, How to launch an EC2 Linux instance and connect to it, How to use S3 in java, Cloud-based simulation of a distributed trust algorithm, A trust management service, A cloud service for adaptive data streaming, Cloud based optimal FPGA synthesis .Exercises and problems.			8 Hours
Course Outcomes			
The students should be able to:			

- Compare the strengths and limitations of cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Apply suitable virtualization concept.
- Choose the appropriate cloud player
- Address the core issues of cloud computing such as security, privacy and interoperability
- Design Cloud Services
- Set a private cloud

Question paper pattern:

The question paper will have ten questions.

There will be 2 questions from each module.

Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. Dan C Marinescu: Cloud Computing Theory and Practice. Elsevier(MK) 2013.

Reference Books:

1. Rajkumar Buyya , James Broberg, Andrzej Goscinski: Cloud Computing Principles and Paradigms, Willey 2014.
2. John W Rittinghouse, James F Ransome:Cloud Computing Implementation, Management and Security, CRC Press 2013.

MINIPROJECT [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – II			
Laboratory Code	16LNI26/ 16SCE26 / 16SCN26 /16SCS26 /16SFC26 / 16SIT26 / 16SSE26	IA Marks	20
Number of Lecture Hours/Week	03 hours of lab	Exam Marks	80
Total Number of Lecture Hours	-----	Exam Hours	03
CREDITS – 02			
<p>Course objectives: This course will enable students to</p> <ul style="list-style-type: none"> • Enable the student to design, develop and analyze an application development 			
<p>The student will carry out a mini project relevant to the course. The project must be development of an application (Hardware/Software). It is preferable if the project is based on mobile application development.</p>			
<p>Course outcomes:</p> <ul style="list-style-type: none"> • Design, develop and to analyze an application development. • Prepare report of the project. 			
<p>Conduction of Practical Examination:</p> <p>The student shall prepare the report by including:</p> <ol style="list-style-type: none"> 1. Define project (Problem Definition) 2. Prepare requirements document <ol style="list-style-type: none"> a. Statement of work b. Functional requirements c. Software / Hardware requirements 			

3. Develop use cases
4. Research, analyze and evaluate existing learning materials on the application
5. Develop user interface and implement code
6. Prepare for final demo

Evaluation:

Evaluation shall be taken up at the end of the semester. Project work evaluation and viva-voce examination shall be conducted. Internal evaluation shall be carried by the Guide and Head of the department for 20 marks. Final examination which includes demonstration of the project and viva-voce shall be conducted for 80 Marks viz report + Outputs of the project + presentation = 30+30+20 = 80 marks.

SEMINAR [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – II			
Subject Code	16SCE27 / 16SCN27 / 16LNI27 / 16SIT27 / 16SSE27 / 16SCS27 / 16SFC27	IA Marks	100
Number of Lecture Hours/Week	----	Exam Marks	-
Total Number of Lecture Hours	----	Exam Hours	-
CREDITS – 01			
Course objectives: This course will enable students to			
<ul style="list-style-type: none"> • Motivate the students to read technical article • Discover recent technology developments 			
Descriptions			
<p>The students should read a recent technical article (try to narrow down the topic as much as possible) from any of the leading reputed and refereed journals like:</p> <ol style="list-style-type: none"> 1. IEEE Transactions, journals, magazines, etc. 2. ACM Transactions, journals, magazines, SIG series, etc. 3. Springer 4. Elsevier publications etc <p>In the area of (to name few and not limited to)</p> <ul style="list-style-type: none"> • Web Technology • Cloud Computing • Artificial Intelligent • Networking • Security • Data mining 			
Course Outcomes			
<p>The students should be able to:</p> <ul style="list-style-type: none"> • Conduct survey on recent technologies • Infer and interpret the information from the survey conducted • Motivated towards research 			
Conduction:			
<p>The students have to present at least ONE technical seminar on the selected topic and submit a report for internal evaluation.</p>			

Marks Distribution: Literature Survey + Presentation (PPT) + Report + Question & Answer + Paper: 20 + 30 + 30 + 20 (100).

SOFT COMPUTING [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – IV			
Subject Code	16SSE41 / 16SCS254 / 16SCN154	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Course objectives: This course will enable students to			
<ul style="list-style-type: none"> • Explain key aspects of soft computing. • Identify the components and building block hypothesis of Genetic algorithm. • Analyze Neuro Fuzzy modeling and control. • Evaluate machine learning through Support vector machines. 			
Module 1			Teaching Hours
Introduction to Soft computing: Neural networks, Fuzzy logic, Genetic algorithms, Hybrid systems and its applications. Fundamental concept of ANN, Evolution, basic Model of ANN, Terminologies used in ANN, MP model, Hebb model.			10 Hours
Module 2			
Perceptron Network: Adaptive linear neuron, Multiple adaptive linear neurons, Back propagation Network (Theory, Architecture, Algorithm for training, learning factors, testing and applications of all the above NN models).			10 Hours
Module 3			
Introduction to classical sets and fuzzy sets: Classical relations and fuzzy relations, Membership functions.			
Module 4			
Defuzzification: Fuzzy decision making, and applications.			10 Hours
Module 5			
Genetic algorithms: Introduction, Basic operations, Traditional algorithms, Simple GA General genetic algorithms, The schema theorem, Genetic programming, applications.			10 Hours
Course Outcomes			
The students should be able to:			
<ul style="list-style-type: none"> • Implement machine learning through neural networks. 			

<ul style="list-style-type: none"> • Design Genetic Algorithm to solve the optimization problem. • Develop a Fuzzy expert system. • Model Neuro Fuzzy system for clustering and classification.
<p>Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>
<p>Text Books: 1. Principles of Soft computing, Shivanandam, Deepa S. N, Wiley India, ISBN 13: 788126527410, 2011</p>
<p>Reference Books: 1. Neuro-fuzzy and soft computing, J.S.R. JANG, C.T. SUN, E. MIZUTANI, Phi (EEE edition), 2012.</p>

INTERNET OF THINGS [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – IV			
Subject Code	16LNI253 /16SCE253 /16SCN151 /16SCS24 /16SIT251 / 16SSE421	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
<p>Course objectives: This course will enable students to</p> <ul style="list-style-type: none"> • Define and explain basic issues, policy and challenges in the IoT • Illustrate Mechanism and Key Technologies in IoT • Explain the Standard of the IoT • Explain resources in the IoT and deploy of resources into business • Demonstrate data analytics for IoT 			
Module -1			Teaching Hours
What is The Internet of Things? Overview and Motivations, Examples of Applications, IPV6 Role, Areas of Development and Standardization, Scope of the Present Investigation. Internet of Things Definitions and frameworks-IoT Definitions, IoT Frameworks, Basic Nodal Capabilities. Internet of Things Application Examples- Overview, Smart Metering/Advanced Metering Infrastructure-Health/Body Area Networks, City Automation, Automotive Applications, Home Automation, Smart Cards, Tracking, Over-The-Air-Passive Surveillance/Ring of Steel, Control Application Examples, Myriad Other Applications.			8 Hours
Module -2			
Fundamental IoT Mechanism and Key Technologies-Identification of IoT Object and Services, Structural Aspects of the IoT, Key IoT Technologies. Evolving IoT Standards- Overview and Approaches, IETF IPV6 Routing Protocol for RPL Roll, Constrained Application Protocol, Representational State Transfer, ETSI M2M, Third Generation Partnership Project Service Requirements for Machine-Type Communications, CENELEC, IETF IPv6 Over Low power WPAN, Zigbee IP(ZIP), IPSO			8 Hours
Module – 3			

Layer ½ Connectivity: Wireless Technologies for the IoT-WPAN Technologies for IoT/M2M, Cellular and Mobile Network Technologies for IoT/M2M, Layer 3 Connectivity :IPv6 Technologies for the IoT: Overview and Motivations. Address Capabilities, IPv6 Protocol Overview, IPv6 Tunneling, IPsec in IPv6, Header Compression Schemes, Quality of Service in IPv6, Migration Strategies to IPv6.	8 Hours
Module-4	
Case Studies illustrating IoT Design-Introduction, Home Automation, Cities, Environment, Agriculture, Productivity Applications.	8 Hours
Module-5	
Data Analytics for IoT – Introduction, Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Oozie, Apache Spark, Apache Storm, Using Apache Storm for Real-time Data Analysis, Structural Health Monitoring Case Study.	8 Hours
Course outcomes:	
At the end of this course the students will be able to: <ul style="list-style-type: none"> • Develop schemes for the applications of IOT in real time scenarios • Manage the Internet resources • Model the Internet of things to business • Understand the practical knowledge through different case studies • Understand data sets received through IoT devices and tools used for analysis 	
Question paper pattern: The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.	
Text Books: 1. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", Wiley, 2013. 2. Arshdeep Bahga, Vijay Madisetti, "Internet of Things: A Hands on Approach" Universities Press., 2015	
Reference Books: 1. Michael Miller, "The Internet of Things", First Edition, Pearson, 2015. 2. Claire Rowland, Elizabeth Goodman et.al., "Designing Connected Products", First Edition, O'Reilly, 2015.	

MANAGING BIG DATA [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – IV			
Subject Code	16LNI422 / 16SCE21 / 16SCN24 / 16SCS21 / 16SIT41 / 16SSE422	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
Course objectives: This course will enable students to <ul style="list-style-type: none"> • Define big data for business intelligence • Analyze business case studies for big data analytics • Explain managing of Big data Without SQL • Develop map-reduce analytics using Hadoop and related tools 			
Module -1			Teaching Hours

UNDERSTANDING BIG DATA: What is big data – why big data –.Data!, Data Storage and Analysis, Comparison with Other Systems, Rational Database Management System , Grid Computing, Volunteer Computing, convergence of key trends – unstructured data – industry examples of big data – web analytics – big data and marketing – fraud and big data – risk and big data – credit risk management – big data and algorithmic trading – big data and healthcare – big data in medicine – advertising and big data – big data technologies – introduction to Hadoop – open source technologies – cloud and big data – mobile business intelligence – Crowd sourcing analytics – inter and trans firewall analytics.	8 Hours
Module -2	
NOSQL DATA MANAGEMENT: Introduction to NoSQL – aggregate data models – aggregates – key-value and document data models – relationships – graph databases – schema less databases – materialized views – distribution models – shading — version – map reduce – partitioning and combining – composing map-reduce calculations.	8 Hours
Module – 3	
BASICS OF HADOOP: Data format – analyzing data with Hadoop – scaling out – Hadoop streaming – Hadoop pipes – design of Hadoop distributed file system (HDFS) – HDFS concepts – Java interface – data flow – Hadoop I/O – data integrity – compression – serialization – Avro – file-based data structures.	8 Hours
Module-4	
MAPREDUCE APPLICATIONS: MapReduce workflows – unit tests with MRUnit – test data and local tests – anatomy of MapReduce job run – classic Map-reduce – YARN – failures in classic Map-reduce and YARN – job scheduling – shuffle and sort – task execution – MapReduce types – input formats – output formats	8 Hours
Module-5	
HADOOP RELATED TOOLS: Hbase – data model and implementations – Hbase clients – Hbase examples –praxis. Cassandra – Cassandra data model – Cassandra examples – Cassandra clients –Hadoop integration. Pig – Grunt – pig data model – Pig Latin – developing and testing Pig Latin scripts. Hive – data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries.	8 Hours
Course outcomes:	
The students shall able to: <ul style="list-style-type: none"> • Describe big data and use cases from selected business domains • Explain NoSQL big data management • Install, configure, and run Hadoop and HDFS • Perform map-reduce analytics using Hadoop • Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data Analytics 	
Question paper pattern:	
The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.	
Text Books:	
<ol style="list-style-type: none"> 1. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012. 2. Eric Sammer, "Hadoop Operations", O'Reilley, 2012. 	
Reference Books:	
<ol style="list-style-type: none"> 1. Vignesh Prajapati, Big data analytics with R and Hadoop, SPD 2013. 2. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012. 3. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011. 4. Alan Gates, "Programming Pig", O'Reilley, 2011 	

[As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – IV			
Subject Code	16SCS423 /16SSE423	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
<p>Course objectives: This course will enable students to</p> <ul style="list-style-type: none"> • Explain iterative, incremental development process leads to faster delivery of more useful software • Evaluate essence of agile development methods • Illustrate the principles and practices of extreme programming • Show the roles of prototyping in the software process • Explain the Mastering Agility 			
Module -1			Teaching Hours
<p>Why Agile?: Understanding Success, Beyond Deadlines, The Importance of Organizational Success, Enter Agility, How to Be Agile?: Agile Methods, Don't Make Your Own Method, The Road to Mastery, Find a Mentor</p>			8 Hours
Module -2			
<p>Understanding XP: The XP Lifecycle, The XP Team, XP Concepts, Adopting XP: Is XP Right for Us?, Go!, Assess Your Agility</p>			8 Hours
Module – 3			
<p>Practicing XP: Thinking: Pair Programming, Energized Work, Informative Workspace, Root-Cause Analysis, Retrospectives, Collaborating: Trust, Sit Together, Real Customer Involvement, Ubiquitous Language, Stand-Up Meetings, Coding Standards, Iteration Demo, Reporting, Releasing:“Done Done”, No Bugs, Version Control, Ten-Minute Build, Continuous Integration, Collective Code Ownership, Documentation. Planning: Vision, Release Planning, The Planning Game, Risk Management, Iteration Planning, Slack, Stories, Estimating. Developing: Incremental requirements, Customer Tests, Test-Driven Development, Refactoring, Simple Design ,Incremental Design and Architecture, Spike Solutions, Performance Optimization, Exploratory Testing</p>			8 Hours
Module-4			
<p>Mastering Agility: Values and Principles: Commonalities, About Values, Principles, and Practices, Further Reading, Improve the Process: Understand Your Project, Tune and Adapt, Break the Rules, Rely on People :Build Effective Relationships, Let the Right People Do the Right Things, Build the Process for the People, Eliminate Waste :Work in Small, Reversible Steps, Fail Fast, Maximize Work Not Done, Pursue Throughput</p>			8 Hours
Module-5			
<p>Deliver Value: Exploit Your Agility, Only Releasable Code Has Value, Deliver Business Results, Deliver Frequently, Seek Technical Excellence :Software Doesn't Exist, Design Is for Understanding, Design Trade-offs, Quality with a Name, Great Design, Universal Design Principles, Principles in Practice, Pursue Mastery</p>			8 Hours

Course outcomes:
Students should be able to <ul style="list-style-type: none"> • Define XP Lifecycle, XP Concepts, Adopting XP • Evaluate on Pair Programming, Root-Cause Analysis, Retrospectives, Planning, Incremental Requirements, Customer Tests • Demonstrate concepts to Eliminate Waste
Question paper pattern:
The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.
Text Books:
1. The Art of Agile Development (Pragmatic guide to agile software development), James shore, Chromatic, O'Reilly Media, Shroff Publishers & Distributors, 2007.
Reference Books:
1. Agile Software Development, Principles, Patterns, and Practices, Robert C. Martin, Prentice Hall; 1st edition, 2002. 2. Agile and Iterative Development A Manger's Guide", Craig Larman Pearson Education, First Edition, India, 2004.

SUPPLY CHAIN MANAGEMENT [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – IV			
Subject Code	16SSE424	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
Course objectives: This course will enable students to			
<ul style="list-style-type: none"> • Define Model of SCM. • Compare and contrast QRM, CPFR. • Evaluate inventory Models and third party logistics. • Explain revenue management 			
Module -1			Teaching Hours
Introduction to Supply Chain Management : Supply chain – objectives – importance – decision phases – process view – competitive and supply chain strategies – achieving strategic fit – supply chain drivers – obstacles – framework – facilities – inventory – transportation – information – sourcing – pricing.			8 Hours

Module -2	
Designing the supply chain network : Designing the distribution network – role of distribution – factors influencing distribution – design options – e-business and its impact – distribution networks in practice – network design in the supply chain – role of network – factors affecting the network design decisions – modeling for supply chain.	8 Hours
Module – 3	
Designing and Planning Transportation Networks.: Role of transportation - modes and their performance - transportation infrastructure and policies - design options and their trade-offs - Tailored transportation.	8 Hours
Module-4	
Sourcing and Pricing: Sourcing – In-house or Outsource – 3rd and 4th PLs – supplier scoring and assessment, selection – design collaboration – procurement process – sourcing planning and analysis. Pricing and revenue management for multiple customers, perishable products, seasonal demand, bulk and spot contracts.	8 Hours
Module-5	
Information Technology in the supply chain: IT Framework – customer relationship management – internal supply chain management – supplier relationship management – transaction management – future of IT.	8 Hours
Course outcomes:	
<p>The student shall be able to</p> <ul style="list-style-type: none"> • Discuss SCM Models, • Formulate of QRM, CPFR. • Implement various Inventory Models and third party logistics. 	
Question paper pattern:	
<p>The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>	
Text Books:	
<ol style="list-style-type: none"> 1. Sunil Chopra and Peter Meindl, Supply Chain Management – Strategy, Planning and Operation, Pearson/PHI, 3rd Edition, 2007. 2. Coyle, Bardi, Longley, The management of Business Logistics – A supply Chain Perspective, Thomson Press, 2006. 3. Supply Chain Management by Janat Shah Pearson Publication 2008. 	
Reference Books:	
<ol style="list-style-type: none"> 1. Donald J Bowersox, Dand J Closs, M Bixby Coluper, Supply Chain Logistics Management, TMH, Second Edition, 2008. 2. Wisner, Keong Leong and Keah-Choon Tan, Principles of Supply Chain Management A 	

Balanced Approach, Thomson Press, 2005.

3. David Simchi-Levi et al, Designing and Managing the Supply Chain – Concepts, ISBN-13:
978-0072357561