SCHEME OF INSTRUCTION & EXAMINATION
B.E. IV YEAR (COMPUTER SCIENCE & ENGINEERING)
Proposed scheme and syllabus with effect from the Academic year 2014-2015

SEMESTER - I

SL. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination			Credits
			Periods per week		Duration In Hours	Maximum Marks		
			L/T	D/P		Univ. Exam	Sessionals	
		THEORY						
1	CS401 UE	Object Oriented Analysis & Design	4	-	3	75	25	4
2	CS402 UE	Compiler Construction	4	-	3	75	25	4
3	CS403 UE	Distributed Systems	4	-	3	75	25	4
4	CS404 UE	Information Security	4	-	3	75	25	4
5		Elective-II	4	-	3	75	25	4
		PRACTICALS						
1	CS431 UE	OOAD-Lab & CC lab	-	3	3	50	25	2
2	CS432 UE	Distributed Systems Lab	-	3	3	50	25	2
3	CS433 UE	Project Seminar	-	3		-	25	2
4	SI 400	Summer Internship	-	-	-	-	*Grade	2
		TOTAL	20	9		475	200	28

Elective-II

CS 405 UE Mobile Computing
CS 406 UE Advanced Computer Architecture
CS 407 UE Information Retrieval Systems
BM 406 UE Medical Instrumentation
EC 423 UE VLSI Technology
EE 405 UE Optimization Techniques
ME 408 UE Entrepreneurship
ME 412 UE Finite Element Analysis

*Grade: S/A/B/C/D/E

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SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

SEMESTER - I

SL. No.	Syllabus Ref. No.	SUBJECT	Scheme of Instruction		Scheme of Examination			Credits
			Periods per week		Duration In Hours	Maximum Marks		
			L/T	D/P		Univ. Exam	Sessionals	
1	CS408 UE	**THEORY** Database Systems (Elective-II)	4	-	3	75	25	4

CS 401 UE With effect from the academic year 2014-2015

OBJECT ORIENTED ANALYSIS AND DESIGN

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 marks
Credits	4

Course Objectives:

- To train the students to solve problems using the notion of objects
- To learn the different phases in object-oriented analysis and design using UML
- To expose the students to the unified software development process

Course Outcomes:

- Students will be able to learn the concepts of object orientation and object oriented programming systems
- Ability to draw valid use-case diagrams, activity diagrams, component diagrams and deployment diagrams.
- Students will be able to learn the unified software process, organizing along time and content , role activity, work flow, content , environment and project management, requirements.
- Students will be able to opted and flourished object oriented system development and rational rose projects and explored to placement/higher education in that direction.

UNIT-I

UML Introduction: Modeling Concepts. Building Blocks of UML

Structural Modeling: Classes, Relationships, Common Mechanics, Class Diagrams, Advanced Classes, Advanced Relationships, Interfaces, Types and Roles, and Packages.

UNIT-II

Behavioral Modeling: Interactions, Use cases, Use case diagrams, Interaction diagrams, Activity diagrams, Events and Signals, State machines, Processes and threads, Time and space, and State chart diagrams.

UNIT-III

Architectural Modeling: Components, Deployment, Collaborations, Patterns, and Frame works, Component diagrams, Systems, and Models.

UNIT-IV

Unified Software Process: Fundamentals, Structures, Organizing along time and content, Role, Activity, Workflow, and Content

Core Workflows: Business Modeling, Environment Project Management, and Requirements.

UNIT-V

Unified Process: Analysis and Design, Test, Implementation, Deployment, Configuration and Change Management.

Suggested Reading:

1. Grady Booch, James Rumbaugh, Ivar Jacobson, "*The Unified Modeling Language User Guide*",

Pearson Education, 2006.
2. Ivar Jacobson, Grady Booch, James Rumbaugh, "*The Unified Software Development Process*", Addison Wesley, 1999.
3. Grady Booch, et al. "*Object Oriented Analysis & Design with Applications*", Pearson Education, 3rd Edition, 2009.
4. Terry Quatrani "*Visual Modeling with Rational Rose 2002 and UML*", Addison Wesley, 2003.

CS 402 UE With effect from the academic year 2014-2015

COMPILER CONSTRUCTION

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 marks
Credits	4

Course Objectives:

- To learn about Lexical Analyzer and Parser Generator tools.
- To learn how to build symbol tables and generate intermediate code.
- To become familiar with compiler optimization technology

Course Outcomes:

- Students will be in a position to develop the compiler for given programming language
- Students will learn all the intricate points and concepts which will help to understand other allied subjects.
- Students will be in a position to design more efficient compiler for the given compiler language.

UNIT – I

Introduction: Compilers, The translation process, Data structures and issues in compiler structure, Bootstrapping and Porting.
Scanning: The scanning process, Regular expressions, Finite Automata, Regular expressions to DFA's, use of LEX to generate scanner.

UNIT – II

Context Free Grammars & Parsing: The parsing process, Context free grammars, Parse tree & Abstract syntax trees, EBNF and syntax diagrams, and Properties of CFLs.
Top Down Parsing: Recursive descent parsing, LL (1) parsing, First and follow sets, Recursive descent parser, and Error recovery in top down parsers.

UNIT – III

Bottom-up Parsing: Overview, LR (0) items and LR (0) Parsing, SLR (1) Parsing, general LR(1) and LALR(1) parsing, YACC, and Error recovery in bottom-up parsers.

UNIT – IV

Semantic Analysis: Attributes and attribute grammars, Algorithms for attribute computation, Symbol table, Data types and Type checking.
Runtime Environments: Memory organization during program execution, Fully static runtime environments, Stack-based runtime environments, Dynamic memory, and Parameter parsing mechanisms.

UNIT – V

Code Generation: Intermediate code and data structures for code generation, Basic code generation techniques, Code generation of data structure references, Code generation of control statements and logical expressions, Code generation of procedure and function calls, Code generation in commercial compilers, Code optimization techniques, and Data flow equation.

Suggested Reading:

1. Kenneth C. Louden, "*Compiler Construction: Principles and Practice*", Thomson Learning Inc., 1997.

2. Ravi Sethi, Aho & Ullman JP, "*Compilers: Principles, Techniques and Tools*", Addison Wesley publishing co., 1986.
3. J.P. Tremblay and P.S. Sorenson, "*The Theory and Practice of Compiler Writing*", TMH-1985.

CS 403 UE With effect from the academic year 2014-2015

DISTRIBUTED SYSTEMS

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks
Credits	4

Course Objectives:

- To acquire an understanding of the issues in distributed systems
- To study architectures and working of distributed file systems
- To expose the students to distributed transaction management, security issues and replication

Course Outcomes:

- Students would be able to describe the problems and challenges associated with principles of distributed systems.
- Students will be able to evaluate the effectiveness and shortcomings of different solutions.
- Students can implement small scale distributed systems and can actually learn the solutions by doing.

UNIT-I

Introduction: Goals and Types of Distributed Systems
Architectures: Architectural Styles, System Architectures, Architectures versus Middleware, and Self-Management in Distributed Systems.
Processes: Threads, Virtualization, Clients, Servers, and Code Migration.
Communication: Fundamentals, Remote Procedure Call, Message-Oriented Communication, Stream-Oriented Communication, and Multicast Communication.

UNIT-II

Naming: Names, Identifiers and Addresses, Flat Naming, Structured Naming, and Attribute-Based Naming.
Synchronization: Clock Synchronization, Logical Clocks, Mutual Exclusion, Global Positioning of Nodes, and Election Algorithms.
Consistency and Replication: Introduction, Data-Centric Consistency Models, Client-Centric Consistency Models, Replica Management, and Consistency Protocols.

UNIT-III

Fault Tolerance: Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, and Recovery.
Distributed Object-Based Systems:Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, and Security.

UNIT-IV

Distributed File Systems:Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, and Security.
Distributed Web-Based Systems:Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, and Security.

UNIT-V

Distributed Coordination-Based Systems:Introduction to Coordination Models, Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, and Security.
Map-Reduce: Example, Scaling, programming model, Apache Hadoop, Amazon Elastic Map Reduce, Mapreduce.net, Pig and Hive.

Suggested Reading:

1. Andrew S. Tanenbaum and Maarten Van Steen, "*Distributed Systems*", PHI 2nd Edition, 2009.
2. R.Hill, L.Hirsch, P.Lake, S.Moshiri, "*Guide to Cloud Computing*, Principles and Practice", Springer, 2013.
3. R.Buyya, J.Borberg, A.Goscinski,"*Cloud Computing-Principles and Paradigms*",Wiley 2013.

CS 404 UE With effect from the academic year 2014-2015

INFORMATION SECURITY

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks
Credits	4

Course Objectives:

- To learn legal and technical issues in building secure information systems
- To provide an understanding of network security
- To expose the students to security standards and practices

UNIT-I

Introduction: History, Critical Characteristics of Information, NSTISSC Security Model, Components of an Information System, Securing the Components, Balancing Security and Access, The SDLC, The Security SDLC.
Need for Security: Business Needs, Threats, Attacks, and Secure Software Development

UNIT-II

Legal, Ethical and Professional Issues: Law and ethics in Information Security, Relevant U.S. Laws, International Laws and Legal Bodies, Ethics and Information Security.
Risk Management: Overview, Risk Identification, Risk Assessment, Risk Control Strategies, Selecting a Risk Control Strategy, Quantitative versus Qualitative Risk Control Practices, Risk Management discussion Points, Recommended Risk Control Practices.

UNIT-III

Planning for Security: Security policy, Standards and Practices, Security Blue Print, Security Education, Continuity strategies.
Security Technology: Firewalls and VPNs: Physical Design, Firewalls, Protecting Remote connections.

UNIT-IV

Security Technology: Intrusion Detection, Access Control, and other Security Tools: Intrusion Detection and Prevention Systems-Scanning, and Analysis Tools- Access Control Devices.
Cryptography: Foundations of Cryptology, Cipher methods, Cryptographic Algorithms, Cryptographic Tools, Protocols for Secure Communications, Attacks on Cryptosystems

UNIT-V

Implementing Information Security: Information security project management, Technical topics of implementation, Non Technical Aspects of implementation, Security Certification and Accreditation.
Security and Personnel: Positioning and staffing security function, Employment Policies and Practices, and Internal control Strategies.
Information Security Maintenance: Security management models, Maintenance model, and Digital Forensics.

Suggested Reading:

1. Michael E Whitman and Herbert J Mattord, "*Principles of Information Security*", Cengage Learning, 2011.
2. Thomas R Peltier, Justin Peltier, John Blackley, "*Information Security Fundamentals*", Auerbach Publications, 2010.
3. Detmar W Straub, Seymour Goodman, Richard L Baskerville, "*Information Security, Policy, Processes, and Practices",* PHI, 2008.
4. Mark Merkow and Jim Breithaupt *" Information Security Principle and Practices"*, Pearson Education, 2007

CS 405 UE With effect from the academic year 2014-2015

MOBILE COMPUTING
(ELECTIVE-II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 marks
Credits	4

Course Objectives:

- To introduce basics of wireless voice and data communication technologies
- To build working knowledge on various telephone and satellite networks
- To study the working principles of wireless LANs and standards
- To study principles of adhoc networks and routing
- To gain knowledge on integration of mobile networks into Internet
- To build skills in working with wireless application protocols to develop mobile applications.

Course Outcomes:

Students shall be able to

- Implement Adhoc Network Routing protocols.
- Mini based project based on tracking, localization and routing in wireless networks.
- Implement file transfer, access and authentication based applications for mobile computing.

UNIT I

Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT II

Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite Networks -Basics – Parameters and Configurations – Capacity Allocation – FAMA and DAMA – Broadcast Systems – DAB - DVB.

UNIT III

Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 802.11b standards – HIPERLAN – Blue Tooth.

UNIT IV

Mobile IP, Dynamic Host Configuration Protocol, Routing in MANETs: DSDV, DSR, AODV and ZRP.
MANETS vs VANETs.

UNIT V

Traditional TCP – classical TCP improvements – WAP, and WAP 2.0.
Mobile Transaction models, File Systems and Mobility Management

Suggested Reading:

1. Jochen H. Schiller, "*Mobile Communications*", Addison Wesley, Second Edition, 2003(Unit I Chap 1,2 &3- Unit II chap 4,5 &6-Unit III Chap 7.Unit IV Chap 8- Unit V Chap 9&10.)

2. William Stallings, "*Wireless Communications and Networks*", PHI/Pearson Education, 2002(Unit I Chapter – 7&10-Unit II Chap 9)
3. Kaveh Pahlavan, Prasanth Krishnamurthy, "*Principles of Wireless Networks*", Prentice Hall, 2003.
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "*Principles of Mobile Computing*", Springer, 2003.
5. Krzysztof Wesolowski, "*Mobile Communication Systems*", John Wiley and Sons Ltd, 2002.

CS 406 UE With effect from the academic year 2014-2015

ADVANCED COMPUTER ARCHITECTURE
(ELECTIVE-II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 marks
Credits	4

Course Objectives:

- To provide concepts on performance measurement of processor architectures.
- To provide knowledge about the need of parallel processing.
- To provide basics about parallelism techniques implemented in uniprocessor technologies.
- To gain knowledge of state-of-the art technologies like superscalar and vector processor.
- To gain knowledge on multiprocessor and multi-core technologies.

Course Outcomes:

- Ability to acquire skills to measure the performance of various processor architectures.
- Ability to apply parallel processing techniques.
- Ability to gain knowledge on parallelism techniques implemented in uniprocessor technologies.
- Ability to understand the state-of-the art technologies like superscalar and vector processor.
- Ability to gain knowledge on multiprocessor and multi-core technologies.

UNIT-I

Measuring Performance and cost: Performance measurement, Enhancements to Uniprocesssor models, Benchmarks, Basic model of advanced computer architectures.

UNIT-II

Pipelining and superscalar techniques: Basic pipelining, data and control hazards, Dynamic instruction scheduling, Branch prediction techniques, Performance evaluation, Case study- Sun Microsystems - Microprocessor.

UNIT-III

Vector Processors**:** Vector Processor Models**,** Vector architecture and Design, Performance evaluation, and Programming Vector processors.
Array Processors: Parallel array processor model, and Memory organization
Interconnection networks: performance measures, static and dynamic topologies

UNIT-IV

Multiprocessors and Multi computers: Multiprocessor models, Shared-memory and Distributed memory architectures, Memory organization, Cache Coherence and Synchronization Mechanisms, Parallel computer, and Performance models.

UNIT-V

Software for parallel Programming: Parallel models, languages, and compilers, Parallel Program Development and Environments, and Trends in Parallel systems- Heterogeneous Computing multi-core architectures, and Asymmetric multi-core architectures.

Suggested Reading:

1. John L. Hennessey and David A. Patterson , *"Computer Architecture, A Quantitative Approach* ", 4th Edition, Elsevier, 2007.
2. Sajjan G. Shiva, "*Advance Computer Architecture* ", Taylor Series Group, CRC press, 2006.
3. Kai Hwang and Naresh Jotwani, "*Advanced Computer Architecture"*, Mc Graw Hill, 1999.

CS 407 UE With effect from the academic year 2014-2015

INFORMATION RETRIEVAL SYSTEMS
(ELECTIVE-II)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 marks
Credits	4

Course Objectives:

- To understand indexing and querying in information retrieval systems
- To learn the different models for information retrieval
- To expose the students to text classification and clustering
- To learn about web searching

Course Outcomes:

On completion of the course the students will be able to

- Understand the algorithms and techniques for information retrieval (document indexing and retrieval, query processing)
- Quantitatively evaluate information retrieval systems
- Classify and cluster documents
- Understand the practical aspects of information retrieval such as those in web search engines.

UNIT-I

Boolean Retrieval: An example information, Building an inverted index, Processing Boolean queries, The extended Boolean model versus ranked retrieval.

The term vocabulary and postings lists: Document delineation and character sequence decoding, determining the vocabulary of terms, Faster postings list intersection via skip pointers, Positional postings, and Phrase queries.

Dictionaries and tolerant retrieval: Search structures for dictionaries, Wildcard queries, Spelling correction.

Index construction: Hardware basics, Blocked sort-based indexing, Single-pass in-memory indexing, Distributed indexing, Dynamic indexing, Other types of indexes.

UNIT-II

Index compression: Statistical properties of terms in information retrieval, Dictionary compression, Postings file compression.

Scoring, term weighting and the vector space model: Parametric and zone indexes, Term frequency and weighting, The vector space model for scoring, and Variant tf-idf functions.

Computing scores in a complete search system: Efficient scoring and ranking, Components of an information retrieval system, Vector space scoring and query operator interaction.

Evaluation in information retrieval: Information retrieval system evaluation, Standard test collections, Evaluation of unranked retrieval sets, Evaluation of ranked retrieval results, Assessing relevance.

UNIT-III

Relevance feedback and query expansion: Relevance feedback and pseudo relevance feedback, Global methods for query reformulation.

XML retrieval: Basic XML concepts, Challenges in XML retrieval, A vector space model for XML retrieval, Evaluation of XML retrieval, Text-centric vs. data-centric XML retrieval.

Probabilistic information retrieval: Basic probability theory, The Probability Ranking Principle, The Binary Independence Model.

Language models for information retrieval: Language models, The query likelihood model.

UNIT-IV

Text classification and Naive Bayes: The text classification problem, Naive Bayes text classification, The Bernoulli model, Properties of Naive Bayes, and Feature selection.

Vector space classification: Document representations and measures of relatedness in vector spaces, Rocchio classification, k- nearest neighbor, Linear versus nonlinear classifiers.

Flat clustering: Clustering in information retrieval, Problem statement, Evaluation of clustering, k-means.

Hierarchical clustering: Hierarchical agglomerative clustering, Single-link and complete-link clustering, Group-average agglomerative clustering, Centroid clustering, Divisive clustering.

UNIT-V

Matrix decompositions and Latent semantic indexing: Linear algebra review, Term-document matrices and singular value decompositions, Low-rank approximations, Latent semantic indexing.

Web search basics: Background and history, Web characteristics, Advertising as the economic model, The search user experience, Index size and estimation, Near-duplicates and shingling.

Web crawling and Indexes: Overview, Crawling, Distributing indexes, Connectivity servers.

Link analysis: The Web as a graph, Page Rank, Hubs and Authorities.

Suggested Reading:

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, *An Introduction to Information Retrieval*, Cambridge University Press, Cambridge, England, 2008
2. David A. Grossman, Ophir Frieder, *Information Retrieval – Algorithms and Heuristics*, Springer, 2nd Edition (Distributed by Universities Press), 2004.
3. Gerald J Kowalski, Mark T Maybury. *Information Storage and Retrieval Systems*, Springer, 2000
4. Soumen Chakrabarti, *Mining the Web: Discovering Knowledge from Hypertext Data*, Morgan-Kaufmann Publishers, 2002.

BM 406 UE With effect from the academic year 2014-2015

MEDICAL INSTRUMENTATION

(ELECTIVE-II for CE/CSE/ECE/EEE/ME)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks
Credits	4

Course Objectives:

- To understand the operation, application, and underlying physiological principles associated with a variety of diagnostic, therapeutic and analytical medical devices used routinely in hospitals.
- To know the basic electrical and electronic components and circuit behavior.
- To understand applicable codes, standards, and the intrinsic hazards associated with many of these devices.

UNIT I

Origin of bio-potentials – ECG, EEG, EMG, EOG, ENG, ERG, EGG.
Bio-potential Electrodes: Half cell potential, Offset voltage, Types of External, internal and Microelectrodes.
Electrochemical transducers. Potentiometric sensors, Ampero-metric sensors, Electro-Chemical gas sensors.
Biosensors – Enzyme-based biosensors, immuno sensors, microbial sensors.

UNIT II

Medical display devices and recorders, Basic requirements for the display and recording of biopotentials signals. PMMC writing systems, General features of ink-jet, thermo-sensitive and optical recorders, Oscilloscopes – Medical, multi-beam & non-fade display systems.

UNIT III

Analytical Instrumentation, Methods of Chemical analysis, Absorption Photometry, Emission Photometry, Fluorometry, chromatography for blood gas analysis, Colorimeters, Spectrophotometers, electrophoresis, auto analyzer.

UNIT IV

ECG: Block diagram & circuits, electrode placement, lead configuration, Types of ECG recorders, Blood pressure measurement: Direct and indirect methods, Blood flow measurement: Electromagnetic & Ultrasonic techniques. Heart sounds: Origin, and phonocardiography.

UNIT V

ECG: Block diagram & circuits, electrode placement, Evoked potentials and their measurement. EMG-Block diagram & circuits, electrode placement, Nerve conduction velocity determination, EMG stimulators.

Suggested Reading:

1. John G.Webster, "*Medical Instrumentation-Application and Design",* John Wiley and Sons Inc., 3rd Ed., 2003.
2. Khandpur R.S., "*Hand Book of Biomedical Instrumentation",* Tata Mc Graw Hill Pub Co. Ltd., 2nd Ed., New Delhi, 2003.
3. Joseph J.Carr and John M.Brown, "*Introduction to Biomedical Equipment Technology",* Pearson Education, 2001.

EC 423 UE With effect from the academic year 2014-2015

VLSI TECHNOLOGY

(ELECTIVE-II for BME/CSE/EEE/ME)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks
Credits	4

Course Objectives:

- To provide a perspective on CMOS and BiCMOS technologies.
- To learn Layout Design of Digital Circuits.
- To understand Sub-system Design elaborately.
- To expose Process technology.

UNIT I

Metal Oxide Semiconductor (MOS) VLSI Technology, Basic MOS Transistors, Enhancementmode Transistor action. Depletion mode Transistor action nMOS fabrication process, CMOS fabrication process, CMOS & Bi CMOS Technologies, MOS & Bi CMOS Transistor Models, and MOS inverter characteristics.

UNIT II

Layout Basics, Static CMOS Gate Circuits, Complex CMOS gates, XOR and XNOR Gates, Multiplexer Circuits, Flip-Flops and Latches: Basic Bistable Circuit, SR Latch, JK. Flip-Flop, Master Slave JK Flip-Flop and Latches, and Power Dissipation in CMOS Gates.

UNIT III

Subsystem Design: Subsystem design Principles, Arithmetic circuits in CMOS, Read Only Memory (ROM), Basic Cells of Static Random Access Memory (SRAM) and Dynamic Random Access Memory (DRAM), SRAM & DRAM Arrays, and Field Programmable Gate Arrays.

UNIT IV

Process Technology-I: Crystal growth, wafer fabrication and Basic Properties, Model of Simulation: Czochralski Crystal Growth, Dopant Incorporation during CZ Crystal Growth, Epitoxy, Oxidation and Lithography and Etching.

UNIT V

Process Technology-II: Polysilicon Film Deposition, Diffusion, Ion implantation, Implants in Real Silicon- the Role of the Crystal Structure, Manufacturing Methods and Equipment, Metallization VLSI Process Integration-CMOS IC technology.

Suggested Reading:

1. Douglas A pucknell and Esharaghian, "*Essential of VLSI circuits and Systems",* PHI 2008.
2. David Hodges, Horace G Jackson &Resve A saleg*, "Analysis and Design of Digital Integrated Circuits",* The McGraw Hill Companies , 3rd edition, 2006.
3. Jan M Rabaey, A Chandrakasan, Borvioje N., "*Digital Integrated Circuits Design Perspective",* 2nd Edition, PHI, 2005.
4. John P.Umera., "*Introduction to VLSI circuits and Systems",* John Wiley & Sons 2002.
5. SM.SZE, "*VLSI Technology",* 2nd Edition, McGraw Hill Company, 1988.

EE 405 UE With effect from the academic year 2014-2015

OPTIMIZATION TECHNIQUES

(ELECTIVE-II for CSE/ECE/ME/CE)

Instruction	4 Periods per week
Duration	3 Hours
University Examination	75 Marks
Sessional	25 Marks
Credits	4

UNIT I

Introduction to Classical Optimization Techniques: Statement of optimization problem, Objective function, Classification of optimization problems. Classical Optimization Techniques: Single-variable a multi-variable optimization without constraints. Multi-variable optimization with equality constraints. Lagrange multiplier method, Multi-variable optimization with inequality constraints, Kuhn-Tucker conditions.

UNIT II

Linear Programming: Standard form, Formulation of the LPP, Solution of simultaneous equations by pivotal condensation, Graphical methods, Simplex algorithm, Big M method, Two phase Simplex method, Duality principle, Dual simplex method.

UNIT III

Non-linear Programming: One-dimensional search methods. Fibonacci method, Golden section method. Direct Search Method: Univariate search and pattern search methods, Powell's method.

UNIT IV

Gradient Method: Steepest descent, conjugate gradient and Quasi-Newton methods, Fletcher-Reeves method of conjugate gradients.

UNIT V

Dynamic Programming: Multistage design process, Types, Principle of optimality, Computational procedure in dynamic programming, Examples using calculus method and tabular method of solutions.

Suggested Reading:

1. S. S.Rao, "Optimization Theory and Application", New Age International, 3rd Edition, 1998.
2. Jasbir S.Arora, "Introduction to Optimum Design", McGraw Hill International Edition, 1989.
3. S.D.Sharma, "Operational Research", Kedamath Ramnath & Co., 2004.

ME 409 UE With effect from the academic year 2014-2015

ENTREPRENEURSHIP

(ELECTIVE-II for CSE/ECE/EE/CE)

Instruction	4 Periods per week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 marks
Credits	4

Course Objectives:

- To motivate students to take up entrepreneurship in future
- To learn nuances of starting an enterprise & project management
- To understand the design principles of solar energy systems, their utilization and performance evaluation
- To understand the behavioral aspects of entrepreneurs and time management

UNIT-I

Indian Industrial Environment – Competence; Opportunities and Challenges, Entrepreneurship and Economic growth, Small Scale Industry in India, Objectives, Linkage among small, medium and heavy industries. Types of enterprises.

UNIT-II

Identification and characteristics of entrepreneurs, Emergence of First generation entrepreneurs, environmental influence and women entrepreneurs. Conception and evaluation of ideas, their sources and decision making. Choice of Technology – Collaborative interaction for Technology development.

UNIT-III

Identification and characteristics of entrepreneurs, Emergence of First generation entrepreneurs, environmental influence and women entrepreneurs. Conception and evaluation of ideas, their sources and decision making. Choice of Technology – Collaborative interaction for Technology development.

UNIT-IV

Project Management during construction phase, project organization, project planning and control using CPM-PERT techniques. Humana aspects of project management. Assessment of tax burden.

UNIT-V

Behavioral aspects of entrepreneurs: Personality – determinats, attributes and models, leadership concepts and models. Values and attitudes. Motivation aspects, change behavior. Corporate social responsibility.

Time Management: Various approaches of time management, their strengths and weaknesses. The urgency addiction and time management matrix.

Suggested Reading:

1. Vasant Desai, "Dynamics of Entrepreneurial Development and Management", Himalaya Publishing House, 1997.
2. Prasanna Chandra, "Project – Planning , Analysis, Selection, Implementation and Review", Tata McGraw-Hill Publishing Company Ltd., 1995.
3. B. Badhai, "Entrepreneurship for Engineers", Dhanpath Rai & Co., Delhi, 2001.
4. Stephen R. Covey and A. Roger Merrill, "First Things First", Simon and Schuster, 2002.Robert D. Hisrich and Michael P.Peters, " Entrepreneurship", Tata McGRaw Hill Edition, 2002.

FINITE ELEMENT ANALYSIS

(ELECTIVE-II for CSE/CE/ECE/EEE/BME**)**

Instruction	4 Periods per week
Duration	3 Hours
University Examination	75 Marks
Sessional	25 Marks
Credits	4

Course Objectives:

- To understand the theory and application of the finite element method for analyzing structural systems
- To learn approximation theory for structural problems as the basis for finite element methods
- To learn formulations for a variety of elements in one, two, and three dimensions. Implementations of element formulations will be examined using MATLAB.
- To understand modeling and analysis of structures using planar, solid, and plate elements

UNIT-I

Introduction to Finite Element Method, solution method using FEM, descretisation, Boundary conditions, load application, types of elements comparison, Stress and Equilibrium, Boundary conditions. Strain-Displacement relations. Stress-strain relations.

One Dimensionla problems: Finite element modeling, coordinates and shape functions.

Potential Energy approach: Assembly of Gloabal stiffness matrix and load vector. Finite element equations, Treatment of boundary conditions. Quadratic shape functions.

UNIT-II

Analysis of trusses and frames: Element stiffness matrix for a truss member. Analysis of plane truss with number of unknowns not exceeding two at each node. Analysis of frames with two translations and a rotational degree of freedom at each node.

Analysis of Beams: Element stiffness matrix for two nodded, two degrees of freedom per node beam element.

UNIT-III

Finite element modeling of two dimensional stress analysis with constant strain triangles and treatment of boundary conditions.

Finite element modeling of Axisymmetirc solids subjected to Axisymmetric loading with triangular elements.

UNIT-IV

Two dimensional four nodded isoprarametric elements and numerical integration.

Steady state heat transfer analysis: One dimensional analysis of a find and two dimensional analysis of thin palate. Analysis of uniform shaft subjected to torsion.

UNIT-V

Dynamic Analysis: Formulation of finite element mode, element matrices, evaluation of Eigen values and Eigen vectors for a stepped bar and a beam.

Time dependent field problems: Application to one dimensional heat flow in a rod. Finite element formation to three dimensional problems in stress analysis. Types of elements used.

Convergence requirements and geometric isotropy. Local, natural and global coordinates. Introduction to Finite Element Analysis Software.

Suggested Reading:

1. Tirupathi R. Chandraputla and Ashok, D. Belgundu" *Introduction to Finite Elements in Engineering*", Pearson Education, 3rd Edition, 2002.
2. Rao S.S., "*The Finite Element Methods in Engineering*", Pergamon Press, 1989.
3. Segerlind, L.J. "*Applied Finite Element Analysis*", Wiley Publication, 1984.
4. Reddy J, "*An Introduction to Finite Element Method*", McGraw-Hill Company, 2005

CS 431 UE With effect from the Academic Year 2014-2015

OBJECT ORIENTED ANALYSIS & DESIGN LAB

AND

COMPILER CONSTRUCTION LAB

Instruction	3 Periods per week
Duration of University Examination	3 Hours
University Examination	50 Marks
Sessional	25 Marks
Credits	2

Course Objective: To expose the students to industry practices and team work.

OBJECT ORIENTED ANALYSIS & DESIGN LAB: Exercises must be taken from 1 to 6

COMPILER CONSTRUCTION LAB: Exercises must be taken from 7 to 12

1. System Definition
    a) Requirements Management
    b) Data Modeling
2. Software Development
    a) Application & Web modeling
    b) Configuration Management
    c) Unit Testing
3. Content Management
4. System Testing
    a) Functional Testing
    b) Reliability Testing
    c) Performance Testing
    d) Defect & Change Tracking
5. Change Management
    a) Configuration Management
    b) Requirement Management
    c) System Documentation
6. Project Management

7. Scanner program using LEX
8. SLR Parser table generation
9. LR Parser table generation
10. Parser Generation using YACC

11-12. Program on Code generation & Code Optimization

CS 432 UE With effect from the academic year 2014-2015

DISTRIBUTED SYSTEMS LAB

Instruction	3 periods per week
Duration	3 Hours
University Examination	50 Marks
Sessional	25 Marks
Credits	2

Course Objective: To enable the students familiar with computer networks and distributed environment.

Course Outcomes:

- Effectively utilize the concepts learnt in theory
- Basic knowledge of using concepts of distributed systems in an integrated approach
- Improved appreciation of the current advances in distributed systems

1. Implementation FTP Client
2. Implementation of Name Server
3. Implementation of Chat Server
4. Understanding of working of NFS (Includes exercises on Configuration of NFS)
5. Implementation of Bulletin Board.
6. Implement a Word count application which counts the number of occurrences of each word in a large collection of documents Using Map Reduce model.
7. Develop an application (small game- like scrabble, Tic-Tac-Toe) using Android SDK.

CS 433 UE With effect from the academic year 2014-2015

PROJECT SEMINAR

Instruction	3 Periods per week
Sessional	25 marks
Credits	2

Course Objectives:

- To train and provide hands-on experience in analysis, design, and programming of information systems by means of case studies and projects.
- To expose the students to industry practices and team work.
- To provide training in soft skills and also train them in presenting seminars and technical report writing.

The department can initiate the project allotment procedure at the end of III year 2nd semester and finalize it in the first two weeks of IV year 1st semester.

First 4 weeks of IV year 1st semester will be spent on special lectures by faculty members, research scholars, post graduate students of the department and invited lectures by engineers from industries and R&D institutions.

The objective of these preliminary talks will be to expose the students to real life practical problems and methodology to solve the technical problems.

Seminar schedule will be prepared by the coordinator for all the students from the 5th week to the last week of the semester which should be strictly adhered to.

Each student will be required to:

1. Submit a one page synopsis before the seminar for display on notice board.
2. Give a 20 minutes presentation followed by 10 minutes discussion.
3. Submit a technical write-up on the talk.

At least two teachers will be associated with the Project Seminar to evaluate students for the award of sessional marks which will be on the basis of performance in all the 3 items stated above.

The seminar presentation should include the following components of the project:

*Problem definition and specification
*Literature survey, familiarity with research journals
*Broad knowledge of available techniques to solve a particular problem.
*Planning of the work, preparation of bar (activity) charts
*Presentation- oral and written.

SI 400 With effect from the academic year 2014-2015

SUMMER INTERNSHIP

Credits 2

Course Objectives:

- To train and provide hands-on experience in analysis, design, and programming of information systems by means of case studies and projects.
- To expose the students to industry practices and team work.
- To provide training in soft skills and also train them in presenting seminars and technical report writing.

Summer Internship is introduced as part of the curricula of encouraging students to work on problems of interest to industries. A batch of three students will be attached to a person from the Computer Industry/Software Companies/R&D Organization for a period of 8 weeks. This will be during the summer vacation following the completion of the III year Course. One faculty coordinator will also be attached to the group of 3 students to monitor the progress and to interact with the industry co-ordinate (person from industry).

After the completion of the project, student will submit a brief technical report on the project executed and present the work through a seminar talk to be organized by the Department. Award of sessionals are to be based on the performance of the students, to be judged by a committee constituted by the department. One faculty member will co-ordinate the overall activity of Industry Attachment Program.

CS 408 UE With effect from the academic year 2014-2015

SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

DATABASE SYSTEMS

(ELECTIVE-II for BME/ ECE/ EE/ ME**)**

Instruction	4 Periods per week
Duration	3 Hours
University Examination	75 Marks
Sessional	25 marks
Credits	4

Course Objectives:

- To understand the basic concept of DBMS
- To learn to design, develop and query the database
- To learn database administration and transaction processing

UNIT-I

Data and Data Management: Role of Data and Databases
Database and Database Management System: Key Database concepts-Basic Database Models-Database Components
Data Modeling: Database Design-Relational Database Models- Relationships-Comparing Data Models

UNIT-II

SQL language: SQL features- command basics-SELECT Fundamentals-Operators and Functions-DDL Commands-DML Commands.
Data Access and Manipulation: SELECT statement Advanced Syntax-Joins and Sub Queries.
SQL Procedures: SQL procedures and Functions-Triggers.

UNIT-III

Designing a Database: Designing Relational Tables-Comparing Relational Designs-Normalizing Data.
Implementing a Database: Physical Design and Implementation- Adjusting Design to the Real World-Implementing Database Objects.

UNIT-IV

Improving Data Access: Performance Rollbacks-Using Indexes and Views-Using Programmable objects.
Database Administration**:** Need for Administration-Administration Responsibilities-Management Task.

UNIT-V

Transactions and Locking: Transaction Basics-Managing Concurrency control-SQL server transaction management.
Database Access and Security: Database Connections-Managing Access Control-Protecting data.

Suggested Reading:

1. Mark L.Gillenson, Paulraj Ponniah., "*Introduction to Database Management*", John Wiley & Sons Ltd, 2008.
2. Lee Chao, *"Database Development and Management"*, Auerbach Publications, 2006.
3. Rob Coronel, *"Database Systems: Design, Implementation & Management"* Thomson Course Technology, 2000.