Rashtreeya Sikshana Samithi Trust

R. V. COLLEGE OF ENGINEERING

(Autonomous Institution Affiliated to VTU, Belgaum)

R.V Vidyaniketan Post, Mysore Road

Bangalore-560 059

Scheme & Syllabus

VII & VIII Semester B.E

Information Science and Engineering

(2012 Scheme)

R. V. College of Engineering, Bangalore-560059

(Autonomous Institution Affiliated to VTU, Belgaum)
Department of Information Science & Engineering

SCHEME OF TEACHING & EXAMINATION

SEMESTER: VII

Sl. No.	Course Code	Course Title	BoS	Credit Allocation*				No. of Credits
				L	**T**	**P**	**S**	
1	12IS71	Web Programming	ISE	3	1	1	0	5
2	12IS72	Software Testing	ISE	3	1	1	0	5
3	12HSC73	Legal Studies & Professional Ethics for Engineers	HSS	2	0	0	0	2
4	12IS74	Human Computer Interaction	ISE	3	0	0	0	3
5	12IS7EX	Elective – E	ISE	3	0	0	0	3
6	12GF7XX	Elective – F	Respective BoS	4	0	0	0	4
7	12GG7XX	Elective – G	Respective BoS	3	0	0	0	3
	Total Hours			21	4	4	0	29
	Total Credits							**25**

* L – Lecture, T – Theory, P – Practical, S – Self Study

Elective – E

Course Code	Course Title
12IS7E1	Wireless Sensor Networks
12IS7E2	Enterprise Architecture
12IS7E3	Big Data Analytics
12IS7E4	Cloud Computing and Applications
12IS7E5	Information Retrieval
12IS7E6	Fuzzy Logic &Genetic Algorithms

Global Elective – F

Course Code	Course Title
12GF7XX	Java & J2EE

Global Elective – G

Course Code	Course Title
12GG7XX	Cloud Computing

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SCHEME OF TEACHING & EXAMINATION

SEMESTER: VIII

Sl. No.	Course Code	Course	BoS	Credit Allocation*				Total Credits
				L	**T**	**P**	**S**	
1	12IS81	Project Work	ISE	0	0	18	0	18
2	12IS82	Technical Seminar	ISE	0	0	1	0	01
3	12HSS83	Innovation and Social Skills	HSS	0	0	1	0	01
Total Hours				0	0	40	0	40
Total Credits								**20**

* L – Lecture, T – Theory, P – Practical, S – Self Study

SEMESTER WISE CREDIT DISTRIBUTION (SELF STUDY CREDIT INCLUDED EXCEPT FOR VII SEM)								
I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**TOTAL**
23 (P) / 25(c)	**25/23**	**27**	**29**	**25**	**26**	**25**	**20**	**200**
48		**56**		**51**		**45**		

Semester VII				
WEB PROGRAMMING				
Course Code	12IS71		**CIE Marks**	100+50
L:T:P:S	3:1:1:0		**SEE Marks**	100+50
Credits	5		**SEE Duration**	3 Hrs

Course Learning Objectives – CLO:
1. Comprehend the fundamentals of Web programming and good practices to be followed while creating well formatted Web Documents.
2. Synthesize the Dynamic Documents using Dynamic HTML and Java Scripts.
3. Analyze the essential technology and practices needed to develop and implement Web Applications
4. Analyze the AJAX specifications and Open Source Technologies like Perl and PHP in order to create Open Source Web Applications.

Unit-I	
Introduction: What is the intelligent web? Examples of intelligent web applications, Basic elements of intelligent applications, What applications can benefit from intelligence? How can I build intelligence in my own application? Machine learning, data mining, and all that Eight fallacies of intelligent applications. **Clustering:** grouping things together, The need for clustering, An overview of clustering algorithms, Link-based algorithms, The k-means algorithm, Robust Clustering Using Links (ROCK), DBSCAN, Clustering issues in very large datasets. **Classification:** placing things where they belong, The need for classification, An overview of classifiers, Automatic categorization of emails and spam filtering, Fraud detection with neural networks, Are your results credible? Classification with very large datasets, Combining classifiers.	**7 Hrs** **L1, L2**

Unit-II	
Java Script: Introduction, Simple program, obtaining user input with prompt dialogs, memory concepts, arithmetic, decision making, assignment operators, control structures – IF, IF…ELSE, WHILE, , FOR repetition statement, SWITCH multiple-selection statement, DO…WHILE repetition statement, logical operators. Java Script: Program modules in java script, function definitions, scope rules, global functions, recursion, arrays, references and reference parameters, passing arrays to functions, sorting arrays, searching arrays, multi-dimensional arrays, math object, string object, date object, Boolean and number object, document object, window object, using cookies, using JSON to represent objects. **Document Object Model:** Introduction, Modeling a document, DOM Nodes and Trees, Traversing and modifying a DOM tree, DOM Collections, dynamic styles, summary of DOM objects and Collections, registering event handlers, on load, onmousemove, the event object, this, onmouseover, onmouseout, onfocus, onblur, onsubmit, onreset, event bubbling, more events.	**7 Hrs** **L2, L3**

Unit-III	
Mark-up languages, XML, Uses of XML. WELL-FORMED XML: Parsing XML, Tags, text, elements, attributes, comments and empty elements. XML Declaration, Processing Instructions, Errors in XML XML NAMESPACES: Need for namespaces, How XML namespaces work, URIs, When to use namespace. VALIDATION: Document type definitions (DTD), Sharing vocabularies, Anatomy of DTD, Developing DTDs, DTD Limitations. XML SCHEMAS: Benefit of XML schemas, Elements of XML Schema Definition, Creating a Schema from multiple documents.	**7 Hrs** **L2, L3, L4**

Unit-IV	
WEB SERVICES, SOAP AND WSDL: What is an RPC? RPC protocols, The new RPC protocol, Web services, The web Service Stack. SCALABLE VECTOR GRAPHICS (SVG): What is SVG? The SVG specification. **HTML 5:** Detecting HTML 5 features – Canvas, video, local storage, web workers, offline applications, geolocation, placeholders, input types. What does it all mean – doctype, root, headers, articles, dates and times, navigation and footers. Let's call it a drawing surface Simple shapes, canvas, Paths, texts, gradients and images. The past, present and future of local storage for web applications, A Form of madness – place holders, autofocus fields, email,web addresses, numbers as spinboxes and sliders, date and color pickers, search boxes.	**7 Hrs** **L3, L4**

Unit-V	
AJAX-I: Basic communication techniques – XHR, AJAX with images, Dynamic script loading, Cache control. AJAX patterns: Communication control patterns – predictive fetch, page preloading, submission throttling, periodic refresh, multi-stage download. Fallback patterns. AJAX libraries – JQuery. **AJAX-II:** Syndication with RSS and Atom – RSS, Atom, XParser, Creating a news ticker, Web search with RSS. JSON – Array, object, mixing literals, syntax, encoding/decoding, JSON versus XML, server-side JSON tools. COMET: HTTP streaming – request delays, file modification example, using Iframes, browser specific approaches, server-sent DOM events, connection management and server-side support.	**7 Hrs** **L4, L5**

	Course Outcomes
1	Define the terminologies in Web programming.
2	Comprehend various techniques in developing Web programming.
3	Apply the web programming techniques to develop the real time web applications.
4	Develop and implement AJAX technology to improve the efficiency of Web applications.

	References:
1	**PJ Deitel, HM Deital, TR Nieto**: Internet & World Wide Web How To Program, 1st Edition, Pearson Education Limited Publications, 2012, ISBN 9788131701126.
2	**Haralambos Marmanis, Dmitry Babenko**: Algorithms of the Intelligent Web, Illustrated Edition, Manning Pubs Co Series, 2009, ISBN: 9781933988665
3	**Joe Fawcett, Jeremy Mcpeak, Nicholas C Zakas**: Professional Ajax, 2nd Edition, Wiley India Pvt.ltd, 2014, ISBN: 9788126512065
4	**Erik Bruchez, Danny Ayers, Eric Van Der Vlist:** Professional Web 2.0 Programming, 1st Edition, Wiley India Pvt.ltd, 2014, ISBN: 9788126510665

Laboratory work (Practical):
Pre-requisite: Basic knowledge of programming languages. A mini project has to be created in a team of not more than 4 students. The product is a Web Application and should constitute all the technologies comprehending the syllabus

Scheme of Continuous Internal Evaluation for Theory
CIE consists of Three Tests each for 45 marks (15 marks for Quiz + 30 marks for descriptive) out of which best of two will be considered. In addition the assignment will carry 10 marks.

Scheme of Semester End Evaluation for Theory
The question paper consists of Part A and Part B. Part A will be for 20 marks covering the complete syllabus and is compulsory. Part B will be for 80 marks and shall consist of five questions carrying 16 marks each. All five questions from Part B will have internal choice and one of the two have to be answered compulsorily
Scheme of Continuous Internal Evaluation for Practical's :
CIE consists of 50 marks out of which 30 marks for developing the Web Application. 20 marks are allotted for internal test.
Scheme of Semester End Examination for Lab :
Students need to demonstrate the Project developed in team.   10% modification should be given by the examiner. SEE is evaluated for 50 marks which include execution of project and viva.

Semester VII				
SOFTWARE TESTING				
Course Code	12IS72		**CIE Marks**	100+50
L:T:P:S	3:1:1:0		**SEE Marks**	100+50
Credits	5		**SEE Duration**	3 Hrs

Course Learning Objectives – CLO:
1. Comprehend the good practices to be followed while writing Professional Programs and systematically, mathematically and professionally testing those programs.
2. Analyze the techniques, practices and essential technology to develop and test the Software.
3. Synthesize the Software Testing knowledge with realistic scenarios to create effective test cases
4. Evaluate good practices of Testing considering the limitations and constraints in implementing theory into practice are clearly understood.

Unit-I	
The Psychology and Economics of Program Testing: The Psychology of Testing, The Economics of Testing, Software Testing Principles. **Program Inspections, Walkthroughs, and Reviews:** Inspections and Walkthroughs, Code Inspections, An Error Checklist for Inspections, Walkthroughs, Desk Checking, Peer Rating. **Test-Case Design:** White-Box Testing, Error Guessing, The Strategy. **Module (Unit) Testing:** Test-Case Design, Incremental Testing, Top-down versus Bottom-up Testing, Performing the Test.	**7 Hrs** **L1, L2, L3**
Unit-II	
Basics of Software Testing and Examples: Basic definitions, Test cases, Insights from a Venn diagram, Identifying test cases, Error and fault taxonomies, Levels of testing. **Examples**: Generalized pseudo code, The triangle problem, T he NextDate function, The commission problem, The SATM (Simple Automatic Teller Machine) problem.	**7 Hrs** **L1, L2**
Unit-III	
Functional Testing: Boundary Value Testing, Boundary value analysis, Robustness testing, Worst case testing, Special value testing, Random testing, Guidelines for boundary value testing; **Equivalence Class Testing:** Equivalence classes, Equivalence class test cases for Triangle problem, Equivalence class test cases for NextDate problem, Equivalence class test cases for Commission problem; **Decision table based testing**: Decision tables, Test case for the Triangle problem, Test case for NextDate function.	**7 Hrs** **L3, L4**
Unit-IV	
Integration and System Testing: Levels of Testing: Traditional view of testing levels, Alternative life cycle models, The SATM system, Separating integration and system testing; **Integration Testing**: A closer look at the SATM system, Decomposition based integration, Call Graph based integration, Path based integration, Case study.	**7 Hrs** **L4**
Unit-V	
System Testing: Threads, Basic concepts for requirements specification, Finding threads, Structural strategies and functional strategies for thread testing, SATM test threads, System testing guidelines, ASF (Atomic System Functions) testing example. **Interaction Testing:** Context of interaction, A taxonomy of interactions , Interaction, composition, and determinism, Client/Server Testing,. **Issues in Object-Oriented Testing:** Units for object-oriented testing, Implications of composition and encapsulation, inheritance, and polymorphism, Levels of object-oriented testing, GUI testing, Dataflow testing for object-oriented software, Examples.	**7 Hrs** **L2, L5**

Course Outcomes	
1	Define the terminologies in software testing.
2	Describe various test types and processes.
3	Apply the testing principles to design test cases.
4	Develop and implement simple test script suitable for testing software.

References:	
1	**Paul C. Jorgensen**: Software Testing, A Craftsman's Approach, 3rd Edition, Auerbach Publications, 2013, ISSN2229-55181
2	**Glenford J. Myers**: The Art of Software Testing, 3rd Edition, Wiley India, Reprint Oct 2011, ISSN: 978-1-118-03196-4
3	**Aditya P Mathur**, : Foundations of Software Testing, 2nd Edition, Addison Wesley Professional, 2014, ISBN: 813-1794768
4	**Srinivasan Desikan, Gopalswamy Ramesh**,: Software Testing – Principles & Practice, Pearson Education India, 2006, ISBN: 817758121X

Laboratory work (Practical):

Laboratory work (Practical):

Pre-requisite: Basic knowledge on software engineering and realization on the importance of software testing. Students are expected to study elaborative information on Software Testing process, testing types, testing principles. Students are expected to explore open source testing tools and setup the same in the lab to learn more.

As a learning point write a brief report on software testing process, types & principles.
Write the SRS for the following Problems and design the test cases according to the SRS

1. Write a program in C/C++ to read 3 sides of a triangle and determine the type of the triangle and test the same using cause Effect Graphing testing technique.
2. Write a program in C/C++ for the commission problem and perform Boundary Value Analysis (BVA).
3. Write a program in C/C++ to compute previous date and next date, given present date as input and perform decision table based testing.
4. Write a program to control the windshield wiper and test the application with MM Path
5. Develop a case study on
   a. Selenium   b. Junit   c. X-SUD etc as tools to be explored by student batches.

Scheme of Continuous Internal Evaluation for Theory

CIE consists of Three Tests each for 45 marks (15 marks for Quiz + 30 marks for descriptive) out of which best of two will be considered. In addition the assignment will carry 10 marks.

Scheme of Semester End Evaluation for Theory

The question paper consists of Part A and Part B. Part A will be for 20 marks covering the complete syllabus and is compulsory. Part B will be for 80 marks and shall consist of five questions carrying 16 marks each. All five questions from Part B will have internal choice and one of the two have to be answered compulsorily

Scheme of Continuous Internal Evaluation for Practical's :
CIE consists of 50 marks out of which 30 marks for regular lab experiments (Record/Report). 20 marks are allotted for internal test.
Scheme of Semester End Examination for Lab :
Students need to execute the experiments listed. 10% modification should be given by the examiner. SEE is evaluated for 50 marks which include execution of experiments and viva.

Semester VII				
LEGAL STUDIES & PROFESSIONAL ETHICS FOR ENGINEERS				
Course Code	**12HSC73**		**CIE Marks**	**50**
L: T: P: S	**2: 0: 0: 0**		**SEE Marks**	**50**
Credits	**02**		**SEE Duration**	**3 Hrs**

Course Learning Objectives
1. Apply the knowledge of the constitutional literacy to describe the fundamental rights and duties as Indian citizen
2. To acquire a basic knowledge of substantive Labour law and to develop skills in legal reasoning and statutory interpretation.
3. To make the student aware of consumer rights, responsibilities and socio-legal framework of protection of consumer interest
4. An understanding of ethical and legal aspects of advertising, consumer problem and their redressal, product and service standard, standardization and eco-friendly products
5. Define individual role, responsibilities and emphasize on professional/ engineering ethics in shaping professionals

UNIT – I	**06 Hrs**
Salient features of Indian Constitution: Preamble to the Constitution of India. Scope & Extent of Fundamental Rights under Part III. Constitutional Provisions relating to Right to Education under Article 21-A: Right to Information Act with Case studies	

UNIT – II	**06 Hrs**
Significance of Directive Principles of State Policy under Part – IV. Executive of the Union and State, Parliament & State Legislature. Anti-defection law, Union Judiciary & State Judiciary, Ombudsman-concept and need, Lokpal and Lokayukta.	

UNIT-III	**04 Hrs**
CONSUMER PROTECTION LAW- concept, definition and scope, object of C P Act, 1986 ,Rights of Consumers .Unfair Trade Practice, Restriction Trade Practice, Defect in goods, Deficiency in service: Medical, Lawyering, Electricity, Housing, Postal services etc. Enforcement of Consumer Rights- Consumer Forum	

UNIT-IV	**04 Hrs**
INTRODUCTION TO LABOUR LEGISLATIONS- Industrial Relation, Labour Problem and Labour Policy in India, Labour Welfare- Factories Act, 1948**,** Hazardous process, Safety and Welfare, Working Hours of Adults, Employment of young persons, Industrial Dispute Act, 1947**,** Reference of Disputes to Boards, Courts or Tribunals	

UNIT – V	**04 Hrs**
Scope and aims of engineering ethics (NSPE Code of Ethics), Responsibility of Engineers, Impediments to responsibility. Honesty, Integrity and reliability, Risks, Safety and Liability in Engineering. Corporate Social Responsibility. Statutory Provision regarding prohibition and prevention of Ragging and Sexual Harassment.	

Course Outcome:

1. Building awareness on the legal framework of operation and increase legal literacy in the context of professional engineering education.
2. To be conversant regarding conflict management in legal perspective and judicial system pertaining to labour management relations.
3. To become an aware &responsible consumer in the market place society capable of & taking action as an aware citizen to defend his/her rights there by contributing towards the development of society, community & industry.
4. To learn on the ethical and moral analysis of decision making scenarios and inculcate ethical behavior as a trait in professional development
5. Enable engineering students to use the knowledge gained during their professional career and protect the social fabric of the country.

References:

1. Dr. J. N Pandey, Constitutional Law of India, Central Law Agency, 44th Edition, 2010.
2. S.C. Srivastava: Industrial Relation and Labour ,Vikas Publishing House, ISBN: 8125918310
3. S.N.Misra- Labour & Industrial Relation, Central Law Publications EAN: 9788190861311
4. Dr R.K.Bangia, Consumer Protection Act, 2011, ISBN10: 8189530917 ISBN13: 9788189530914 ,Allahabad Law Agency
5. Avtar Singh: Law of Consumer Protection: Principles and Practice ,4th Edition Eastern Book Company, 2005 ,ISBN 8170128544, 9788170128540
6. Jr. Charles E Harris, Michael. S. Pritchard and Michael J Rabins, Engineering Ethics, Thompson Asia, 2003–08-05
7. Mike W Martin and Roland Schinzinger, Ethics in Engineering, 2005, 4th Edition, ISBN: 0-07-283115-4

Scheme of Continuous Internal Evaluation for Theory (50 Marks)

CIE consists of five components: two quizzes (30%), two written test (60%) and one Assignment (10%) The written test is aimed at evaluating the interim knowledge gained in the subject by the students. The quizzes are aimed at assisting faculty in checking the progress of the students in the subject. Assignment develops the writing skill and acquired knowledge with scientific background in a well-organized way.

Scheme of Semester End Evaluation for Theory (50 Marks)

The question paper consists of Part A and Part B. Part A is for 20 marks covering the complete syllabus and is compulsory and of objective type. Part B is for 30 marks, 6 questions carrying 05 marks each.

Semester VII				
Human Computer Interaction				
Course Code	12IS74		**CIE Marks**	100
L:T:P:S	3:0:0:0		**SEE Marks**	100
Credits	3		**SEE Duration**	3 Hrs

Course Learning Objectives – CLO:

1. Understanding of guidelines, principles, and theories influencing human computer interaction.

2. Recognize how a computer system may be modified to include human diversity.

3. Learn to Select an effective style for a specific application and to Design mock ups and carry out user and expert evaluation of interfaces.

4. Carry out the steps of experimental design, usability and experimental testing, and evaluation of human computer interaction systems.

Unit-I	
Usability of Interactive Systems: Introduction, Usability Measures, Usability Motivations, Universal Usability, Goals for Our Profession, **Guidelines, Principles, and Theories**: Introduction, Guidelines, Principles, Theories **Development Processes : Managing Design Processes** Introduction, Organizational Design to Support Usability, The Four Pillars of Design, Development Methodologies, Ethnographic Observation, Participatory Design, Scenario Development, Social Impact Statement for Early Design Review, Legal Issues	**7 Hrs** **L1, L3**

Unit-II	
Evaluating Interface Designs: Introduction, Expert Reviews, Usability Testing and Laboratories, Survey Instruments, Acceptance Tests, Evaluation During Active Use Controlled Psychologically Oriented Experiments **Interaction Styles, Direct Manipulation and Virtual Environments :** Introduction Examples of Direct Manipulation, Discussion of Direct Manipulation, 3D Interfaces Teleoperation, Virtual and Augmented Reality **Menu Selection, Form Fill-in, and Dialog Boxes :** Introduction, Task-Related Menu Organization, Single Menus, Combinations of Multiple Menus, Content Organization Fast Movement through Menus, Data Entry with Menus: Form Fill-in, Dialog Boxes and Alternatives, Audio Menus and Menus for Small Displays	**7 Hrs** **L2, L3**

Unit-III	
Command and Natural Languages : Introduction, Command-Organization, Functionality, Strategies, and Structure, Naming and Abbreviations, Natural Language in Computing **Interaction Devices :** Introduction, Keyboards and Keypads, Pointing Devices Speech and Auditory Interfaces, Displays – Small and Large **Collaboration and Social Media Participation:** Introduction, Goals of Collaboration and Participation, Asynchronous Distributed Interfaces: Different Place, Different Time	**7 Hrs** **L3, L4**

Synchronous Distributed Interfaces: Different Place, Same Time, Face-to-Face Interfaces: Same Place, Same Time	

Unit-IV	
Design Issues, Quality of Service : Introduction, Models of Response Time Impacts Expectations and Attitudes, User Productivity, Variability in Response Time, Frustrating Experiences **Balancing Function and Fashion** : Introduction, Error Messages, Non anthropomorphic Design, Display Design, Web Page Design, Window Design, Color	**8Hrs** **L2, L4**

Unit-V	
User Documentation and Online Help : Introduction, Online versus Paper, Documentation, Reading from Paper versus from Displays, Shaping the Content of the Documentation, Accessing the Documentation, Online Tutorials and Animated Demonstrations, Online Communities for User Assistance, The Development Process **Information Search :** Introduction, Searching in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Search Interface **Information Visualization :** Introduction, Data Type by Task Taxonomy, Challenges for Information Visualization	**7 Hrs** **L2, L5**

Course Outcomes	
1	Explain the human components functions regarding interaction with computer
2	Demonstrate Understanding of Interaction between the human and computer components.
3	Use HCI in the software process
4	Apply and Implement Interaction design rules

References:	
1	Designing the User Interface: Strategies for Effective Human-Computer Interaction., Ben Shneiderman and Catherine Plaisant, 5th Edition, Pearson Publications, ISBN: 0321537351
2	The essential guide to user interface design, Wilbert O Galitz, Wiley, 3rd Ed, ISBN: 978-0-471-27139-0
3	Human – Computer Interaction. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, Pearson 3rd Ed, ISBN 0-13-046109-1
4	Interaction Design Prece, Rogers, Sharps. 3nd ed., Wiley, ISBN: 978-1-119-02075-2

Scheme of Continuous Internal Evaluation for Theory
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Scheme of Semester End Evaluation for Theory
The question paper consists of Part A and Part B. Part A will be for 20 marks covering the complete syllabus and is compulsory. Part B will be for 80 marks and shall consist of five questions carrying 16 marks each. All five questions from Part B will have internal choice and one of the two have to be answered compulsorily

Semester VII				
Wireless Sensor Networks				
Course Code	12IS7E1		**CIE Marks**	100
L:T:P:S	3:0:0:0		**SEE Marks**	100
Credits	3		**SEE Duration**	3 Hrs

Course learning Objective:
1. Introduce the wireless sensor network concepts and routing principles.
2. Understand the architecture and sensor network scenarios.
3. Analyze the data dissemination and data gathering algorithms.
4. Compare and contrast the routing protocols and emphasis on security challenges

Unit-I	
Overview of Wireless Sensor Networks Key definitions of Sensor Networks, Advantages of Sensor Networks, Unique constraints and challenges, Driving applications, Enabling technologies for Wireless Sensor Networks **Architectures** Layered architecture, Clustered architecture, Single-Node architecture-hardware components, Energy consumption of sensor nodes, Operating systems and Execution Environments, Network Architecture-Sensor Network Scenarios, Optimization goals and Figures of Merit, Gateway concepts.	**6 Hrs** **L1, L2**

Unit-II	
Data Dissemination and Data Gathering Flooding, Gossiping, Rumor Routing, Sequential assignment Routing, Directed Diffusion, Sensor protocols for Information via Negotiation, Cost-field approach, Geographic hash table, Small minimum energy communication network. Direct Transmission, Power efficient gathering for sensor information systems, Binary scheme, Chain-based three level scheme. **MAC Protocols for Wireless Sensor Networks** Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC protocol for Ad Hoc Wireless Networks, Classifications of MAC protocols, Contention-Based protocols, Contention-Based protocols with reservation mechanisms, Contention-Based MAC protocols with scheduling mechanisms, MAC protocols that use Directional Antennas, Other MAC protocols.	**8 Hrs** **L2, L3, L4**

Unit-III	
Routing protocols in Sensor Networks Location-based Protocols: MECN, SMECN, GAF, GEAR, Span, TBF, BVGF, GeRaF, Data-centric Protocols: SPIN, Directed Diffusion, Rumor Routing, COUGAR, ACQUIRE, EAD, Information-Directed Routing, Gradient, Based Routing, Energy-aware Routing, Information-Directed Routing, Quorum-Based Information Dissemination, Home Agent Based Information Dissemination, Hierarchical Protocols: LEACH, PEGASIS, HEED, TEEN, APTEEN, Mobility-based Protocols: SEAD, TTDD, Joint Mobility and Routing, Data MULES, Dynamic Proxy Tree-Base Data Dissemination, Multipath-based Protocols: Sensor-Disjoint Multipath, Braided Multipath, N-to-, Multipath Discovery, Heterogeneity-based Protocols: IDSQ, CADR, CHR, QoS-based protocols: SAR, SPEED, Energy-aware routing.	**8 Hrs** **L2, L3, L4**

Unit-IV	
Location Discovery, Infrastructure Establishment and Quality of a Sensor Network Indoor localization, Topology Control, Clustering, Time Synchronization, Localization and Positioning, sensor Tasking and Control, Sensor Network localization, Coverage, Exposure, Other Issues. **Security in Wireless Sensor Networks** Security in Ad Hoc Wireless Networks, Network Security requirements, Issues and Challenges in security provisioning, network Security Attacks, Key management, Secure Routing in Ad Hoc Networks.	**7 Hrs** **L3, L4, L5**

Unit-V	
Sensor Network Platforms and Tools Sensor node Hardware-Berkeley Motes, programming Challenges, Node-level software platforms, Node-level simulators, State-centric programming. **Applications of WSNs** S Ultra wide band radio communication, Wireless fidelity systems, Future directions, Home automation, Smart metering applications.	**7 Hrs** **L2, L3, L4**

Course Outcomes	
1	Define and list the concepts of overview of sensor technologies and architectures.
2	Design of new technology for sensor networks using MAC and routing layer protocols.
3	Demonstrate the routing protocols for Sensor Networks and Infrastructure Establishment through the creation of small test beds.
4	To analyze the need for security in Wireless Sensor Networks.
5	Evaluate the Sensor Network platforms and tools.
6	Create and design of new applications for Wireless Sensor Networks.

References:	
1	C. SivaRam Murthy and B.S. Manoj, "Ad Hoc Wireless Networks: Architectures and Protocols, PHI, 2012 Edition, Prentice Hall communications Engineering and Emerging Technology Series, ISBN-10: 0133007065.
2	Holger Karl and Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks", John Wiley, 2007 ISBN: 0470519231, 9780470519233.
3	Kazem Soharby et al.," Wireless sensor Networks-Technology, protocols and Applications", John Wiley, 2007, ISBN: 978-0-471-74300-2
4	Feng Zhao & Leonidas J G, "Wireless Sensor Networks-An Information Processing Approach", Elseiver, 2007, ISBN:10: 1558609148, ISBN-13: 978-1558609143.

Assignment Exercises

1. Create a topology for the sensor network with any number of motes with initiating a connection through the PC to the WSN starter Kit and check the following:
   • to modify nodes properties and health settings
   • for configuring visual data representation
   • for setting sampling rate, acquiring unique identifier, adding an alert, and exporting database.
 	
2. Program a sensor node to establish a sensor network with local and remote connections by setting network parameters (parameters are Node Id, Group ID, RF Power, and RF Channel) in connection with base destination and wireless connection.
 	
3. Create multiple WSN running simultaneously, using the same frequency without any interference.
 	
4. Establish data routing, single and multi-hop between sensor motes and check the network connectivity and stability for the wireless range.
 	
5. Develop a sensor network application to validate the presence of light and verify the calibration of temperature.

Scheme of Continuous Internal Evaluation for Theory
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Scheme of Semester End Evaluation for Theory
The question paper consists of Part A and Part B. Part A will be for 20 marks covering the complete syllabus and is compulsory. Part B will be for 80 marks and shall consist of five questions carrying 16 marks each. All five questions from Part B will have internal choice and one of the two have to be answered compulsorily

Semester VII				
Enterprise Architecture				
Course Code	12IS7E2		**CIE Marks**	100
L:T:P:S	3:0:0:0		**SEE Marks**	100
Credits	3		**SEE Duration**	3 Hrs

Course Learning Objectives - CLO:
1. Comprehend the life cycle of Enterprise Applications
2. Analyze the different Policies for Infrastructure Management and Illustrate the importance of different solutions layers.
3. Evaluate Enterprise Information Architecture and Applications.
4. Create the business model, Solution layers, Systems testing and roll out of the Enterprise Applications.

Unit-I	
An Enterprise IT Renovation Roadmap: Agony versus Agility, Enterprise Software is a Different Animal, Importance of Enterprise Software Architectures, Requirements for an Enterprise Software Architecture, Relation of Enterprise Architecture and Enterprise standards, Organizational Aspects, and Enterprise IT Renovation Roadmap. Evolution of the Service Concept: Enterprise Computing and Programming Paradigms	**7 Hrs** **L1, L2**

Unit-II	
Class, State and Interaction Modeling: Object and class concepts; Link and associations concepts; Generalization and Inheritance; A sample class model; Navigation of class models; Advanced object and class concepts; Association ends; N-ary associations; Aggregation; Abstract Classes; Multiple Inheritance; metadata; Reification; Constraints, Derived data, Packages; State Modeling: Events, States, Transitions and Conditions; State diagrams; State diagram behavior; Nested state diagrams; Nested States; Signal generalization; Concurrency; Use case models; Sequence models; Activity models;	**7 Hrs** **L2, L3**

Unit-III	
Service-Oriented Architectures: Software Architecture Elements of a Service-Oriented Architecture, The Architectural Roadmap: Architectural roadmap, Fundamental SOA, Networked SOA, Process-Enabled SOA Services as Building Blocks: Service Types, Layers on the Enterprise Level	**7 Hrs** **L2, L3**

Unit-IV	
SOA & Organizational Roadmap: Motivation and Benefits: Enterprise perspective, Personal perspective Organizational SOA Roadmap: Stake holders and Potential Conflicts of interest, Organizational SOA Roadmap, Four Pillars for success, An ideal World, The Real world – Organization-wide standards, Recommendations for the SOA Protagonist	**7 Hrs** **L2, L4**

Unit-V	
Enterprise Architecture Applications & Frameworks: Introduction, Standards and Compliance, Enterprise Data Integration, Mobile Enterprise, Enterprise Portal, Enterprise Application Portfolio Management, Single Sign On, Outsourcing Enterprise IT Operations, Enterprise Application Integration, Introduction, Enterprise Reference Architecture, Zachman Framework, RM-ODP, CIMOSA, TOGAF	**7 Hrs** **L3, L5**

	Course Outcomes
1	Comprehend complexities as a critical success factor in ensuring sustained growth, long-term impact, and effective leadership.
2	Design a roadmap for the successful establishment of SOA at the enterprise level.
3	Create systems to take care of conflicts of interests of different stakeholders or financing the overheads of the SOA infrastructure
4	Analyze global challenges, peculiarities, and nuances of enterprise solutions.

	References:
1	Dirk Krafzig, Karl Banke, Dirk Slama, "Enterprise SOA: Service-oriented Architecture Best Practices", Prentice Hall Professional, 2005
2	Michael Blaha, James Rumbaugh – Object-Oriented Modeling and Design with UML, 2nd Edition, Prentice Hall of India, 2006
3	Sudeep Mallick, S V Subrahmanya, Manoj Subhadevan, "Principles of Enterprise IT Architecture", Wiley, India, 2006
4	Pallab Saha, "A Systemic Perspective to Managing Complexity with Enterprise Architecture" ISBN13: 9781466645189, 2013

Assignment Exercises

Following Exercises can be carried out using Enterprise Architect Tool

1. Develop a class model having Multiple Inheritance to track Employee details in an organization
2. Design a state model for an automatic door which works on Sensors
3. Design a sequence diagram for a Stock Exchange system with three Normal scenarios and three exception scenarios
4. Develop a use case model for a computer e-mail system i) List three actors ii) one use case to get email iii) use case diagram for computer e-mail system iv)Exception scenario v) Normal scenario for use case
5. Develop an activity diagram for the preparation of Time Table.
6. Develop a class model to track every citizen in the government from the birth date to death date.
7. Develop a class model to track the tax paid by every citizen towards the government in his lifetime.
8. Design a sequence diagram describing three normal scenarios for distributing Pension to persons aged above 60 from the government to every Tax Payer
9. Develop a sequence diagram describing three exceptional scenarios under which a person may not receive Pension after attaining 60 even if the person is a regular Tax Payer
10. Design a Use Case diagram with the actors involved for each use case, in an organization to frame and amend the rules and regulations.

Scheme of Continuous Internal Evaluation for Theory

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Scheme of Semester End Evaluation for Theory

The question paper consists of Part A and Part B. Part A will be for 20 marks covering the complete syllabus and is compulsory. Part B will be for 80 marks and shall consist of five questions carrying 16 marks each. All five questions from Part B will have internal choice and one of the two have to be answered compulsorily

Semester VII				
BIG DATA ANALYTICS				
Course Code	12IS7E3		**CIE Marks**	100
L:T:P:S	3:0:0:0		**SEE Marks**	100
Credits	3		**SEE Duration**	3 Hrs

Course Learning Objectives – CLO:
1. Understand , design and implement a Multidimensional data model, and use effectively.
2. Apply the Data Analytics lifecycle to Big Data projects
3. Integrate Big Data with traditional data warehouses and BI systems
4. Identify un-modeled, multi-structured data and apply tools like Hadoop, Map Reduce & Spark to solve actual Big Data problems

Unit-I	
Data Warehousing and Online Analytical Processing what is Data Warehouse: Basic Concepts Data Warehouse, Data Warehouse Modeling: Data Cube, A Multidimensional Data Model ,Stars, Snowflakes, and Fact Constellations: Schemas for Multidimensional Data Models	**6 Hrs** **L1, L2, L3**

Unit-II	
Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and Methods, Frequent Item set Mining Methods, Which Patterns Are Interesting?—Pattern Evaluation Methods. **Classification:** Basic Concepts, Decision Tree Induction, Bayes Classification Methods	**6 Hrs** **L1, L3, L4**

Unit-III	
Rule-Based Classification, Bayesian Belief Networks, Classification by Back propagation, Support Vector Machines, Cluster Analysis: Basic Concepts and Methods: Cluster Analysis, Partitioning Methods, Hierarchical Methods, Density-Based Methods	**7 Hrs** **L2,L3**

Unit-IV	
BI Definitions and Concepts: BI Component Framework, BI Users,Applications, Roles and Responsibility, Basics of Data Integration: ETL process, What is Data Integration, Data Integration Technologies, Data Quality, Data profiling	**7 Hrs** **L2,L3, L4**

Unit-V	
Data Analytics-Basics of Enterprise Reporting: Reporting Perspectives common to all levels of Enterprise, Report standardization and presentation practices, Enterprise reporting characteristics in OLAP world ,Balanced Scorecard, Dashboard, How to create it, Scorecards v/s Dashboards, The buzz behind Analysis	**7 Hrs** **L3,L5, L6**

Course Outcomes	
1	Evaluate the dominant data warehousing architectures and their support for quality attributes and apply preprocessing statistical methods for any given raw data.
2	Analyze the results generated from the constructed artifact to determine if patterns of clusters were detected in the data sets.
3	Design and implement a simple data warehouse, data cubes and OLAP operations.
4	Design an enterprise dashboard that depicts the key performance indicators which helps in decision making.

References:	
1	Jiawei Han and Micheline Kamber; Data Mining – Concepts and Techniques; 3rd Edition;

	Morgan Kaufmann Publishers Inc, 2011; ISBN 9789380931913.
2	R N Prasad, Seema Acharya "Fundamentals of Business Analytics", Wiley India, 2011: ISBN -13:9788126532032
3	Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, first Edition, Pearson education.2012, ISBN:0321321367
4	Ian H. Witten Eibe Frank, Mark A.;Data Mining , Practical Machine Learning Tools and Techniques; Hall; 3rd Edition; Morgan Kaufmann; 2011; ISBN:9780123748560

Assignment Exercises
Sample Assignment Topics using tools like R, Hadoop, SAP LUMIRA , pentaho, SAP HANA, weka.   1. Develop Multidimensional datacube for Datasets like, Airplane Bird Strikes Dataset, Cyber Crime Statistic Dataset, Population Density dataset etc.   2. Design and implement Apriori and FP Tree Algorithm to find frequent itemsets in a given Training Data set.   3. Demonstrate partition\cluster analysis for a dataset by using K-Mean and K-Medoids Algorithms.   4. Create a Dashboard for educational dataset.

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Semester VII			
CLOUD COMPUTING AND APPLICATIONS			
Course Code	12IS7E4	**CIE Marks**	100
L:T:P:S	3:0:0:0	**SEE Marks**	100
Credits	3	**SEE Duration**	3 Hrs

Course Learning Objectives - CLO:
1. To learn advanced and cutting edge state-of-the-art knowledge and implementation in cloud computing.
2. To read and understand research publications in the technical area of cloud computing, beyond that of the traditional textbook level.
3. To learn advanced services and applications in stacks of cloud
4. Explore the cloud Infrastructure and understanding Abstraction & Virtualization in cloud computing

Unit-I	
Cloud Computing at a Glance: Introduction, The Vision of Cloud Computing , Defining a Cloud ,Cloud Computing Reference Model ,Characteristics and Benefits , Historical Developments , Distributed Systems , Virtualization , Service-Oriented Computing , Building Cloud Computing Environments , Application Development , Infrastructure and System Development ,Computing Platforms and Technologies.	**7 Hrs** **L1, L2**

Unit-II	
Principles of Parallel and Distributed Computing: Parallel vs. Distributed Computing , Elements of Parallel Computing , Approaches to Parallel Programming , Components of a Distributed System , Distributed Object Frameworks , Service Oriented Computing ,Virtualization : Introduction , Characteristics of Virtualized Environments , Taxonomy of Virtualization Techniques , Execution Virtualization , Other Types of Virtualization , Virtualization and Cloud Computing , Pros and Cons of Virtualization , Technology Examples : Para virtualization, Full Virtualization ,Hyper-V.	**7 Hrs** **L1, L2**

Unit-III	
Cloud Computing Architecture:Cloud Reference Model , Architecture , Infrastructure / Hardware as a Service , Platform as a Service , Software as a Service , Types of Clouds , Public Clouds , Private Clouds , Hybrid Clouds , Community Clouds , Economics of the Cloud , Open Challenges ,Cloud Definition , Cloud Interoperability and Standards , Scalability and Fault .	**7 Hrs** **L1, L2,**

Unit-IV	
Aneka: Cloud Application Platform: Framework Overview , Anatomy of the Aneka Container , From the Ground Up: Platform Abstraction Layer , Fabric Services , Foundation Services , Application Services , Building Aneka Clouds , Infrastructure Organization , Logical Organization , Private Cloud Deployment Mode , Public Cloud Deployment Mode , Hybrid Cloud Deployment Mode , Cloud Programming and Management , Aneka Management Tools .Concurrent Computing, Multithreading with Aneka , Introducing the Thread Programming Model , Aneka Thread vs. Common Threads , Programming Applications with Aneka Threads Aneka Threads Application Model	**7 Hrs** **L2, L3, L4, L5**

Unit-V	

Cloud Applications:Scientific Applications , Healthcare: ECG Analysis in the Cloud , Biology: Protein Structure Prediction , Biology: Gene Expression Data Analysis for Cancer Diagnosis , Geoscience: Satellite Image Processing , Business and Consumer Applications , CRM and ERP , Productivity ,Social Networking , Media Applications , Multiplayer Online Gaming.	**7 Hrs**	**L3, L4, L5**

Course Outcomes	
1	Understand the basics of cloud computing models and virtualization.
2	Evaluate the issues related to the development of cloud applications.
3	Design cloud based scientific applications.
4	Analyze real world case studies of existing cloud based software solutions.

References:	
1	Rajkumar Buyya, Christian Vecchiola, and ThamaraiSelvi, "Mastering Cloud Computing", Indian Edition: Tata McGraw Hill, ISBN-13: 978-1-25-902995-0, New Delhi, India, Feb 2013.
2	Dr Kumar Saurabh, "Cloud Computing: Insights Into New-Era Infrastructure ", Wiley India Pvt. Ltd.-New Delhi, 2011 ISBN: 8126536039
3	George Reese, "Cloud application architectures", Wiley India 2011, ISBN: 978-0596156367
4	Eugene Ciurana, "Developing with Google App Engine" Wiley India 2011 ISBN: 978-1430218319

Assignment Exercises

Designing and Deploying Cloud Solutions for Business

1. Explain and recognize industry standard cloud and virtualization technologies and their implications on customer needs
   - Describe and recognize common virtualization technologies and products and their implications on customer needs
   - Describe the business benefits of Virtualization
   - Define cloud and identify and describe various types of cloud services and their implications on customer needs
   - Describe the business benefits and risks of using cloud services
2. Plan and design end-to-end IT solutions for Business customers.
   - Consult with an Business customer to translate their business objectives into an enabling technology strategy
   - Gather the customer's technical requirements and assess existing infrastructure, Design the end-to-end Technical Solution for an Business customer including on-premises, hosted, and cloud solution components
   - Design online presence and hosted services solution elements (incorporating both onsite and cloud components as appropriate)
   - Design an end-to-end solution for support/disaster recovery for an Business customer
   - Write and present a solution proposal to the customer decision makers
3. Install, configure, and upgrade end-to-end IT solutions for Business customers
   - Implement changes to the existing infrastructure to support solution - including servers, storage, data, network, clients, applications, and users
4. Optimize and troubleshoot end-to-end IT solutions for Business customers
   - Apply the HP troubleshooting methodology in an end-to-end solution environment

- Troubleshoot common issues in end-to-end solutions for Business customers
- Optimize common performance issues in end-to-end solutions for Business customers
5. Administer and manage end-to-end IT solutions for Business customers
  - Add users, groups and profiles on cloud services in addition to local infrastructure

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Scheme of Semester End Evaluation for Theory

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Semester VII				
INFORMATION RETREIVAL				
Course Code	12IS7E5		**CIE Marks**	100
L:T:P:S	3:0:0:0		**SEE Marks**	100
Credits	3		**SEE Duration**	3 Hrs

Course Learning Objectives - CLO:

1. To Comprehend the foundation knowledge in information retrieval.
2. To equip students to apply sound skills to solve computational search problems.
3. To enable students to analyze and evaluate search engines.
4. To enable students to gain hands-on experience in building search engines.

Unit-I	
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.	**7 Hrs** **L1, L2**

Unit-II	
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.	**7 Hrs** **L2, L3, L4**

Unit-III	
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.	**7 Hrs** **L3, L4, L5**

Unit-IV	
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.	**7 Hrs** **L2, L3, L4**

Unit-V	
User Interfaces and Visualization: Introduction, Human-Computer interaction, The information access process, Starting points, Query specification, Context, Using relevance judgments, Interface support for the search process **Searching the Web:** Introduction, Challenges, Characterizing the web, Search engines, Browsing, Metasearchers, Finding the needle in the haystack, Searching using hyperlinks.	**8 Hrs** **L2, L3, L4**

Course Outcomes	
1	Identify and design the various components of an Information Retrieval system.
2	Apply machine learning techniques to text classification and clustering which is used for efficient Information Retrieval.
3	Analyze the Web content structure.
4	Evaluate the performance of search engines.

References:	
1	Ricardo Baeza – Yates, BerthierRibeiro – Neto; Modern Information Retrieval; First Edition; Pearson Education Limited; 2013; ISBN-9788131709771.
2	David A. Grossman, OphirFrieder; Information Retrieval Algorithms and Heuristics; Second Edition; Springer Verlag; 2012; ISBN-9788181289179.
3	William B. Frakes, Ricardo Baeza-Yates; Information Retrieval Data Structures and Algorithms; First Edition; Pearson Education Limited; 2012; ISBN-9788131716922.
4	HinrichSchutze, PrabhakarRaghavan, Christopher D Manning; Introduction To Information Retrieval; First Edition; Cambridge University Press India Pl; 2014; ISBN-9781107666399.

Assignment Excercises

Sample Assignment Topics:

1. Build and evaluate a search engine that adapts to implicit user feedback. This requires developing a user interface that tracks various user behavioral signals (e.g., clicks, dwell times, mouse movement, etc.) and uses that information to improve the quality of the ranking function over time as more and more information becomes available.
2. Develop and evaluate an algorithm that will automatically summarize, each hour, the most widely discussed topics on Twitter. The summary should be short (e.g., tweet-length) and provide an adequate summary of the topic.
3. Build and evaluate a "person search engine". The search engine should automatically crawl and build textual representations of people that can be queried against. Example queries might include specific names (e.g., "george bush"), job descriptions (e.g., "car company ceos"), facts about the person (e.g., "highest paid female musician"), etc.
4. Develop and evaluate a tool that will automatically associate images with news articles. More specifically, given the text of a news article, the task is to automatically identify a single relevant that could be placed alongside the article. For example, for a news article about the positive effects of green tea, relevant images would include tea leaves, cups of tea, health-related symbols/logos, etc.
5. Build and evaluate a cross-lingual search engine. For example, use Wikipedia as a source of parallel corpora.
6. Suppose we have a collection of chat messages from an online multiplayer game. We also have a game log that records when a monster is killed in the game and the names of the players who did it. Build and evaluate a tool that would detect time and location of a monster being killed by looking only at the content of chat messages, without accessing the game log.
7. Suppose we have a collection of chat messages from an online multiplayer game. Different people are talking among themselves in different parts of the virtual world. Our chat transcript records all these conversations without a clear boundary between individual dialogues, we know who send each message, but we do not know the recipient; the messages are recorded in the log in the order they were sent. Develop and evaluate a tool that will automatically separate the chat transcript into individual

conversations.

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Semester VII				
FUZZY LOGIC &GENETIC ALGORITHMS				
Course Code	12IS7E6		**CIE Marks**	100
L:T:P:S	3:0:0:0		**SEE Marks**	100
Credits	3		**SEE Duration**	3 Hrs

Course Learning Objectives - CLO:
1. To cater the knowledge of Neural Networks and Fuzzy Logic Control and use these for controlling real time systems.
2. To model the systems using Mamdani and Sugeno models.
3. To implement Neuro Fuzzy modeling.
4. To integrate Neural Networks and Fuzzy Logic techniques in extending the capabilities of the technologies to result in more effective and efficient problem solving methodologies.

Unit-I	
FUZZY SET THEORY: Introduction to Neuro – Fuzzy and Soft Computing ,Fuzzy Rules and Fuzzy Reasoning – Extension Principle and Fuzzy Relations – Fuzzy If-Then Rules – Fuzzy Reasoning – Fuzzy Inference Systems – Mamdani Fuzzy Models – Sugeno Fuzzy Models – Tsukamoto Fuzzy Models – Input Space Partitioning and Fuzzy Modeling.	**7 Hrs L1,L 3,L4**
Unit-II	
NEURO FUZZY MODELING Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.	**7 Hrs L2,L 5**
Unit-III	
NEURAL NETWORKS Supervised Learning Neural Networks – Perceptrons - Adaline – BackpropagationMutilayerPerceptrons – Radial Basis Function Networks – Unsupervised Learning Neural Networks – Competitive Learning Networks – Kohonen Self-Organizing Networks – Learning Vector Quantization – Hebbian Learning.	**7 Hrs L2,L 3**
Unit-IV	
NEURO FUZZY MODELING Adaptive Neuro-Fuzzy Inference Systems – Architecture – Hybrid Learning Algorithm – Learning Methods that Cross-fertilize ANFIS and RBFN – Coactive Neuro Fuzzy Modeling – Framework Neuron Functions for Adaptive Networks – Neuro Fuzzy Spectrum.	**7 Hrs L4**
Unit-V	
APPLICATIONS OF COMPUTATIONAL INTELLIGENCE Printed Character Recognition – Inverse Kinematics Problems – Automobile Fuel Efficiency Prediction – Soft Computing for Color Recipe Prediction.	**7 Hrs L5,L 6**

Course Outcomes	
1	Develop the skills to gain a basic understanding of neural network and fuzzy logic
2	Explore the functional components of neural network classifiers and functional components of fuzzy logic classifiers
3	Develop and implement a basic trainable neural network or a fuzzy logic system for a typical control, computing application or biomedical application.

4	Carry out the optimization associated with neural network learning

	References:
1	J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004.
2	Timothy J.Ross, "Fuzzy Logic with Engineering Applications", McGraw-Hill, 1997.
3	Davis E.Goldberg, "Genetic Algorithms: Search, Optimization and Machine Learning", Addison Wesley, N.Y., 1989.
4	Rajasekaran and G.A.V.Pai, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.

Assignment Excercises

1. Simulation models of all fuzzy membership functions
2. Simulation models of single neurons
3. Simulation models of ANN algorithms
4. Speed control of a permanent magnet direct current (PMDC) motor
5. A tracking controller for moving objects
6. A door position control system
7. Additional examples from industry and other sources
8. On-line FLC control using the **Virtual Control System Lab** set
9. Simulating a water level control system using the simulator: **Fuzzy Logic Controller** Matlab/Simulink and Real Time Workshop
10. System analysis using MATLAB

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Semester VII				
JAVA & J2EE				
Course Code	12GF7XX		**CIE Marks**	100
L:T:P:S	4:0:0:0		**SEE Marks**	100
Credits	4		**SEE Duration**	3 Hrs

Course Learning Objectives:
1. Comprehend the fundamentals of object-oriented programming in Java, including elements of Java programming such as variables, conditional and iterative execution, defining classes, invoking methods, using class libraries, etc.
2. Comprehend the essentials of the threads and exceptions, Event driven Graphical User Interface (GUI) programming and Applet Programming.
3. Understand and develop applications in java to access databases in java using JDBC driver.
4. Analyze the role of J2EE in development of enterprise software in Java language, and to understand how J2EE facilitates integration of java components with non-Java systems including databases using servlets and Java Server Pages(JSP).

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Unit - I

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Introduction An Overview of Java, Introduction to Class - object, A Closer Look at Methods and Classes, Inheritance, Packages and Interfaces. Enumerations, Autoboxing, and Annotations	**8 Hrs** L1, L2

<div align="center">

Unit – II

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Advanced features -I Exception Handling, Multithreaded Programming, String Handling, Introduction to streams classes.	**9 Hrs** L2, L3

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Unit – III

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Advanced features –II Applets: Architecture, Applet Lifecycle, repaint ( ), HTML APPLET Tags, passing parameters to Applets; Introduction to Swings	**9 Hrs** L2, L3

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Unit – IV

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Overview: J2EE and J2SE. **Java Database Connectivity:**JDBC introduction, JDBC Driver Types, JDBC process, Creating and executing SQL statement - Statement Object, ResultSet Object	**9 Hrs** L3, L4

<div align="center">

Unit – V

</div>

Server side programming **Overview:**JSP, Servlets and Tomcat, Model View Controller (MVC) **Servlets:** Life Cycle of Servlet, Handling GET and POST requests, The Servlet API, The Javax.servlet Package, Reading Servlet Parameter, The Javax.servlet.http package, Handling HTTP Requests and Responses, Using Cookies, Session Tracking	**9 Hrs** L3, L5

Course Outcomes	
1	Understand the basic concepts of Java Standard Edition and Enterprise Edition.
2	Use the Java SDK environment to create, debug and run Java standalone and applet programs.
3	Design and build robust and maintainable web applications by creating dynamic HTML content with Servlets.
4	Promote and be open to creative solutions applying Servlets.

References:	
1	Herbert Schildt; "Java The Complete Reference"; McGraw Hill Osborne Media; 8th Edition, 2011; ISBN: 9781259002465
2	Y. Daniel Liang; "Introduction to Java Programming"; Prentice Hall; 8th Edition; 2010; ISBN: 0132130807.
3	Jim Keogh; "J2EE - The Complete Reference"; Tata McGraw Hill; 1st Edition; 2002; ISBN: 9780070529120.
4	Bruce Eckel; "Thinking in Java"; Pearson Education; 4th Edition, 2006; ISBN 0131872486

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Scheme of Semester End Evaluation for Theory

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Semester VII				
CLOUD COMPUTING				
Course Code	12GG7XX		**CIE Marks**	100
L:T:P:S	3:0:0:0		**SEE Marks**	100
Credits	3		**SEE Duration**	3 Hrs

Course Learning Objectives - CLO:

1. To learn advanced and cutting edge state-of-the-art knowledge and implementation in cloud computing.

2. To read and understand research publications in the technical area of cloud computing, beyond that of the traditional textbook level.

3. To learn advanced services and applications in stacks of cloud

4. Explore the cloud Infrastructure and understanding Abstraction & Virtualization in cloud computing

Unit-I	
Introduction to Cloud Computing: Defining cloud computing, types of cloud, Characteristics of cloud computing, benefits of cloud computing, Disadvantages of cloud computing. Assessing the value proposition, avoiding capital expenditures, computing the total cost of ownership, defining the licensing models	**7Hrs** **L1, L2**

Unit-II	
Cloud Architecture: Exploring the cloud computing stack; infrastructure; virtual applications; communication protocols; Connecting to the cloud.	**6Hrs** **L1, L2**

Unit-III	
Services & Applications: Defining infrastructure as a service (Iaas); Defining Software as a service (SaaS); Defining Platform as a service (PaaS); Defining identity management as a service (IDaaS); Defining Communications as a Service (CaaS).	**7Hrs** **L1, L2,**

Unit-IV	
Understanding Abstraction & Virtualization: Using Virtualization technologies; Load balancing & Virtualization; advance load balancing; the Google cloud; exploring Microsoft cloud service; Understanding Amazon web services; surveying the Google application portfolio; Understanding hypervisors; virtual machine types; VMware Vsphere.	**7Hrs** **L2, L3, L4, L5**

Unit-V	
Exploring the cloud Infrastructure: Administration the cloud; cloud management lifecycle; cloud management products; Emerging cloud management standards; securing the cloud: boundaries & mapping; securing data: brokered storage & access, Encryption; Establishing identity & presence.	**7Hrs** **L3, L4, L5**

Course Outcomes	
1	Understand the basics of cloud computing models and virtualization.
2	Evaluate the issues related to the development of cloud applications.

3	Apply the concepts to design cloud based simple applications.
4	Analyse real world case studies of existing cloud based software solutions.

References:	
1	Barrie Sosinsky,"Cloud computing bible", CRC Press, 2010, ISBN: 978-0-470-90356-8.
2	Toby Velte, Anthony Velte, Robert Elsenpeter,"Cloud Computing, A practical Approach", Wiley India, 2011, ISBN: 0071626948.
3	George Reese, "Cloud Application Architectures", Wiley India 2011, ISBN: 978-0596156367.
4	Eugene Ciurana, "Developing with Google App Engine" Wiley India 2011 ISBN: 978-1430218319.

Assignment Exercises
Designing and Deploying Cloud Solutions for Business

1. Explain and recognize industry standard cloud and virtualization technologies and their implications on customer needs
   - Describe and recognize common virtualization technologies and products and their implications on customer needs
   - Describe the business benefits of Virtualization
   - Define cloud and identify and describe various types of cloud services and their implications on customer needs
   - Describe the business benefits and risks of using cloud services
2. Plan and design end-to-end IT solutions for Business customers.
   - Consult with an Business customer to translate their business objectives into an enabling technology strategy
   - Gather the customer's technical requirements and assess existing infrastructure, Design the end-to-end Technical Solution for an Business customer including on-premises, hosted, and cloud solution components
   - Design online presence and hosted services solution elements (incorporating both onsite and cloud components as appropriate)
   - Design an end-to-end solution for support/disaster recovery for an Business customer
   - Write and present a solution proposal to the customer decision makers
3. Install, configure, and upgrade end-to-end IT solutions for Business customers
   - Implement changes to the existing infrastructure to support solution - including servers, storage, data, network, clients, applications, and users
4. Optimize and troubleshoot end-to-end IT solutions for Business customers
   - Apply the HP troubleshooting methodology in an end-to-end solution environment
   - Troubleshoot common issues in end-to-end solutions for Business customers
   - Optimize common performance issues in end-to-end solutions for Business customers
5. Administer and manage end-to-end IT solutions for Business customers
   - Add users, groups and profiles on cloud services in addition to local infrastructure

Scheme of Continuous Internal Evaluation for Theory

CIE consists of Three Tests each for 40 marks (15 marks for Quiz + 25 marks for descriptive) out of which best of two will be considered. In addition the assignment will carry 20 marks.

Scheme of Semester End Evaluation for Theory

The question paper consists of Part A and Part B. Part A will be for 20 marks covering the complete syllabus and is compulsory. Part B will be for 80 marks and shall consist of five questions carrying 16 marks each. All five questions from Part B will have internal choice and one of the two have to be answered compulsorily

Place of Project Work:

The project work should be carried out in the Industry, in case the project is given by the industry(*as internship, provided the department Project Review Committee has approved the project*) and the facilities for carrying out project work are not available in the college.

The project work should be carried out in the college, in case the project is given by or   suggested by the faculty. For any additional facilities required for testing etc., students are permitted to visit the research labs, where those facilities are available.

Project Evaluation:

1. Continuous monitoring of project work will be carried out and cumulative evaluation will be done.
2. **Weekly Activity Report**(WAR) has to be maintained by the project batch and the same has to be discussed with the Internal Guide regularly.
3. In case of *Industry project*, during the course of project work, the internal guides will be in constant touch with external guides and will visit the industry at least thrice, for assessment.
4. The students are required to meet their internal guides once in a week to report their progress in project work.
5. For CIE assessment the project groups must give a final seminar with the draft copy of the project report in place of synopsis.
6. The presentation by each group will be for 30-40 minutes.
7. The project team is required to submit Hard copies of the detailed Project Report in the prescribed format as well as Soft copy on a CD.
8. For CIE 50% weightage should be given to the project guide and 50% weightage to the project evaluation committee.
9. The Project team is required to demonstrate the functioning of the modules and the integrated application along with a presentation on the details of the project carried out during the Semester End Examination (SEE) in the department.

CIE Assessment:

The following are the weightages given for the various stages of the project.

1. Selection of the topic and formulation of objectives   10%
2. Design and Development of Project methodology   25%
3. Execution of Project   25%
4. Presentation, Demonstration and Results Discussion   30%
5. Report Writing   10%

SEE Assessment:

The following are the weightages given during Viva Examination.

1. Written presentation of synopsis   10%
2. Presentation/Demonstration of the project   30%

3. Methodology and Experimental Results & Discussion	30%
4. Report	10%
5. Viva Voce	20%

Calendar of Events for the project Work:

Week	Event
Beginning of 7th Semester	Formation of group and approval by the department committee
7th Semester	Problem selection and literature survey
Last two weeks of 7th Semester	Finalization of project and guide allotment
II Week of 8th Semester	Synopsis submission and preliminary seminar
III Week	First visit of the internal guides to industry in case of industry offered projects
III to VI Week	Design and development of project methodology
VII to IX Week	Implementation of the project
X Week	Second visit by guide to industry in case of industry offered projects & submission of draft copy of the report
XI and XII Week	Third visit by guide to industry for demonstration. Final seminar for internal assessment

Evaluation Scheme for CIE and SEE

Scheme of Evaluation for CIE		Scheme of Evaluation for SEE	
Particulars	**%Marks**	**Particulars**	**%Marks**
Project Evaluation I	10%	Project Synopsis (Initial Write up)	10%
Project Evaluation II	25%	Project Demo / Presentation	30%
Project Evaluation III	25%	Methodology and Results Discussion	30%
Project Evaluation Phase-IV (Submission of Draft Project Report for Verification)	30%	Project Work Report	10%
Project Evaluation Phase-V (Project Final Internal Evaluation)	10%	Viva-voce	20%
Total	100	Total	100

Project Work outcomes:

After the successful completion of the course, the students should be able to

1. Perform literature review
2. Identify state of the art in that field and be able define the problem.
3. Establish the methodology to carry out the project work

4. Design Experiments scientifically / Perform Numerical Analysis / Develop Analytical models
5. Interpret the Experimental / Numerical / Analytical Results
6. Apply advanced tools / techniques for solving the problem
7. Prepare quality document of project work.

	Semester VIII			
	SEMINAR			
Course Code	12IS82		**CIE Marks**	50
L:T:P:S	0:0:1:0		**SEE Marks**	--
Credits	1		**SEE Duration**	--
General Guidelines for the seminar				

1. The seminar has to be presented by individual student.
2. The topic of the seminar should be from current thrust area. This is to be decided in consent with Internal guide.
3. The topic can be based on standard papers (like IEEE / ACM / CSI etc.) in the thrust area for the selected topic.
4. Each student has to prepare an Innovative Paper out of seminar topic.
5. Presenting / Publishing this paper in Conference / Journal will be given weightage in CIE.
6. The student needs to submit both hard & soft copy of the seminar report.

Scheme of Evaluation for CIE

1. Relevance of the Topic   : 20% of Marks
2. Presentation   : 50% of Marks
3. Report   : 10% of Marks
4. Innovative Paper Publication : 20 % of Marks