Choice-based Credit System (CBCS)
VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS01
Title of the Course: Operating System

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Introduction, basic h/w support necessary for modem operating systems -Services provided by OS, system programs and system calls - brief discussions of evolution of OS - real time and distributed systems: a brief overview of issues. Processes and 3 levels of scheduling - process control block and context switch -goals of scheduling and different scheduling algorithms - threads: user level and kernel level.	09
II	CPU Scheduling: Review of multiprogramming, concepts, scheduling concepts, scheduling algorithms, algorithm evaluation, multiple processor scheduling. Process cooperation and synchronization, mutual exclusion and implementation, semaphores, conditional critical regions and monitors -classical inter - process communication problems - message passing.	09
III	Deadlocks and strategies for handling them - protection and security issues - access lists, capabilities, and cryptographic techniques - introduction to distributed systems. File systems, user interface - disk space management and space allocation strategies - examples from UNIX, DOS, Windows etc - directory structures - disk caching - file system consistency and logs -disk arm scheduling strategies. Disk scheduling: physical characteristics, FCFS scheduling, SSTF scheduling, SCAN, CSCAN, Selecting a disk-scheduling algorithm, sector queuing.	09
IV	Memory management techniques - contiguous and non-contiguous -paging and segmentation - translation look aside buffers (TLB) and overheads - virtual memory and demand paging - page faults and instruction restart - problems of large address spaces - page replacement algorithms and working sets - miscellaneous issues.	09
V	Protection and Security: Goal of Protection, Mechanism and policies, domain of protection, access matrix, implementation of access matrix, dynamic protection structures, revocation, existing systems, language based protection, protection problems security.	09
	Total	45

Text Book/s:

1. Modern Operating Systems - Tanenbaum, Pearson Edn. 2nd edn.
2. Operating System concepts - Silberchatz & Galvin, Addison Wesley, 2nd Edn.
3. Operating System Concepts & Design - By Milan Milenkovic (TMH)

VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS02
Title of the Course: Software Testing and Quality Assurance

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository	9
II	Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing Requirements based testing – positive and negative testing –Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– cause effect graphing – error guessing - compatibility testing – user documentation testing –domain testing Using White–Box Approach to Test design – Test Adequacy Criteria –static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White–box Based Test Design –code complexity testing – Evaluating Test Adequacy Criteria	9
III	The Need for Levels of Testing, Unit Test, Unit Test Planning, Designing the Unit Tests. The Test Harness, Running the Unit tests and Recording results, Integration tests, Designing Integration Tests, Integration Test Planning, Scenario testing –defect bash elimination, System Testing – types of system testing, Acceptance testing – performance testing , Regression Testing, Internationalization testing, ad-hoc testing, Alpha Test , Beta Tests, Testing OO systems – usability and accessibility testing	9
IV	People and organizational issues in testing – organization structures for testing teams –testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group	9
V	Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – evaluating software quality – defect prevention – testing maturity model	9
	Total	45

Text Book/s:

1. Srinivasan Desikan and Gopalaswamy Ramesh, " Software Testing – Principles and Practices ", Pearson education, 2006.
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education,2008.

Reference Book/s:

1. Boris Beizer, “Software Testing Techniques”, Second Edition,Dreamtech, 2003
2. Elfriede Dustin, “Effective Software Testing”, First Edition, Pearson Education, 2003.
3. Renu Rajani, Pradeep Oak,“ Software Testing–Effective Methods, Tools and Techniques ”, Tata McGraw Hill, 2004.
4. Burnstein, "Practical Software Testing", Springer International Edition

VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS03
Title of the Course: Computer System Security

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	Security Attacks (Interruption, Interception, Modification and Fabrication), Security Services (Confidentiality, Authentication, Integrity, Non-repudiation, access Control and Availability) and Mechanisms, A model for Internetwork security, Internet Standards and RFCs, Buffer overflow & format string vulnerabilities, TCP session hijacking, ARP attacks, route table modification, UDP hijacking, and man-in-the-middle attacks.	09
II	Conventional Encryption Principles, Conventional encryption algorithms, cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.	09
III	Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.	09
IV	Email privacy: Pretty Good Privacy (PGP) and S/MIME. IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management. Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).	09
V	Basic concepts of SNMP, SNMPv1 Community facility and SNMPv3. Intruders, Viruses and related threats, Firewall Design principles, Trusted Systems. Intrusion Detection Systems.	09
	Total	45

Text Book/s:

1. Network Security Essentials (Applications and Standards) by William Stallings Pearson Education.
2. Cryptography & Network Security by Atul Kahate , Tata Mc Graw Hill

Reference Book/s:

1. Fundamentals of Network Security by Eric Maiwald (Dreamtech press)
2. Network Security - Private Communication in a Public World by Charlie Kaufman, Radia Perlman and Mike Speciner, Pearson/PHI.
3. Cryptography and network Security, Third edition, Stallings, PHI/Pearson
4. Principles of Information Security, Whitman, Thomson.
5. Network Security: The complete reference, Robert Bragg, Mark Rhodes, TMH
6. Introduction to Cryptography, Buchmann, Springer.

VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS04
Title of the Course: TCP/IP and Internet

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	00	--	03	03	03	10	10	80	100

Unit	Contents	Hours
I	INTRODUCTION AND ADDRESSES: Introduction, The TCP/IP Architecture, protocol & layering, The Internet Protocol: IP Packet, IP Addressing, Subnet Addressing, IP Routing, Classless Inter-Domain Routing (CIDR), Address Resolution(ARP), Reverse Address Resolution(RARP), Internet Message Control Protols(ICMP) Error and Control Messages, Dynamic	09
II	NETWORK LAYER PROTOCOLS: Router functionality, Dynamic versus Static routing, Routing tables, Unicast routing: Routing Information Protocol (RIP), Border Gateway Protocol (BGP), Open Shortest Path First (OSPF), Routing algorithms (link state, distance vector), Multicast Routing: Routing protocols (MOSPF, DVMRP, CBT, and PIM), MBONE, IGMP, End-to-end datagram delivery, and Flow control	09
III	TRANSPORT LAYER PROTOCOLS & NEXT GENERATION IP: Transmission Control Protocol (TCP): TCP Reliable Stream Service, TCP Operation, TCP Protocol, User Datagram Protocol (UDP), Stream Control Transmission Protocol (SCTP), IPv6, ICMPv6, Transitioning from IPv4 to IPv6.	09
IV	APPLICATION LAYER PROTOCOLS: Client-Server Interaction: The Client-Server Paradigm, The Socket Interface. Naming With The Domain Name System, Electronic Mail Representation And Transfer, File Transfer And Remote File Access, World Wide Web Pages And Browsing,	09
V	MULTIMEDIA INFORMATION & NETWORKING: Introduction to Digital Audio, Audio compression, Streaming Audio, Internet Radio, Voice over IP, Introduction to video, Video compression, Video on demand The Real time transport Protocol: RTP Scenarios and terminology, RTP Packet format, RTP Control Protocol(RTCP) Session control Protocols: Session initiation Protocol, H.323 Multimedia communication systems, Media Gateway Control Protocols	09
	Total	45

Text Book/s:

1. TCP/IP Protocol Suite, 4th Edition, by Behrouz A Forouzan (Tata Mcgraw Hill 2010).

Reference Book/s:

1. Internetworking with TCP/IP, Volume 1: Principles, Protocols, and Architecture, by Douglas Comer, 5th edition, Prentice Hall.
2. Computer Networking with Internet Protocols and Technology, 1/e -- © 2003 William Stallings
3. Communication networks, Leon-Gracia& Widjaja,2001, TMH
4. TCP/IP Illustrated, Volume 1 : The Protocols, 1/e -- © 2000, W. Richard Stevens, Person education
5. TCP/IP Illustrated, Volume 2 : The Implementation, 1/e -- © 1996, Gary R. Wright
6. An Engineering approach to computer networking, S. Keshav, Addison Wesley, 2001

VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS05
Title of the Course: CE-I: Neural Network & Fuzzy Logic

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	00	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Fundamental Concepts and Models of Artificial Neural Systems: Biological Neurons and Their Artificial Models, Models of Artificial Neural Networks, Learning and Adaptation, Neural Network Learning Rules, Overview of Neural Networks.	09
II	Single-Layer Perceptron Classifiers: Discriminant Functions, Linear Machine and Minimum Distance Classification, Training and Classification using the Discrete Perceptron: Algorithm and Example, Single Layer continuous Perceptron Networks for Linearly Separable Classifications,	09
III	Multilayer Feedback Networks: Linearly Non-separable Pattern Classification, Delta learning Rule, Feedforward Recall and error Back-Propagation Training, Learning factors, Classifying and expert Layered Networks, Functional Link Networks.	09
IV	From Classical (CRISP) Sets to Fuzzy Sets: Introduction, Crisp sets: An overview, Fuzzy sets: Basic Types, Fuzzy sets: Basic Concepts, characteristics and significant of the Paradigm Shift. Fuzzy Sets Versus Crisp Sets: Additional Properties of a - cuts, Representation of Fuzzy sets, Extension Principles for Fuzzy sets.	09
V	Operations on Fuzzy Sets: Types of Operations, Fuzzy Complements, Fuzzy Intersections: t-Norms, Fuzzy Unions: t-Conorms, Combinations of operations, Aggregation Operations. Fuzzy Arithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals, and Arithmetic Operations on Fuzzy Numbers, Lattice Fuzzy Numbers, And Fuzzy Equations.	09
	Total	45

Text Book/s:

1. J.M.. Zurada, Introduction to Artificial Neural Systems, Jaico Publishing House, India
2. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic, Theory and Applications, PHI, Pvt. Ltd. - 1997.

VII-Semester B. E. (Computer Science & Engineering)

Course Code: **7BECS05**
Title of the Course: **CE-I: Advanced Computer Architecture**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	00	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Trends towards parallel processing, parallelism in uniprocessor systems, parallel computer structures, architectural classification schemes, parallel processing applications, memory hierarchy in parallel processing systems, addressing schemes. Pipleline concept, linear pipelining and space time diagram, classification of pipeline processors, nonlinear pipeline and reservation table, interleaved memory organization, arithmetic pipelines, principles of designing pipeline processors, vector processing.	09
II	SIMD array processors, organization, masking and routing mechanisms, inter PE communications, SIMD inter connection networks, single stage and multi stage networks, mesh connected Illiac networks, parallel shifter, shuffle exchange and omega networks, parallel algorithms for array processors, matrix multiplication, polynomial evaluation, parallel sortings, fast fourier transform computation, associative array processor.	09
III	Multiprocessor architecture, loosely coupled and tightly coupled multiprocessor systems, processor characteristics, inter connection networks crossbar switch and multi port memories, multi stage networks, banyan and delta networks parallel memory organization, multiprocessing operating systems, classification and requirements, software requirements for MPS, language features to exploit parallelism, multi processor scheduling strategies, parallel algorithms.	09
IV	Data flow computers, control flow versus data flow, data flow computer architectures, data flow graphs, data flow languages, Dennis and Irvine machines, dataflow design alternatives, dependence driven and multi level event driven approaches, VLSI computing structures, systolic array architecture, VLSI matrix arithmetic processor.	09
V	Performance evaluation of computers, measurements and parameters, stochastic model simulation model, study of architecture of Cray and Cyber super computers, massively parallel processor systems, image processing on MPP, C.mmp multiprocessor system, crazy X MP	09

	super computer.	
	Total	45

Text Book/s:

1. Kai Hwang, Faye A. Briggs, "Computer Architecture and Parallel Processing" McGraw-Hill international Edition

Reference Book/s:

1. Kai Hwang, "Advanced Computer Architecture", Tata McGraw-Hill
2. William Stallings, "Computer Organization and Architecture, Designing for performance" Prentice Hall, Sixth edition.
3. Kai Hwang, Scalable Parallel Computing .
4. Harrold Stone, High performance computer Architecture .
5. Richard Y. Kain, Advanced Computer Architecture
6. http://www.intel.com/products/processor (for Intel Itanium Processor)

VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS05
Title of the Course: CE-I: Enterprise Resource Planning

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	00	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	ERP – Curtain Raiser: An overview, Accommodating variety, Integrated Management Information, Seamless Integration, Supply Chain Management, Resource Management, Integrated data model, Scope, Technology, Benefits of ERP, Evolution, ERP revised, ERP & Modern Enterprise, problems.	09
II	ERP & Related Technologies: MAn overview, Business Process Reengineering(BPR), Management Information System(MIS), Decision Support Systems(DSS), Executive Information Systems (EIS), Data Warehousing, Data Mining, OLAP	09
III	Business Engineering & ERP: An overview, What is Business Engineering (BE)? ERP Implementation and the Competitive Advantage: Significance of BE, Principles of BE, BPR, ERP & IT, BE with IT, ERP and Management concerns, problems. Business Modeling: An overview, Building the Business Model, problems.	09
IV	The ERP Market & Making of ERP: An overview, Role of consultants, vendors & users, customization, precautions, ERP: Post-implementation options, ERP implementation Lifecycle, Guidelines for ERP implementation, problems. ERP & competitive strategy, problems.	09
V	An overview, SAP AG, SAP R/3 Applications, Baan, Oracle, PeopleSoft, JD Edwards, Examples of Indian ERP packages, problems. An overview, Market Dynamics & Competitive Strategy, problems. Future Directions in ERP. Various ERP Case studies.	09
	Total	45

Text Book/s:

1. Enterprise Resource Planning – Concepts & Practice (Second Edition) By V. K. Garg & N.K. Venkitakishnan (PHI)
2. Enterprise Resource Planning- Alexis Leon (TMH)

Reference Book/s:

1. ERP Demystified – By Alexis Leon (TMH)

VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS05
Title of the Course: CE-I: Multimedia Systems

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	00	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	Multimedia Authoring and Data Representations: Introduction to Multimedia, Multimedia Authoring and Tools, Graphics and Image Data Representations. Color in Image and Video, Fundamental Concepts in Video, Basics of Digital Audio.	09
II	Multimedia Data Compression: Lossless Compression Algorithms, Run-Length Coding, Variable-Length Coding (VLC), Huffman Coding, Adaptive Huffman Coding, Lossy Compression Algorithms, Quantization, Uniform Scalar Quantization, Nonuniform Scalar Quantization, Vector Quantization, Transform Coding, Discrete Cosine Transform (DCT), Image Compression Standards.	09
III	Basic Video Compression Techniques, MPEG Video Coding I - MPEG-1 and 2, MPEG Video Coding II — MPEG-4, 7 and Beyond, MPEG Audio Compression.	09
IV	Multimedia Communication: Computer and Multimedia Networks, Multimedia Network Communications and Applications, Interactive TV (ITV) and Set-Top Box (STB), Broadcast Schemes for Video-on-Demand, Buffer Management, Further Exploration , Wireless Networks , Multimedia over Wireless Networks , Trends in Wireless Interactive Multimedia	09
V	Multimedia Retrieval: Content-Based Retrieval in Digital Libraries, Minimum three Case studies	09

Total	45

Text Book/s:

1. Fundamentals of Multimedia 1st Edition by Mark S. Drew & Ze-Nian Li, Pearson Education

Reference Book/s:

1. Multimedia Fundamentals, Volume 1: Media Coding and Content Processing, 2nd Edition by Ralf Steinmetz,
2. Klara Nahrstedt, Pearson Education.
3. Multimedia Making Work (TMH Pub.) by Tay Vaughan.
4. Advanced Multimedia Programming (McGraw Hill Pub.) - Steve Rimmer
5. Digital Image Processing – Gonzalez and Woods, Pearson Education

VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS05
Title of the Course: CE-I: Digital Image Processing

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	00	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction to Image Processing:** Scenes And Images, Application Of Image Processing, Image Processing System (Hardware, Software), Elements of Visual Perception, Structure of the Human Visual System, Image Sensing and Acquisition, Image Sampling and Quantization, Basic Relationship between Pixels, Adjacency, Connectivity, Regions and Boundaries, Logic Operations in Image processing, Image Enhancement in Spatial Domain, Spatial domain Methods, Point processing, Neighbourhood processing, High pass filtering, High-Boost Filtering, Zooming, Image Enhancement based on Histogram Modelling.	09
II	**Discrete Image Transform:** Linear Transformations:Representation of a Discrete Function, Sampling, One dimensional Discrete Transformations, Two dimensional Discrete Linear Transformations , FFT, DCT, DST, Walsh-Hadamard Transform, Walsh transform, Haar transform, Fast algorithm for computing Hadamard transform, Slant transform, K-L Transform, Wavelet Transform and Subband Coding.	09
III	**Image Enhancement in Frequency Domain:** Fourier Transform, One dimensional Fourier	09

	Transform, Two dimensional Fourier Transform, Properties of DFT, Low Pass Frequency Domain Filters: Ideal Low Pass Filters, Butterworth Low Pass Filters, Gaussian Low Pass Filters, High Pass Frequency Domain Filters: Ideal High Pass Filters, Butterworth High Pass Filters, Gaussian High Pass Filters, High Boost Filtering, Clipping and Thresholding, Homomorphic Filtering, Relationship between Filtering in the spatial and frequency domain.	
IV	**Segmentation** : Point, Line and Ege Detection, Computing the Gradient, Finding Gradients using Masks: Roberts Mask, Prewitt and Sobel Operators, Compass Operators, Canny Edge Detector, Edge Linking, Connectivity, Region-based Segmentation, Thresholding, Region Extraction, Image Compression: Fidelity Criteria, Image compression Standards, Huffman Coding, LZW Coding, Run-Length Coding, Predictive Coding, Interpolative coding.	09
V	**Morphological Image processing:** Arithmetic and Logical Operation, Erosion and Dilation, Structuring Elements, Opening and Closing, Hit-or-Miss Transform, Boundary Extraction, Hole(Region) Filling, Thinning, Thickening, Pruning, Morphological reconstruction, Representation and Description: Chain Codes, Polygonal Approximations, Signatures, Medical Axis transform, Moments, Fourier Descriptors, Topological Descriptors, Texture	09
	Total	45

Text Book/s:

1. B. Chanda, D. Datta Mujumdar, "Digital Image Processing And Analysis", PHI , 5th Reprint ISBN-81-203-1618-5
2. R.C. Gonzalez, R.R. Woods, "Digital Image Processing Person Education ", ISBN - 81-7808-629-8

Reference Book/s:

1. William Pratt, "Digital Image Processing", John Willey & Sons Inc. ISBN-9-814-12620-9
2. Anil K. Jain, "Fundamentals Of Digital Image Processing", PHI, ISBN-81-203-0929-4

VII-Semester B. E. (Computer Science & Engineering)

Course Code: **7BECS06**
Title of the Course: **Computer System Security**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

	List of Practicals
	The student is expected to perform 10-12 practical's based on following topics.
I	Practical 1 & 2 should be based on Security Services, TCP session, Routing, UDP.
II	Practical 3 & 4 should be based on Encryption algorithms, Hash Functions and HMAC.
III	Practical 5 & 6 should be based on Public key cryptography, Private key cryptography algorithms, digital signatures, digital and key management Kerberos, X.509 Directory Authentication Service.
IV	Practical 7, 8 & 9 should be based on Email, IP Security, Web Security, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

V	Practical 10, 11 & 12 should be based on SNMP, Viruses and threats, Intrusion Detection Systems.

VII-Semester B. E. (Computer Science & Engineering)

Course Code: **7BECS07**
Title of the Course: **TCP/IP and Internet**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

	List of Practicals
	Students should perform 10 Experiments from the given list.
1	Study of TCP/IP Protocol Suit
2	Study of ARP & RARP
3	Study of DNS
4	Study of Routing Protocol, Routing algorithm
5	Study of TCP, IP and UDP Protocol
6	To study addressing, subnetting, and forwarding techniques
7	To build and Configure TCP/IP LAN topology

8	To build and configure the DHCP
9	To configure DNS Server
10	To study Client-Server concepts using Socket programming
11	To study File Transfer Protocol
12	To Study Remote File Access Protocol
13	length IP subnet address using IP address 192.168.0.0 and Subnet Mask 255.255.224.0

VII-Semester B. E. (Computer Science & Engineering)

Course Code: 7BECS08
Title of the Course: Major Project Literature Review & Presentation

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	04	25	25	50

	Major Project Literature Review & Presentation
	In the Major Project Literature Review & Presentation, The Student is expected to carry out the following- 1. Selection of a Major Project Title 2. Extensive Literature Review of the chosen topic 3. Presentation of overall idea about the project in front of a panel of internal experts.

	On completion of above mentioned activities, the student has to prepare a synopsis and literature review in spiral binding form and has to certify by the dept and should be submitted. The panel of internal experts has to carry out viva voce of the student and has to evaluate the student.

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: **8BECS01**
Title of the Course: **Compiler Construction**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction to Compilor:** Compilers and Translators, why to write compiler, The structure compiler, phases of compiler, bookkeeping, error handling, compiler construction tools, Interpreter and the related issues, Cross compiler, Incremental compiler, Boot strapping, Lexical Analyzer(LEX), LEX specification details.	09

II	**Syntax Analysis Introduction:** Role of parsers & issues of separating lexical & syntax analysis, parsing technique: Top down parser, Predictive parser, Bottom up parsing, LR parse (SLR, CLR & LALR etc), Implementation of LR parser. Automatic constructions of parser (YACC), YACC specification file details.	09
III	**Intermediate code Generation:** Syntax-directed translation schemes, Intermediate code, postfix notation, parse tree and syntax tree, Three address codes, quadruples, triples, translation of assignment statements, Boolean expression, Array references in arithmetic expression, procedure calls, Declaration, case statement.	09
IV	**Symbol Tables:** Contents, Data structure for symbol tables, representing scope information. Error detection and recovery: Error handling: Lexical-phase, Syntactic phase and semantic phase, Code Generation Introduction: Issues in code generation, Target machine, Run-time storage management, Basic blocks and flow graphs, Next-use information, A simple code generator, Register allocation and assignment, The dag representation of basic blocks, Peephole optimization, Generating code from dags.	09
V	**Code Optimization:** Introduction, Principle sources Of Optimization, optimization of basic blocks, Loop in flow graphs, Introduction to global data flow analysis, Iterative solution of data-flow equations, code improving transformation.	09
	Total	45

Text Book/s:

1. A V Aho, R. Sethi, .J D Ullman, "Compilers: Principles, Techniques, and Tools", Pearson Education, ISBN 81 - 7758 - 590 - 8
2. Aho & Ullman , Principles of compiler Design.

Reference Book/s:

1. Lex and Yece-O'relly.
2. Dhamdhere. Compiler Construction, McMillan India
3. Muchnlk -Advanced compiler design & Implementation.

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: 8BECS02
Title of the Course: Data Warehousing and Data Mining

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
03	01	--	04	03	03	10	10	80	100

Unit	Contents	Hours
I	**Data Warehousing**: Basic Concepts, Data Warehouse Design: Architecture, data marts, meta	09

	data repository, introduction to ETL process, Multidimensional data analysis, Data Warehouse Modeling: Data Cube, OLAP and OLAP operations, Different OLAP Servers, Data Warehouse Usage.	
II	**Data Mining** : Need of data mining technique, Introduction to KDD process , A Multi-Dimensional View of Data Mining, Data Mining Functionalities Applications of data mining, classification of data mining techniques, Major Issues in Data Mining,	09
III	**Data objects and Preprocessing :**Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization Measuring Data Similarity and Dissimilarity. Data Preprocessing : Data Cleaning , Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.	09
IV	**Classification and association rule mining:**Classification basics, supervised Vs unsupervised learning, and Prediction. Issues Regarding Classification and Prediction. Classification by Decision Tree Introduction: what is decision tree? Algorithm for Decision Tree Induction, Attribute Selection Measure, Extracting Classification Rules from Trees, Approaches to Determine the Final Tree Size, Enhancements to basic decision tree induction. Association rule mining : Basics, Mining single-dimensional Boolean association rules from transactional databases, Mining multilevel association rules from transactional databasesMining multidimensional association rules from transactional databases and data warehouse.	09
V	**Cluster analysis:** Cluster Analysis: Introduction, applications of clustering, examples of clustering, requirements of clustering in data mining, A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical methods – Density: Based Methods – Grid: Based Methods – Model: Based Clustering Methods – Clustering , Outlier Analysis.	09
	Total	45

Text Book/s:

1. Jiawei Han and Micheline Kamber ―Data Mining Concepts and Techniques, Third Edition, Elsevier,
2. P. S. Deshpande, Chaudhari, " Multidimentional data analysis and datamining", DreamTech Press
3. Paul Raj Punniah – Data Warehousing Fundamentals for IT professionals. Second edition, WIELLY, John-Wielly and sons.

Reference Book/s:

1. Alex Berson and Stephen J. Smith ―Data Warehousing, Data Mining & OLAP, Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Arun K.Pujari, Data mining techniques , second edition,Universities Press.2010.
3. G. K. Gupta ―Introduction to Data Mining with Case Studies‖, Easter Economy Edition, Prentice Hall of India, 2006.

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: 8BECS03
Title of the Course: CE-II: Cloud Computing

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	00	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	INTRODUCTION: Cloud Computing Introduction, Form, Collaboration to cloud, Working of cloud computing, pros and cons, benefits, developing cloud computing services, Cloud service development, discovering cloud services.	09
II	CLOUD COMPUTING FOR EVERYONE: Centralizing email communications, cloud computing for community, collaborating on schedules, collaborating on group projects and events, cloud computing for corporation, mapping schedulesm managing projects, presenting on road.	09
III	USING CLOUD SERVICES: Collaborating on calendars, Schedules and task management, exploring on line scheduling and planning, collaborating on event management, collaborating on contact management, collaborating on project management, collaborating on word processing, spreadsheets, and databases.	09
IV	OUTSIDE THE CLOUD: Evaluating web mail services, Evaluating instant messaging, Evaluating web conference tools, creating groups on social networks, Evaluating on line groupware, collaborating via blogs and wikis	09
V	STORING AND SHARING: Understanding cloud storage, evaluating on line file storage, exploring on line book marking services, exploring on line photo editing applications, exploring photo sharing communities, controlling it with web based desktops.	09
	Total	45

Text Books:

1. Enterprise Cloud Computing by Gautam Shroff,Cambridge
2. Michael Miller, "Cloud Computing", Pearson Education, New Delhi, 2009

Reference Books:

1. Google Apps by Scott Granneman Pearson
2. Cloud Security & Privacy by Tim Malhar, S. Kumaraswammy, S. Latif (SPD 'O'-REILLY)
3. Cloud Computing: A Practical Approach, Antohy T Velte, et.al McGraw Hill
4. Cloud Computing Bible by Barrie Sosinsky, Wiley India
5. Stefano Ferretti et.al. QoS aware Clouds", 2010 IEEE 3rd International Conference on Cloud Computing

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: 8BECS03
Title of the Course: CE-II : Advanced Database

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	00	--	04	04	03	10	1	80	100

							0		

Unit	Contents	Hours
I	**DATABASE DESIGN ISSUES:** ER Model :Normalization, Security, Integrity,Consistency ,Database Tuning, Optimization and Research Issues, Design of Temporal Databases ,Design of Spatial Databases.	09
II	**DISTRIBUTED DATABASES** Distributed Databases Vs Conventional Databases, Architecture, Advantages, Disadvantages, Fragmentation, Horizontal, vertical, hybrid Replication Top-up design, the allocation problem, Bottom-down design, Data Replication, Data Fragmentation, Transparently Naming & Autonomy, Distributed Query Processing, Recovery, Concurrency Control,Deadlock Handling	09
III	**OBJECT ORIENTED & OBJECT RELATIONAL DATABASES** Introduction to Object Oriented Data Bases – Approaches, Modeling and Design, Persistence, Query Languages, Transaction – Concurrency, Multi Version Locks, Recovery.	09
IV	**EMERGING SYSTEMS** Enhanced Data Models: Client/Server Model, Data Warehousing and Data Mining, Web Databases, Mobile Databases.	09
V	**CURRENT TRENDS** Rules Knowledge Bases, Active and Deductive Databases, Parallel Databases, Multimedia Databases, Image Databases, Text Database, Unstructured Databases, Cloud Computing, Data streaming.	09
Total		45

Text Book/s:

1. R. Elmasri and S.B. Navathe, “Fundamentals of Database “, Pearson Education, 2004.
2. F.Henry Korth, Abraham Silberschatz, S.Sudharshan, “ Database System Concepts”, Fourth Ediion, Tata Mcgraw Hill, 2002.

Reference Book/s:

1. Elisa Bertino, Barbara Catania, Gian Piero Zarri, “Intelligent Database Systems”, Addison-Wesley, 2001.
2. Carlo Zaniolo, Stefano Ceri, Christos Faloustsos, R.T.Snodgrass, V.S.Subrahmanian, “Advanced Database Systems”, Morgan Kaufman, 1997.
3. N.Tamer Ozsu, Patrick Valduriez, “Principles Of Distributed Database Systems”, PHI, Inc., 1999.
4. Abdullah Uz Tansel Et Al, “Temporal Databases:”Theory, Design And Principles”, Benjamin Cummings Publishers, 1993.

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: 8BECS03
Title of the Course: CE-II : Distributed System

Course Scheme	Evaluation Scheme (Theory)

Lectur e	Tutoria l	Practica l	Periods/wee k	Credit s	Duration of paper, hrs	MS E	I E	ES E	Tota l
04	00	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction:** Definition, Goals, Types of distributed systems: Distributed Computing System, Distributed Information System, Architecture: Architectural, Styles, System Architecture, **Processes and Communication**: Virtualization, Servers, Code Migration, Software Agents, Remote Procedure Call, Message Oriented Transient Communication	09
II	**Synchronization:** Distributed Shared Memory: General architecture, Design and Implementation Issues, Consistency Models, Implementing Sequential Consistency Model, Replacement Strategy, Thrashing, Heterogeneous DSM, Physical Clock Synchronization, Logical Clock, Mutual exclusion, Election Algorithms	09
III	**Distributed File Systems:** Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, **Fault Tolerance:** Introduction, Process Resilience, Distributed Commit, Recovery.	09
IV	**Distributed Operating Systems:** Amoeba: Design goals, architecture, process management, file management. Mach: Design goals, architecture, process management, memory management	09
V	**Distributed Multimedia Systems:** Introduction, Characteristics of multimedia data, Quality of service management, Resource management, Stream adaptation, Case study : The Tiger Video file server	09
	Total	45

Reference Books:

1. Distributed Systems Principles and Paradigms- A. S. Tanenbaum (2nd Edition) , Pearson Education
2. Distributed Operating Systems - P. K. Sinha (PHI) (For Distributed shared memory and distributed operating systems)
3. Distributed Systems – Concepts & Design by George Coulouris, Jean Dollimore, Tim Kindberg (Pearson Education)

Course Code: **8BECS03**
Title of the Course: **CE-II : E-Commerce**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
04	00	--	04	04	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction to E-Commerce:** Overview, Traditional vs. Electronic Business Transactions, Benefit of Electronic Commerce, Information Technology and Business, Internet structure and growth. Network infrastructure, other Networks.	09
II	**EDI to E-Commerce:** Electronic Data Interchange, The UN/EDIFACT Standard, The Internet and Extranet for E-Commerce, Identification and Tracking tools for Electronic Commerce. Transactions on the Internet, requirements of payment system. Types of electronic payment. Tools for implementation.	09
III	**Security and E-Commerce:** The benefit of Cryptography, The process of Encryption, The working of Public-key Cryptography, The importance of digital Certificates, The Comparison of encryption methods, An overview of Internet Security Systems.	09
IV	**Consumer and Business Markets:** Consumer Demographics, Loyalty and Acceptance, Value chain and the market place. Business evaluation on the internet.	09
V	**Electronic Customer Support:** The web response system and PPI, security and software modules, Submitting and tracking Online Problems, Dividing process to protect corporate Information. The Beginnings of a Virtual Factory: Virtual Co-ordination, Implementation CITIS operations Controlling Access to shared Data and applications. Entrusting access to an intermediatory.	09
	Total	45

Text Book/s:

1. Bajaj & Nag - E-Commerce the cutting edge of business.
2. David Kosiur - Understanding electronics Commerce.

Course Code: 8BECS04
Title of the Course: OE-I : Cyber Laws and Ethics

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
02	00	--	02	02	03	10	10	80	100

Unit	Contents	Hours
I	Introduction to Computer Security: Definition, Threats to security, Government requirements, Information Protection and Access Controls, Computer security efforts, Standards, Computer Security mandates and legislation, Privacy considerations, International security activity.	09
II	Secure System Planning and administration, Introduction to the orange book, Security policy requirements, accountability, assurance and documentation requirements, Network Security, The Red book and Government network evaluations.	09
III	Information security policies and procedures: Corporate policies- Tier 1, Tier 2 and Tier3 policies - process management-planning and preparation-developing policies-asset classification policy developing standards.	09
IV	Information security: fundamentals-Employee responsibilities- information classification Information handling- Tools of information security- Information processing-secure program administration	09
V	Organizational and Human Security: Adoption of Information Security Management Standards, Human Factors in Security- Role of information security professionals.	09
	Total	45

Reference Books:

1. Debby Russell and Sr. G. T Gangemi, "Computer Security Basics (Paperback)", 2nd Edition, O' Reilly Media, 2006.
2. Thomas R. Peltier, "Information Security policies and procedures: A Practitioner's Reference", 2nd Edition Prentice Hall, 2004.
3. Kenneth J. Knapp, "Cyber Security and Global Information Assurance: Threat Analysis and Response Solutions", IGI Global, 2009.
4. Thomas R Peltier, Justin Peltier and John blackley," Information Security Fundamentals", 2nd Edition, Prentice Hall, 1996
5. Jonathan Rosenoer, "Cyber law: the Law of the Internet", Springer-verlag, 1997
6. James Graham, "Cyber Security Essentials" Averbach Publication T & F Group.

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: 8BECS04
Title of the Course: OE-I : Fundamentals of Management for Engineers

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
02	00	--	02	02	03	10	10	80	100

Unit	Contents	Hours
I	**Introduction to Management:** Evolution of Management, Nature & Scope-Functions of Management Role of Manager-levels of Management-Managerial Skills - Challenges-Planning-Planning Process Types of Plans-MBO	09
II	**Organization Structure & HRM:** Organization Design-Organizational Structure-Departmentation– Delegation-Centralization - Decentralization-Recentralization-Organizational Culture- Organizational climate- Organizational change Human Resource Management-HR Planning - Recruitment & Selection - Training & Development Performance appraisal - Job satisfaction-Stress Management Practices	09
III	**Operation Management:** Introduction to Operations Management-Principles and Types of Plant Layout-Methods of production (Job Batch and Mass production) - Method study and Work Measurement-Quality Management - TQM-Six sigma - Deming's Contribution to Quality - Inventory Management – EOQ - ABC Analysis - JIT System-Business Process Re-engineering (BPR)	09
IV	**Marketing Management:** Introduction to Marketing-Functions of Marketing-Marketing vs. Selling Marketing Mix - Marketing Strategies - Product Life Cycle - Market Segmentation - Types of Marketing - Direct Marketing-Network Marketing - Digital Marketing-Channels of Distribution - Supply Chain Management (SCM)	09
V	**Project Management:** Introduction to Project Management-steps in Project Management - Project Planning - Project Life Cycle-Network Analysis-Program Evaluation & Review Technique (PERT)- Critical Path Method (CPM) - Project Cost Analysis - Project Crashing - Project Information Systems	09
	Total	45

Text Book/s:

1. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.
2. Fundamentals of Management, Stephen P.Robbins, Pearson Education, 2009.
3. Essentials of Management, Koontz Kleihrich, Tata Mc - Graw Hill.
4. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
5. Industrial Engineering and Management: Including Production Management, T.R.Banga, S.C Sharma, Khanna Publishers.

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: 8BECS04
Title of the Course: OE-I : Entrepreneurship

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/week	Credits	Duration of paper, hrs	MSE	IE	ESE	Total
02	00	--	02	02	03	10	10	80	100

Unit	Contents	Hours
I	**Entrepreneurial Perspectives** Introduction to Entrepreneurship – Evolution - Concept of Entrepreneurship - Types of Entrepreneurs - Entrepreneurial Competencies, Capacity Building for Entrepreneurs. Entrepreneurial Training Methods - Entrepreneurial Motivations - Models for Entrepreneurial Development - The process of Entrepreneurial Development.	09
II	**New Venture Creation** Introduction, Mobility of Entrepreneurs, Models for Opportunity Evaluation; Business plans – Purpose, Contents, Presenting Business Plan, Procedure for setting up Enterprises, Central level - Startup and State level - T Hub, Other Institutions initiatives.	09
III	**Management of MSMEs and Sick Enterprises** Challenges of MSMEs, Preventing Sickness in Enterprises – Specific Management Problems; Industrial Sickness; Industrial Sickness in India – Symptoms, process and Rehabilitation of Sick Units.	09
IV	**Managing Marketing and Growth of Enterprises** Essential Marketing Mix of Services, Key Success Factors in Service Marketing, Cost and Pricing, Branding, New Techniques in Marketing, International Trade.	09
V	**Strategic perspectives in Entrepreneurship** Strategic Growth in Entrepreneurship, The Valuation Challenge in Entrepreneurship, The Final Harvest of New Ventures, Technology, Business Incubation, India way – Entrepreneurship; Women Entrepreneurs – Strategies to develop Women Entrepreneurs, Institutions supporting Women Entrepreneurship in India.	09
	Total	45

Text Book/s:

1. Entrepreneurship Development and Small Business Enterprises, Poornima M. Charantimath, 2e, Pearson, 2014.
2. Entrepreneurship, a South – Asian Perspective, D.F. Kuratko and T. V. Rao, 3e, Cengage, 2012.
3. Entrepreneurship, Arya Kumar, 4 e, Pearson 2015.

4. The Dynamics of Entrepreneurial Development and Management, Vasant Desai, Himalaya Publishing House, 2015.

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: **8BECS06**
Title of the Course: **Compiler Construction**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

	List of Practicals
	The student is expected to perform practicals based on following topics.
I	Practical no. 1 , 2 & 3 should be based on the Lex
II	Practical no. 4 should be based on Flex.
III	Pr Practical no. 5,6,7 & 8 should be based on Yacc to recognize arithmetic expression, Strings, valid variable ,grammar
IV	Pr Practical no. 9 & 10 should be based on Yacc to evaluate arithmetic expression

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: **8BECS07**
Title of the Course: **Data Warehousing and Data Mining**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	02	02	25	25	50

	List of Practicals
	Practical's of Data warehousing and data mining shall be based on syllabus. Software's like Oracle, MatLab and open source tools like Weka can be used for implementation of practicals. **Practical:** Students should perform 08-10 Experiments from the given list.
I	Practical 1 and 2 will be on unit I (Data Warehousing)
II	Practical 3 will be on unit II (Study of Open source tools like Weka)
III	Practical 4, 5 and 6 will be on unit III (Study of any data set, Data similarity dissimilarity, statistical analysis of data.)
IV	Practical 7 and 8 will be on unit IV (Classification algorithm and association rule mining algorithm)
V	Practical 9 and 10 will be on unit V (clustering algorithms)

VIII-Semester B. E. (Computer Science & Engineering)

Course Code: **8BECS08**
Title of the Course: **Major Project**

Course Scheme					Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Periods/week	Credits	TW	POE	Total
--	--	01	06	06	75	75	150

	Major Project Work
	As the Major Project topic has already been chosen and Literature Review of Project has also been completed in Seventh Semester under Major Project Literature Review and Presentation, The Student is expected to carry out the following- 1. Formulation of Scope & Methodology for the proposed study. 2. Implementation of project work 3. Carry out necessary experimention for analysis and testing of the project work On completion of above mentioned activities of project work, the student has to prepare a project report in the specified format and deliver a seminar on project work before final submission. Evaluation of project work will be on the basis of quality of work carried out, submitted Report, Seminar & Viva-Voce.