Regulation: GNITC - R16

COURSE STRUCTURE
&
DETAILED SYLLABUS

for

III & IV Year B.Tech. Degree Course

(Applicable for the batch admitted from 2016-17)

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING

GURU NANAK INSTITUTIONS
TECHNICAL CAMPUS
(An Autonomous Institution)
Campus: Ibrahimpatnam, R.R. District - 501506 (T.S).

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)
SCHOOL OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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CSE III YEAR **I SEMESTER**

CSE III YEAR **II SEMESTER**

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
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SCHOOL OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

CSE IV YEAR **I SEMESTER**

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SCHOOL OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
COURSE STRUCTURE
(Applicable for the Batch admitted from 2016-17)

III YEAR **I SEMESTER**

S. No.	Course Code	Group	Name of the Course	L	T	P	Credits
1	CS0541	PC	Computer Networks	3	1	0	4
2	CS0542	PC	Compiler Design	3	1	0	4
3	CS0543	PC	Data Base Management Systems	3	1	0	4
4	MB0531	HS	Manegerial Economics and Financial Analysis	4	0	0	4
5		OE	**Open Elective – I**	3	0	0	3
6	CS0544	PC	Data Base Management Systems Lab	0	0	3	2
7	CS0545	PC	Compiler Design Lab	0	0	3	2
8	CS0546	PC	Computer Networks Lab	0	0	3	1
5 Theory + 3 Labs			**Total Credits**				**24**

III YEAR **II SEMESTER**

S. No.	Course Code	Group	Name of the Course	L	T	P	Credits
1	CS0641	PC	Data Warehousing and Data Mining	3	1	0	4
2	IT0641	PC	Web Technologies	3	1	0	4
3	CS0651 CS0652 CS0653 CS0654 CS0655	PE	**Professional Elective – I** • Artificial Intelligence • Computer Graphics • Software Project Management • Speech Processing • Principle of Programming Languages	4	0	0	4
4	CS0656 CS0657 CS0658 EC0652	PE	**Professional Elective – II** • Machine Learning and Pattern Recognition • Software Testing Methodologies • Social Network Analysis • Digital Image Processing	4	0	0	4
5		OE	**Open Elective – II**	3	0	0	3
6	CS0642	PC	Data Warehousing and Data Mining Lab	0	0	3	2
7	IT0642	PC	Web Technologies Lab	0	0	3	2
8	HE0631	HS	Advanced English Language Communications Skills Lab	0	0	3	1
5 Theory + 3 Labs			**Total Credits**				**24**

Note: Industry Oriented Mini Project to be taken up during the vacation after III year II semester examinations and it will be evaluated in IV Year I Semester

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IV YEAR **I SEMESTER**

S. No.	Course Code	Group	Name of the Course	L	T	P	Credits
1	CS0741	PC	Network Security & Cryptography	3	1	0	4
2	CS0742	PC	Grid & Cloud Computing	3	1	0	4
3	IT0758 CS0751 CS0752 CS0753	PE	**Professional Elective – III** • Design Patterns • Advanced Databases • Mobile Computing • Business Intelligence & Big Data	4	0	0	4
4	CS0754 EC075B CS0755	PE	**Professional Elective – IV** • Information Retrieval Systems • Adhoc and Sensor Networks • Embedded Systems • Natural Language Processing	4	0	0	4
5	CS0756 CS0757 CS0758 CS0759	PE	**Professional Elective – V** • Ethical Hacking • Web Mining • Bio-informatics • Internet of Things	4	0	0	4
6	CS0743	PC	Network Security & Cryptography Lab	0	0	3	2
7	CS0744	PC	Grid & Cloud Computing Lab	0	0	3	2
8	CS0781		Industry Oriented Mini Project	0	0	3	2
5 Theory + 2 Labs + 1 Project			**Total Credits**				**26**

IV YEAR **II SEMESTER**

S. No.	Course Code	Group	Name of the Course	L	T	P	Credits
1	MB0831	HS	Management Science	4	0	0	4
2		OE	**Open Elective – III**	3	0	0	3
3	CS0891		Seminar	0	0	3	1
4	CS0871		Major Project	0	0	15	14
2 Theory + 1 Seminar + 1 Project			**Total Credits**				**22**

PC – Professional Core **HS – Humanities and Social Sciences**

PE – Professional Elective **OE – Open Elective**

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LIST OF PROFESSIONAL ELECTIVES FOR COMPUTER SCIENCE & ENGINEERING STUDENTS

PROFESSIONAL ELECTIVE – I:

1) CS0651 : Artificial Intelligence
2) CS0652 : Computer Graphics
3) CS0653 : Software Project Management
4) CS0654 : Speech Processing
5) CS0655: Principles of Programming Languages

PROFESSIONAL ELECTIVE – II:

1) CS0656 : Machine Learning and Pattern Recognition
2) CS0657 : Software Testing Methodologies
3) CS0658 : Social Network Analysis
4) EC0652: Digital Image Processing

PROFESSIONAL ELECTIVE – III:

1) IT0758 : Design Patterns
2) CS0751 : Advance Databases
3) CS0752 : Mobile Computing
4) CS0753: Business Intelligence & Big Data

PROFESSIONAL ELECTIVE – IV:

1) : Information Retrieval Systems
2) CS0754 : Adhoc and Sensor Networks
3) EC0755 : Embedded Systems
4) CS0755 : Natural Language Processing

PROFESSIONAL ELECTIVE – V:

1) CS0756: Ethical Hacking
2) CS0757: Web Mining
3) CS0758: Bio-informatics
4) CS0759: Internet of Things

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OPEN ELECTIVES

OPEN ELECTIVE - I (in III Year I Semester)			
S. No.	**Course Code**	**Name of the Course**	**Offering Department**
1	CE0561	Disaster Management	Civil Engineering
2	EE0561	Non – Conventional Power Generation	Electrical & Electronics Engineering
3	EE0562	Electrical Engineering Materials	
4	EE0563	Nano-Technology	
5	ME0561	Operations Research	Mechanical Engineering
6	ME0562	Basics of Thermodynamics	
7	ME0563	Fabrication Processes	
8	EC0561	Electronic Measuring Instruments	Electronics & Communication Engineering
9	CS0561	OOPS through JAVA	Computer Science & Engineering
10	CS0562	Computer Graphics	

OPEN ELECTIVE - II (in III Year II Semester)			
S. No.	**Course Code**	**Name of the Course**	**Offering Department**
1	CE0661	Estimation, Quantity Survey & Valuation	Civil Engineering
2	EE0661	Design Estimation and Costing of Electrical Systems	Electrical & Electronics Engineering
3	EE0662	Energy Storage Systems	
4	EE0663	Mechatronics	
5	ME0661	Jet propulsion and Rocket Engineering	Mechanical Engineering
6	ME0662	Ergonomics	
8	EC0661	Principles of Electronic Communications	Electronics & Communication Engineering
9	CS0661	Cyber Security	Computer Science & Engineering
10	CS0662	Database Management Systems	
11	MB0661	Intellectual Property Rights	Master of Business Administration

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OPEN ELECTIVE - III (in IV Year II Semester)			
S. No.	**Course Code**	**Name of the Course**	**Offering Department**
1	CE0861	Environmental Impact Assessment	Civil Engineering
2	MB0861	Enterprise Resource Planning	Master of Business Administration
3	MB0862	Management Information Systems	
4	MB0863	Organizational Behavior	
5	ME0861	Fundamentals of Robotics	Mechanical Engineering
6	ME0862	Non-Conventional Energy Sources	
7	ME0863	Aspects of Heat Transfer in Electrical / Electronically controlled Units	
8	EC0861	Principles of Computer Communications and Networks	Electronics & Communication Engineering
9	IT0861	Web Technologies	Information Technology
10	CS0861	Simulation & Modeling	Computer Science & Engineering

NOTE: Computer Science & Engineering Students are supposed to choose the Open Electives offered by other departments

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III Year B.Tech. CSE I-Sem

L	T	P	C
3	1	0	4

(CS0541) COMPUTER NETWORKS

PRE-REQUISITES:

1. A course on “Computer Programming and Data Structures”
2. A course on “Design and Analysis of Algorithms”

COURSE OBJECTIVE:

This course is intended to equip the students with an overview of the fundamental concepts of computer networks and the protocols of the various layers

SYLLABUS:

UNIT – I

Network hardware, Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet. Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT – II

Data link layer: Design issues, framing, Error detection and correction. Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel. Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols. Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT – III

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

UNIT – IV

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT – V

Application Layer –Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK:

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition,Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe the basic computer network technology

CO2: Express the functions of each layer in the OSI and TCP/IP reference model

CO3: Apply the skills of subnet and routing mechanisms

CO4: Examine the protocols of computer networks, and how they can be applied in network design and implementation

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III Year B.Tech. CSE I-Sem

L	T	P	C
3	1	0	4

(CS0542) COMPILER DESIGN

PRE-REQUISITES:

1. A course on “Formal Languages and Automata Theory”
2. A course on “Computer Organization and Architecture”
3. A course on “Computer Programming and Data Structures”

COURSE OBJECTIVE:

This course aims at introducing the major concepts of language translation and phases of compiler, besides the techniques used in each phase

SYLLABUS:

UNIT – I

Introduction: The structure of a compiler, the science of building a compiler, programming language basics

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT – II

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars and Parser Generators.

UNIT – III

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.

Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

UNIT – IV

Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

UNIT – V

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial- Redundancy Elimination, Loops in Flow Graphs.

TEXT BOOK:

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica Lam, Ravi Sethi, Jeffry D. Ullman.

REFERENCE BOOKS:

1. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly.
2. Compiler Construction, Louden, Thomson.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define a compiler, given a set of language features and identify the patterns, tokens & regular expressions for lexical analysis

CO2: Express their skills in using lex tool & yacc tool for developing a scanner and parser

CO3: Compute LL and LR parsers

CO4: Calculate the performance of various algorithms used in every phase of compiler, in terms of time and space complexity

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III Year B.Tech. CSE I-Sem

L	T	P	C
3	1	0	4

(CS0543) DATA BASE MANAGEMENT SYSTEMS

PRE-REQUISITE:

1. A course on “Advanced Data Structures”

COURSE OBJECTIVE:

This course is introduced to describe the basic concepts of SQL, build queries using SQL commands and generate applications of database systems

SYLLABUS:

UNIT-I

Database System Applications: database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational model, other models, database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, storage manager, the query processor, history of data base systems, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model, conceptual design for large enterprises.

UNIT- II

Introduction to the Relational Model: integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views, form of basic SQL query, examples of basic SQL queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity’s, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases, Oracle, SQL Server, DB2.

UNIT- III

Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus.

Schema refinement: Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT- IV

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity. Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with loss of nonvolatile storage, Advance Recovery systems, Remote Backup systems.

UNIT-V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V Edition

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe the basic fundamentals of DBMS, database design and normal forms

CO2: Identify the appropriate SQL commands for retrieval and management of data

CO3: Explain the basics of transaction processing and concurrency control

CO4: Model database storage structures and access techniques

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III Year B.Tech. CSE I-Sem

L	T	P	C
4	0	0	4

(MB0531) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES:

1. To understand the concepts and importance of economics in managerial problems
2. To understand the basic financial management concepts including the principles of financial analysis

SYLLABUS:

UNIT - I

Introduction & Demand Analysis: Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand*: Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting*- methods of demand forecasting.

UNIT- II

Production & Cost Analysis: *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Laws of Returns, Internal and External Economies of Scale. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

UNIT- III

Markets & Forms of Business Organisations: Types of competition and Markets, Features of Perfect competition and Monopoly. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing*: COURSE OBJECTIVES and Policies of Pricing. Methods of Pricing. *Business:* Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Limited companies.

UNIT- IV

Capital Budgeting: Methods and sources of raising capital - Capital Budgeting: Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

UNIT-V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions -Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis***:** Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH,.
2. Vijay Kumar & Appa Rao Managerial Ecoconomics & Financial Analysis, Cengage.
3. J. V. Prabhakar Rao & P.V. Rao Managerial Ecoconomics & Financial Analysis, Maruthi Publishers,

REFERENCE BOOKS:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson,
3. Lipsey & Chrystel, Economics, Oxford University Press, Domnick Salvatore: Managerial Economics In a Global Economy, Thomson.
4. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI, 2012.

COURSE OUTCOMES:

1. Students will be able to apply the principles of economics for managerial decisions.
2. The students will be able to analyze the financial position of a company with the techniques of financial accounting and ratio analysis

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III Year B.Tech-I Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-I
(CE0561) DISASTER MANAGEMENT

PRE-REQUISITES: NIL

COURSE OBJECTIVE:

This subject explains different disasters, tools and methods for disaster management.

SYLLABUS:

UNIT - I

Understanding Disaster

Concept of Disaster, Different approaches, Concept of Risk, Levels of Disasters, Disaster Phenomena and Events (Global, national and regional)

Hazards and Vulnerability

Natural and man-made hazards; response time, frequency and forewarning levels of different hazards, Characteristics and damage potential or natural hazards; hazard assessment, Dimensions of vulnerability factors; vulnerability assessment, Vulnerability and disaster risk, Vulnerabilities to flood and earthquake hazards.

UNIT - II

Disaster Management Mechanism

Concepts of risk management and crisis managements, Disaster Management Cycle, Response and Recovery, Development, Prevention, Mitigation and Preparedness, Planning for Relief.

UNIT - III

Capacity Building

Capacity Building: Concept, Structural and Nonstructural Measures, Capacity Assessment; Strengthening Capacity for Reducing Risk Counter-Disaster Resources and their utility in Disaster Management, Legislative Support at the state and national levels.

UNIT - IV

Coping with Disaster

Coping Strategies; alternative adjustment processes, Changing Concepts of disaster management, Industrial Safety Plan; Safety norms and survival kits. Mass media and disaster management.

UNIT - V

Planning for disaster management

Strategies for disaster management planning, Steps for formulating a disaster risk reduction plan, Disaster management Act and Policy in India. Organizational structure for disaster management in India. Preparation of state and district disaster management plans.

TEXT BOOKS:

1. Alexander, D. Natural Disasters, ULC press Ltd, London, 1993.
2. Carter, W.N. Disaster Management: A Disaster Management Handbook, Asian Development Bank, Bangkok, 1991.
3. Manual on Natural Disaster Management in India, NCDM, New Delhi, 2001.

REFERENCE BOOKS :

1. Abarquez I. & Murshed Z. CommUNITy Based Disaster Risk Management: Field Practitioner's Handbook, ADPC, Bangkok, 2004.
2. Goudie, A. Geomorphological Techniques, Unwin Hyman, London 1990.
3. Goswami, S.C Remote Sensing Application in North East India, Purbanchal Prakesh, Guwahati, 1997.
4. Chakrabarty, U.K. Industrial Disaster Management and Emergency Response, Asian Book Pvt. Ltd., New Delhi 2007.
5. Disaster Management in India, Ministry of Home Affairs, Government of India, New Delhi, 2011.
6. National Policy on Disaster Management, NDMA, New Delhi, 2009
7. Disaster Management Act. (2005), Ministry of Home Affairs, Government of India, New Delhi, 2005.
8. District Disaster Management Plan-Model Template, NIDM, New Delhi, 2005.
9. Disaster Management, Future challenge and OpportUNITies, Edited by Jagbir singh, I.K. international publishing home Pvt, Ltd.

COURSE OUTCOME:

1. Student understands the measures to reduce the risk and loss of property and lives during disaster.

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III Year B.Tech-I Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-I
(EE0561) NON CONVENTIONAL POWER GENERATION

PRE-REQUISITE: NiL

COURSE OBJECTIVES:

1. To introduce various types of renewable technologies available.
2. The technologies of energy conversion from these resources and their quantitative analysis.

SYLLABUS:

UNIT - I

Fundamentals of Solar Energy-Solar spectrum- Solar Radiation on Earth's surface-Solar radiation geometry-Solar radiation measurements- Solar radiation data- Solar radiation on horizontal and tilted surfaces. Solar Thermal conversion- Flat plate collectors- concentrated collectors- construction and thermal analysis- Solar applications- Solar ponds- Heliostat systems-water heater-air heater-solar still.

UNIT – II

Solar-Electric Power generation- Photovoltaic cells- Equivalent circuit- V-I Characteristics- Photovoltaic modules – constructional details- design considerations-Tracking- Maximum power point tracking - Solar Thermo electric conversion.

UNIT – III

Wind Energy- Fundamentals of wind energy-power available in wind- Betz Limit-Aerodynamics of wind turbine- Wind turbines- Horizontal and vertical axis turbines – their configurations- Wind Energy conversion systems.

UNIT – IV

Energy from Bio Mass- Various fuels- Sources-Conversion technologies-Wet Processes – Dry Processes- Bio Gas generation – Aerobic and anaerobic digestion - Factors affecting generation of bio gas - Classification of bio gas plants-Different Indian digesters- Digester design considerations - Gasification process - Gasifiers – Applications. Geothermal Energy - sources- Hydrothermal convective - Geo-pressure resources - Petro-thermal systems (HDR) - Magma Resources-Prime Movers.

UNIT – V

OTEC Systems- Principle of operation - Open and closed cycles, Energy from Tides - Principle of Tidal Power - Components of tidal Power plants - Operation Methods - Estimation of Energy in Single and double basin systems - Energy and Power from Waves-Wave energy conversion devices - Fuel Cells - Design and Principle of operation - Types of Fuel Cells - Advantages and disadvantages - Types of Electrodes – Applications - Basics of Batteries - Constructional details of Lead acid batteries - Ni-Cd Batteries.

TEXT BOOKS :

1. John Twidell & Wier, Renewable Energy Resouces, CRC Press, 2009.
2. G.D.Rai – Non Conventional Energy sources, Khanna publishers.

REFERENCE BOOKS:

1. D.P .Kothari, Singal,Rakesh, Ranjan, Renewable Energy sources and Emerging Technologies, PHI, 2009.
2. F.C.Treble, Generating Electricity from Sun.
3. C.S.Solanki, Solar Photo volatics- Fundamentals- Principles and Applications, PHI 2009
4. S.P.Sukhatme, Solar Energy Principles and Application – TMH

COURSE OUTCOMES:

1. The student will be able analyze solar thermal and photovoltaic systems and related technologies for energy conversion.
2. Wind energy conversion and devices available for it.
3. Biomass conversion technologies.
4. Geo thermal resources and energy conversion principles and technologies.
5. Power from oceans (thermal, wave, tidal) and conversion and devices.
6. Fundamentals of fuel cells and commercial batteries.

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III Year B.Tech-I Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-I
(EE0562) ELECTRICAL ENGINEERING MATERIALS

PRE-REQUISITES: Nil

COURSE OBJECTIVE:
To understand the importance of various materials used in electrical engineering and obtain a qualitative analysis of their behavior and applications.

SYLLABUS:

UNIT- I
DIELECTRIC MATERIALS: Dielectric as Electric Field Medium, leakage currents, dielectric loss, dielectric strength, breakdown voltage, breakdown in solid dielectrics, flashover, liquid dielectrics, electric conductivity in solid, liquid and gaseous dielectrics, Ferromagnetic materials, properties of ferromagnetic materials in static fields, spontaneous, polarization, curie point, anti-ferromagnetic materials, piezoelectric materials, pyroelectric materials.

UNIT – II
MAGNETIC MATERIALS: Classification of magnetic materials, spontaneous magnetization in ferromagnetic materials, magnetic Anisotropy, Magnetostriction, diamagnetism, magnetically soft and hard materials, special purpose materials, feebly magnetic materials, Ferrites, cast and cermet permanent magnets, ageing of magnets. Factors effecting permeability and hysteresis

UNIT – III
SEMICONDUCTOR MATERIALS: Properties of semiconductors, Silicon wafers, integration techniques, Large and very large scale integration techniques (VLSI).

UNIT – IV
MATERIALS FOR ELECTRICAL APPLICATIONS: Materials used for Resistors, rheostats, heaters, transmission line structures, stranded conductors, bimetals fuses, soft and hard solders, electric contact materials, electric carbon materials, thermocouple materials. Solid, Liquid and Gaseous insulating materials, Effect of moisture on insulation.

UNIT – V

SPECIAL PURPOSE MATERIALS: Refractory Materials, Structural Materials, Radioactive Materials, Galvanization and Impregnation of materials, Processing of electronic materials, Insulating varnishes and coolants, Properties and applications of mineral oils, Testing of Transformer oil as per ISI

TEXT BOOKS:

1. R K Rajput: A course in Electrical Engineering Materials, Laxmi Publications. 2009
2. T K BasaK: A course in Electrical Engineering Materials:, New Age Science Publications 2009
3. TTTI Madras: Electrical Engineering Materials
4. Adrianus J.Dekker: Electrical Engineering Materials, THM Publication

COURSE OUTCOMES:

By the end of the course, students will be able to

1. Understand various types of dielectric materials, their properties in various conditions.
2. Evaluate magnetic materials and their behavior.
3. Evaluate semiconductor materials and technologies.
4. Materials used in electrical engineering and applications.

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III Year B.Tech-I Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-I
(EE0563) NANO-TECHNOLOGY

PRE-REQUISITES: Nil

COURSE OBJECTIVES: To enable the student to understand fundamentals of nano materials and technologies for these materials and their manufacturing, applications in various fields.

SYLLABUS:

UNIT - I

Background of Nanotechnology: Scientific Revolutions, Nanotechnology and Nanomachines - The Periodic Table, Atomic Structure, Molecules and Phases, Energy, Molecular and Atomic size, Surfaces and Dimensional Space, Top down and Bottom up approach.

UNIT - II

Molecular Nanotechnology: Atoms by inference, Electron Microscopes, Scanning electron microscope, Modern transmission electron microscope, Scanning probe microscope-atomic force microscope, scanning, tunneling microscope, Self Assembly.

UNIT - III

Nanopowders and Nanomaterials: Preparation, Plasma arcing, chemical vapor deposition, Sol-gels,
Electrodeposition, Ball milling, using natural nanoparticles, Applications of nanomaterials.

UNIT - IV

Nanoelectronics: Approaches to nanoelectronics, Fabrication of integrated circuits, MEMS, NEMS, Nano
circuits, Quantum wire, Quantum well, DNA-directed assembly and application in electronics
.

UNIT - V

Applications: MEMS, NEMS, Coatings, Optoelectronic Devices, Environmental Applications,
Nanomedicine.

TEXT BOOKS :

1. Introduction to Nanoscience and Nanotechnology Gabor L. Hornyak, *NanoThread, Inc., Golden, Colorado, USA***;** H.F. Tibbals, *University of Texas Southwestern Medical Center, Dallas, USA***;** Joydeep Dutta**,** *Asian Institute of Technology, Pathumthani, Thailand***;** John J. Moore, *Colorado School of Mines, Golden, USA*
2. Introduction to Nanotechnology by Charles P. Poole Jr and Frank J.Owens Wiley India Pvt Ltd.
3. Introduction to Nanoscience and Nanotechnology, Chatopadhyaya.K.K, and Banerjee A.N,
4. Introduction to nano tech by phani kumar
5. Introduction to Nano Technology by Charles P. Poole Jr and Frank J. Owens. Wiley India Pvt Ltd.
6. Introduction to Nanoscience and Nanotechnology, Chatopadhyaya.K.K, and Banerjee A.N,
7. NANOTECHNOLOGY Basic Science and EmergingTsechnologies by Michael Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse**-** CHAPMAN & HALL/CRC PRESS 2002.

COURSE OUTCOMES:

1. To evaluate electronic structural studies of nano materials and different synthesis methods to obtain nano structures.
2. Understand characterization techniques through various measurements to study electrical, mechanical,thermal properties of nano materials.
3. Applications of nano materials for specific purposes like MEMS, NEMS, nano electronics, energy storage.

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OPEN ELECTIVE-I
(ME0561) OPERATIONS RESEARCH

PRE-REQUISITES: Nil

COURSE OBJECTIVES:
Understanding the mathematical importance of development of model in a particular optimization model for the issue and solving it.

SYLLABUS:

UNIT – I
Development – Definition– Characteristics and Phases – Types of models – Operations Research models – applications.
ALLOCATION: Linear Programming Problem - Formulation – Graphical solution – Simplex method – Artificial variables techniques: Two–phase method, Big-M method; Duality Principle.

UNIT – II
TRANSPORTATION PROBLEM – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy.
Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem; Traveling Salesman problem.

UNIT – III
SEQUENCING – Introduction – Flow **–**Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines-graphical model
REPLACEMENT: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely-Group Replacement.

UNIT – IV
THEORY OF GAMES: Introduction –Terminology– Solution of games with saddle points and without saddle points- 2 x 2 games –m x 2 & 2 x n games - graphical method – m x n games - dominance principle.
INVENTORY: Introduction – Single item, Deterministic models – Types - Purchase inventory models with one price break and multiple price breaks –Stochastic models – demand discrete variable or continuous variable – Single Period model with no setup cost.

UNIT – V

WAITING LINES: Introduction – Terminology-Single Channel – Poisson arrivals and Exponential Service times – with infinite population and finite population models Multichannel – Poisson arrivals and exponential service times with infinite population.

DYNAMIC PROGRAMMING:

Introduction – Terminology- Bellman's Principle of Optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

TEXT BOOKS:

1. Operation Research /J.K.Sharma/ MacMilan.
2. Operations Research/A.C.S.Kumar/Yesdee

REFERENCE BOOKS:

1. Operations Research: Methods and Problems / Maurice Saseini, Arhur Yaspan and Lawrence Friedman
2. Operations Research /A.M.Natarajan, P.Balasubramaniam, A. Tamilarasi/Pearson Education.
3. Operations Research / Wagner/ PHI Publications.
4. Introduction to O.R/Hillier & Libermann (TMH).
5. Introduction to O.R /Taha/PHI

COURSE OUTCOME:

Understanding the problem, identifying variables & constants, formulas of optimization model and applying appropriate optimization Techniques.

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OPEN ELECTIVE-I
(ME0562) BASICS OF THERMODYNAMICS

PRE-REQUISITE: Engineering Chemistry and Physics

COURSE OBJECTIVE: To understand the treatment of classical Thermodynamics and to apply the First and Second laws of Thermodynamics to engineering applications

SYLLABUS:

UNIT – I
Introduction: Basic Concepts:
System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Exact & Inexact Differentials, Cycle, Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility

UNIT II
Types, Displacement & Other forms of Work, Heat, Point and Path functions, Zeroth Law of Thermodynamics – Concept of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale

UNIT – III
First and Second Laws of Thermodynamics: First Law: Cycle and Process, Specific Heats (cp and cv), Heat interactions in a Closed System for various processes, Limitations of First Law, Concept of Heat Engine (H.E.) and Reversed H.E. (Heat Pump and Refrigerator), Efficiency/COP, Second Law: Kelvin-Planck and Clausius Statements, Carnot Cycle, Carnot Efficiency, Statement of Clausius Inequality, Property of Entropy, T-S and P-V Diagrams

UNIT - IV
Mixtures of perfect Gases – Mole Fraction, Mass friction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction , Volume fraction and partial pressure, Equivalent Gas const.
Atmospheric air - Psychrometric Properties – Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature, , Specific Humidity, Relative Humidity, saturated Air, Vapour pressure, Degree of saturation – Adiabatic Saturation ,Psychrometric chart.

UNIT - V

Power Cycles : Otto, Diesel cycles - Description and representation on P–V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis

Refrigeration Cycles:

Bell-Coleman cycle, Vapour compression cycle-performance Evaluation.

TEXT BOOKS:

1. Engineering Thermodynamics / PK Nag /TMH, III Edition
2. Thermodynamics / C.P.Arora.

REFERENCE BOOKS:

1. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
2. Fundamentals of Classical Thermodynamics – G. Van Wylan & R.E. Sonntag – John Wiley Pub.
3. Thermodynamics – J.P.Holman / McGrawHill
4. Engineering Thermodynamics – Jones & Dugan
5. Thermodynamics & Heat Engines – Yadav – Central Book Depot, Allahabad.

COURSE OUTCOMES:

At the end of the course, the student should be able to

1. Understand and differentiate between different thermodynamic systems and processes
2. Understand and apply the laws of Thermodynamics to different types of systems undergoing various processes
3. Understand and analyze the Thermodynamic cycles

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OPEN ELECTIVE – I
(ME0563) FABRICATION PROCESSES

PRE-REQUISITES: Nil

COURSE OBJECTIVE:
Understand the philosphipies of various Manufacturing process.

SYLLABUS:

UNIT – I
Casting : Steps involved in making a casting – Advantage of casting and its applications; Patterns - Pattern making, Types, Materials used for patterns, pattern allowances and their construction; Properties of moulding sands.
Methods of Melting - Crucible melting and cupola operation – Defects in castings;
Casting processes – Types – Sand moulding, Centrifugal casting, die- casting, Investment casting, shell moulding; Principles of Gating – Requirements – Types of gates, Design of gating systems – Riser – Function, types of Riser and Riser design.

UNIT – II
Welding: Classification – Types of welds and welded joints; Gas welding - Types, oxy-fuel gas cutting. Arc welding, forge welding, submerged arc welding, Resistance welding, Thermit welding.
Inert Gas Welding _ TIG Welding, MIG welding, explosive welding, Laser Welding; Soldering and Brazing; Heat affected zone in welding. Welding defects – causes and remedies; destructive and non- destructive testing of welds.

UNIT – III
Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth. Stamping, forming and other cold working processes. Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning.
Types of presses and press tools. Forces and power requirement in the above operations.

UNIT – IV
Extrusion of Metals : Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion – Extruding equipment – Tube extrusion and pipe making, Hydrostatic extrusion. Forces in extrusion

UNIT – V

Forging Processes : Forging operations and principles – Tools – Forging methods – Smith forging, Drop Forging – Roll forging – Forging hammers : Rotary forging – forging defects – cold forging, swaging, Forces in forging operations.

TEXT BOOK:

1. Manufacturing Technology / P.N. Rao/TMH

REFERENCE BOOKS:

1. Production Technology / R.K. Jain
2. Metal Casting / T.V Ramana Rao / New Age
3. Principles of Metal Castings / Rosenthal.
4. Welding Process / Parmar /
5. Production Technology /Sarma P C /
6. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Edu.

COURSE OUTCOME:

For given product, one should be able identify the manufacturing process.

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OPEN ELECTIVE - I
(EC0561) ELECTRONIC MEASURING INSTRUMENTS

NOTE: NO DETAILED MATHEMATICAL TREATMENT IS REQUIRED.

PRE-REQUISITE: Nil

COURSE OBJECTIVES:

1. It provides an understanding of various measuring systems functioning and metrics for performance analysis.
2. Provides understanding of principle of operation, working of different electronic instruments viz. signal generators, signal analyzers, recorders and measuring equipment.
3. Provides understanding of use of various measuring techniques for measurement of different physical parameters using different classes of transducers.

SYLLABUS:

UNIT-I

Block Schematics of Measuring Systems and Performance Metrics: Performance Characteristics, Static Characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag.

UNIT-II

Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary Waveform Generator, and Specifications.

UNIT-III

Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments. CRT, Block Schematic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes.

UNIT-IV

Recorders: X-Y Plotter, Curve tracer, Galvanometric Recorders, Servo transducers, pen driving mechanisms, Magnetic Recording, Magnetic recording techniques.

UNIT-V

Transducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperature sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

TEXT BOOKS:

1. Electronic Measurements and Instrumentation: B.M. Oliver, J.M. Cage TMH Reprint 2009.
2. Electronic Instrumentation: H.S.Kalsi – TMH, 2nd Edition 2004.

REFERENCE BOOKS:

1. Electronic Instrumentation and Measurements – David A. Bell, Oxford Univ. Press, 1997.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI 5th Edition 2003.
3. Electronic Measurements and Instrumentation – K. Lal Kishore, Pearson Education 2010.
4. Industrial Instrumentation: T.R. Padmanabham Springer 2009.

COURSE OUTCOMES:

On completion of this course student can be able to

1. Identify the various electronic instruments based on their specifications for carrying out a particular task of measurement.
2. Measure various physical parameters by appropriately selecting the transducers.
3. Use various types of signal generators, signal analyzers for generating and analyzing various real-time signals

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III Year B.Tech-I Sem

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OPEN ELECTIVE – I
(CS0561) OOPS THROUGH JAVA
(OFFERED TO OTHER DEPARTMENTS)

PRE-REQUISITE:

1. A course on "Computer Programming & Data Structures"

COURSE OBJECTIVE:

This course aims at introducing the object oriented programming concepts using the java language and the design of graphical user interface using applets and swings

SYLLABUS:

UNIT – I

Object oriented thinking and Java Basics- Need for oop paradigm, summary of oop concepts, coping with complexity, abstraction mechanisms. A way of viewing world – Agents, responsibility, messages, methods, History of Java, Java buzzwords, data types, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and casting, simple java program, concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, method binding, inheritance, overriding and exceptions, parameter passing, recursion, nested and inner classes, exploring string class.

UNIT – II

Inheritance, Packages and Interfaces – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes, the Object class. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces, Exploring java.io.

UNIT – III

Exception handling and Multithreading-- Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. String handling,Exploring java.util.Differences between multi threading and multitasking, thread life cycle, creating threads, thread priorities, synchronizing threads, inter thread communication, thread groups, daemon threads. Enumerations, auto boxing, annotations, generics.

UNIT – IV

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes. The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT – V

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets. Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

TEXT BOOKS:

1. Java the complete reference, 7th editon, Herbert Schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, Pearson Education.

REFERENCE BOOKS:

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. An introduction to Java programming and object oriented application development, R.A. Johnson- Thomson.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define the applications for a range of problems using object- oriented programming techniques

CO2: Illustrate the packages and interfaces

CO3: Apply exception handling, event handling and multithreading

CO4: Design simple Graphical User Interface applications

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OPEN ELECTIVE – I
(CS0562) COMPUTER GRAPHICS
(OFFERED TO OTHER DEPARTMENTS)

PRE-REQUISITES:

1. Familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.
2. A course on "Computer Programming and Data Structures"

COURSE OBJECTIVE:

The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics

SYLLABUS:

UNIT-I

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices, Output primitives: Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid-point circle and ellipse algorithms Filled area primitives: Scan-line polygon fills algorithm, boundary-fill and flood-fill algorithms.

UNIT-II

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems, 2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm, Polygon Filling.

UNIT-III

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications, Visible surface detection methods: Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP-tree methods, area sub- division and octree methods.

TEXT BOOKS:

1. "Computer Graphics C version", Donald Hearn and M.Pauline Baker, Pearson Education
2. "Computer Graphics Principles & practice", second edition in C, Foley, Van Dam, Feiner and Hughes, Pearson Education.
3. Computer Graphics, Steven Harrington, TMH

REFERENCE BOOKS:

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe the relevant mathematics of computer graphics

CO2: Illustrate the basic graphics application programs, including animation

CO3: Design applications that display graphic images to given specifications

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III Year B.Tech. CSE I-Sem

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(CS0544) DATA BASE MANAGEMENT SYSTEMS LAB

CO-REQUISITE:

1. A course on “Database Management Systems”

COURSE OBJECTIVE:

This lab course is intended to describe the SQL basics for data definition, data manipulation and introduce ER data model, database design and normalization

LIST OF EXPERIMENTS:

1) Concept design with E-R Model
2) Relational Model
3) Normalization
4) Practicing DDL commands
5) Practicing DML commands
6) Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7) Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8) Triggers (Creation of insert trigger, delete trigger, update trigger)
9) Procedures
10) Usage of Cursors

TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO1: Define database schema for a given application and apply normalization
CO2: Discuss skills in using SQL commands for data definition and data manipulation
CO3: Prepare solutions for database applications using procedures, cursors and triggers

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III Year B.Tech. CSE I-Sem

L	T	P	C
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(CS0545) COMPILER DESIGN LAB

PRE-REQUISITES:

1. A course on “Formal Languages and Automata Theory”
2. A course on “Computer Organization and Architecture”
3. A course on “Computer Programming and Data Structures”

CO-REQUISITE:

A course on “Compiler Design”

COURSE OBJECTIVE:

This lab course aims at providing practical programming skills necessary for constructing a compiler

LIST OF EXPERIMENTS:-

1. Design a DFA to accept all strings containing a substring(01)
2. Write a LEX Program to scan reserved word & Identifiers of C Language
3. Write a LEX Program to scan integers as Float Numbers in C Language
4. Implement Predictive Parsing algorithm
5. Implement RD Parser for the Grammar S->AB
   A->a/ε B->b/ε
6. Write a C program to generate three address code.
7. Implement SLR(1) Parsing algorithm
8. Write a YACC program to parse the Strings.

TEXT BOOKS:

1. Compilers: Principles, Techniques and Tools: Alfred V.Aho,Ravi Sethi, Jeffrey D. Ullman; Pearson Education
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

REFERENCE BOOKS:

1. lex & yacc – John R. Levine, Tony Mason, Doug Brown, O’reilly
2. Modern Compiler Design- Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler-Cooper & Linda, Elsevier.
4. Compiler Construction, Louden, Thomson.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO1: Define a compiler given a set of language features.

CO2: Identify patterns, tokens & regular expressions for lexical analysis.

CO3: Compute lex tool & yacc tool to devleop a scanner & parser.

CO4: Analyze LL(1), SLR, LR(1), LALR and operator precedence parsers

CO5: Generate the intermediate code

III Year B.Tech. CSE I-Sem

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(CS0546) COMPUTER NETWORKS LAB

PRE-REQUISITES:

1. A course on "Computer Programming and Data Structures"
2. A course on "Design and Analysis of Algorithms"

CO-REQUISITE:

1. A course on "Computer Networks"

COURSE OBJECTIVE:

This lab course is intended to provide practical exposure of the concepts , designing, modeling, and evaluation in computer networks

LIST OF EXPERIMENTS:-

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijkstra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement instance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption.
8. Using a simulation software
   i. Create a scenario and study the performance of CSMA/CD protocol
   ii. Create a scenario and study the performance of token bus and token ring
   iii. Study Transmission Control Protocol

TEXT BOOK:

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S.Keshav,2nd Edition,Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO1: Describe data link layer farming methods

CO2: Classify error correction and detection techniques and design data link layer protocols

CO3: Employ routing and congestion algorithms and also generate encryption algorithms

CO4: Test the network scenario and study the performance of computer networks and protocols

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III Year B.Tech. CSE II-Sem

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(CS0641) DATA WAREHOUSING AND DATAMINING

PRE-REQUISITES:

1. A Course on "Database Management Systems"
2. A Course on "Probability and Statistics"

COURSE OBJECTIVE:

The course aims at providing the student with the concepts related to data warehousing, online analytical processing (OLAP) and various techniques used for the functionalities of data mining

SYLLABUS:

UNIT-I
DATA MINING

Data-Types of Data-, Data Mining Functionalities- Interestingness Patterns-Classification of Data Mining systems- Data mining Task primitives -Integration of Data mining system with a Data warehouse-Major issues in Data Mining-Data Preprocessing.

UNIT-II
DATA WAREHOUSE AND BUSINESS ANALYSIS

Data Warehouse-Data Warehouse Architecture- Multidimensional Data Model-Data cube and OLAP Technology-Data Warehouse Implementation -DBMS schemas for Decision support - Efficient methods for Data cube computation.

UNIT-III
ASSOCIATION RULE MINING AND CLASSIFICATION

Mining Frequent Patterns-Associations and correlations- Mining Methods- Mining Various kinds of Association Rules- Correlation Analysis- Constraint based Association mining.- Classification and Prediction**-** Basic concepts-Decision tree induction-Bayesian classification, Rule-based classification - classification by Back propagation,-Support vector machines-Associative Classification, Lazy learners-Other classification methods – Prediction.

UNIT-IV
CLUSTERING AND APPLICATIONS

Cluster analysis-Types of Data in Cluster Analysis-Categorization of Major Clustering Methods- Partitioning Methods,-Hierarchical Methods- Density-Based Methods,-Grid-Based Methods,-Model-Based Clustering Methods- Clustering high dimensional data-Constraint- Based cluster analysis-Outlier Analysis.

UNIT-V

MINING DATA STREAMS, TIME-SERIES AND SEQUENCE DATA

Basic concepts- Mining data streams-Mining Time-series data--Mining sequence patterns in Transactional databases-.Mining Object- Spatial- Multimedia-Text and Web data**-** Spatial Data mining- Multimedia Data mining--Text Mining- Mining the World Wide Web.

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - Jiawei Han & Micheline Kamber, Elsevier.
2. Data Warehousing, Data Mining &OLAP- Alex Berson and Stephen J. Smith- Tata McGraw-Hill Edition, Tenth reprint 2007

REFERENCE BOOKS:

1. Building the DataWarehouse- W. H. Inmon, Wiley Dreamtech India Pvt. Ltd..
2. Data Mining Introductory and Advanced topics –Margaret H Dunham, Pea.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system

CO2: Discuss preprocessing statistical methods for any given raw data

CO3: Produce interesting patterns from large amounts of data that can be used for further analysis

CO4: Evaluate the accuracy of supervised and unsupervised models and algorithms

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III Year B.Tech. CSE II-Sem

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(IT0641) WEB TECHNOLOGIES

COURSE OBJECTIVES:

- To learn the basic web concepts and Internet protocols
- To introduce XML and processing of XML data
- To introduce client side scripting with Javascript and DHTML
- To introduce server side programming with Java Servlets and JSP

SYLLABUS:

UNIT-I

INTRODUCTION: Web Essentials - Clients, Servers and Communication:
The Internet, Basic Internet Protocols: TCP/IP, UDP, DNS, The World Wide Web: Hypertext Transport Protocol, HTTP Request Message, HTTP Response Message, Web Clients, Web Servers.
Markup Languages - HTML: Basic Tags, Forms, Style sheets

UNIT-II

Client-Side Programming - Introduction to JavaScript, JavaScript in Perspective, Basic Syntax, Variables and Data Types, Statements, Operators, Literals, Functions, Objects, Arrays, Built-in Objects, JavaScript Debuggers.
Host Objects - Browsers and the DOM: Introduction to the Document Object Model, Intrinsic Event Handling, Modifying Element Style, the Document Tree, DOM Event Handling.

UNIT-III

Server-Side Programming - Java Servlets: Servlet Architecture, Servlets Generating Dynamic Content, Servlet Life Cycle, Parameter Data, Sessions, Cookies, URL Rewriting, Case Study.

UNIT-IV:

Representing Web Data XML: XML Documents and Vocabularies, XML Versions and the XML Declaration, XML Namespaces, DOM-Based XML Processing, Event-oriented Parsing: SAX, Transforming XML Documents, Selecting XML Data: XPath, Template-based Transformation: XSLT, Displaying XML Documents in Browsers, Case Study.

UNIT-V:

Separating Programming and Presentation - JSP Technology: Introduction to Java Server Pages, Running JSP Applications, Basic JSP, JavaBeans Classes and JSP, Tag Libraries and Files, Support for the Model-View-Controller Paradigm, Case Study.

TEXT BOOK:

1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education.

REFERENCE BOOKS:

1. Deitel H.M. and Deitel P.J., "Internet and World Wide Web How to program", Pearson International, 2012, 4th Edition.
2. J2EE: The complete Reference By James Keogh, McGraw-Hill.
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson.
4. Paul Dietel and Harvey Deitel, "Java How to Program", Prentice Hall of India, 8th Edition.
5. Web Technologies, Black Book, Dreamtech Press.
6. Gopalan N.P and Akilandeswari J, "Web Technology", Prentice Hall of India.

COURSE OUTCOMES:

1. Ability to create dynamic and interactive web sites
2. Gain knowledge of client side scripting using javascript and DHTML.
3. Demonstrate understanding of what is XML and how to parse and use XML data
4. Able to do server side programming with Java Servlets and JSP

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
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III Year B.Tech. II –Sem

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PROFESSIONAL ELECTIVE - I
(CS0651) ARTIFICIAL INTELLIGENCE

PRE-REQUISITES:

1. Basic concept of Automation and how it is related to Computer Science.
2. Basic Programming Languages like C, C++ and Java as they give a basic knowledge of writing and executing codes.
3. High level Programming Language i.e. Python, R or any other, most preferable language for Artificial Intelligence is Python because of the high availability of Frameworks and Consistent availability and support.
4. Few concepts of Mathematics like Calculus, Probability, Matrices and Statistics.

COURSE OBJECTIVE:

The aim of the course is to introduce the concepts of state space representation, exhaustive search, and heuristic search together with the time and space complexities

SYLLABUS:

UNIT- I
INTRODUCTION:

AI problems, The Underlying Assumption, AI Techniques, The Level of the Model, Criteria for Success

Problems, Problem Spaces and Search: Defining the Problem as a State Space Search, Production Systems, Problem Characteristics, Production System Characteristics, Issues in the Design of Search Programs

Heuristic Search Techniques:

Generate – and – Test, Hill Climbing, Best – First Search, Problem Reduction, Constraint Satisfaction, and Means-Ends Analysis.

UNIT- II
KNOWLEDGE REPRESENTATION:

Issues in Knowledge Representation, Representing Simple Facts in Predicate Logic, Representing Instance and ISA Relations, Computable Functions and Predicates, Resolution, Natural Deduction

Representing Knowledge Using Rules: Procedural Vs Declarative Knowledge, Logic Programming, Forward Vs Backward Reasoning, Matching, Control Knowledge

Weak Slot – and – Filler Structures: semantic nets, frames

Strong Slot – and – Filler Structures: conceptual dependency, scripts, CYC

UNIT III

REASONING TECHNIQUES:

Introduction to Nonmonotonic reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, Augmenting a Problem Solver, Implementation of Depth First Search and Breadth First Search, Probability and Bayes Theorem, Certainty Factors and Rule-based Systems, Bayesian Networks.

UNIT IV

GAME PLAYING:

Overview, Minimax Search, Alpha – Beta Cutoffs

Planning System: Overview, The Blocks World, Components of a Planning System, Goal Stack Planning, Hierarchical Planning

Understanding: Understanding as constraint satisfaction, Waltz Algorithm

Natural Language Processing: Introduction, Syntactic Processing, Augmented Transition Networks, Semantic Analysis

UNIT V

LEARNING:

What Is Learning? Rote Learning, Learning by Taking Advice, Learning in Problem Solving, Learning from Examples, Winston's Learning Program, Decision Trees

Expert Systems: Representing and Using Domain Knowledge, Shell, Explanation, Knowledge Acquisition.

TEXT BOOK:

1) Artificial Intelligence" 3rd Edn. , E.Rich and K.Knight (TMH)

REFERENCE BOOKS:

1) Artificial Intelligence A Modern Approach, Second Edition, Stuart Russell, Peter Norvig, PHI/ Pearson Education.
2) Artificial Intelligence and Expert systems – Patterson PHI

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe an efficient problem space for a problem expressed in natural language

CO2: Express search algorithm for a problem and estimate its time and space complexities

CO3: Choose the skill for representing List using the appropriate technique for a given problem

CO4: Apply AI techniques to solve problems of game playing, expert systems, machine learning and natural language processing

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PROFESSIONAL ELECTIVE - I
(CS0652) COMPUTER GRAPHICS

PRE-REQUISITES:

1. Familiarity with the theory and use of coordinate geometry and of linear algebra such as matrix multiplication.
2. A course on "Computer Programming and Data Structures"

COURSE OBJECTIVE:

The aim of this course is to provide an introduction of fundamental concepts and theory of computer graphics and input devices, geometric representations and transformations

SYLLABUS:

UNIT-I

Introduction: Application areas of Computer Graphics, overview of graphics systems, video-display devices, raster-scan systems, random scan systems, graphics monitors and work stations and input devices

Output primitives: Points and lines, line drawing algorithms (Bresenham's and DDA Algorithm), mid-point circle and ellipse algorithms

Filled area primitives: Scan-line polygon fills algorithm, boundary-fill and flood-fill algorithms

UNIT-II

2-D geometrical transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems

2-D viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm, Polygon Filling

UNIT-III

3-D object representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon rendering methods.

UNIT-IV

3-D Geometric transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3D Viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

UNIT-V

Computer animation: Design of animation sequence, general computer animation functions, raster animation, computer animation languages, key frame systems, motion specifications

Visible surface detection methods: Classification, back-face detection, depth-buffer, scan- line, depth sorting, BSP-tree methods, area sub-division and octree methods

TEXT BOOKS:

1. "Computer Graphics C version", Donald Hearn and M.Pauline Baker, Pearson Education
2. "Computer Graphics Principles & practice", second edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
3. Computer Graphics, Steven Harrington, TMH

REFERENCE BOOKS:

1. Procedural elements for Computer Graphics, David F Rogers, Tata Mc Graw hill, 2nd edition.
2. Principles of Interactive Computer Graphics", Neuman and Sproul, TMH.
3. Principles of Computer Graphics, Shalini Govil, Pai, 2005, Springer.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Identify the basics with the relevant mathematics of computer graphics

CO2: Explain the basic graphics application programs, including animations

CO3: Choose applications that display graphic images to given specifications

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PROFESSIONAL ELECTIVE -I
(CS0653) SOFTWARE PROJECT MANAGEMENT

PRE-REQUISITES:

1. Understanding the specific roles within a software organization as related to project and process
   Management.
2. Understanding the basic infrastructure competences(e.g. process modeling and measurement)

COURSE OBJECTIVE:

This course is intended to describe and determine the purpose and importance of project management from the perspective of planning, tracking and completion of project

SYLLABUS:

UNIT -I

Conventional Software Management: The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software economics, pragmatic software cost estimation.

UNIT-II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections. **The old way and the new:** The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT- III

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts. **Model based software architectures:** A Management perspective and technical perspective. **Work Flows of the process:** Software process workflows, Iteration workflows.

UNIT- IV

Checkpoints of the process: Major milestones, Minor Milestones, Periodic status assessments. Iterative Process Planning**:** work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation**:** Automation building blocks, The Project Environment.

UNIT- V

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation. Tailoring the Process**:** Process discriminates.

Future Software Project Management: modern Project Profiles, Next generation Software economics, modern process transitions.

Case Study: The command Center Processing and Display system-Replacement(CCPDS- R).

TEXT BOOK:

1. Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCE BOOKS:

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe software economics, phases in the life cycle of software development, project organization, and project control and process instrumentation

CO2: Identify the major and minor milestones, artifacts and metrics from management and technical perspective

CO3: Produce software product using conventional and modern principles of software project management

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4	0	0	4

PROFESSIONAL ELECTIVE -I
(CS0654) SPEECH PROCESSING

PRE-REQUISITES:

1. A course on "Mathematics I"
2. A course on "Computer Oriented Statistical Methods"
3. Generally, a basic knowledge of signals and systems, linear algebra, and probability and statistics and programming experience in a high-level language is required.

COURSE OBJECTIVE:

The aim of the course is to describe the fundamental concepts of speech production and speech perception

SYLLABUS:

UNIT-I

Fundamentals of Digital Speech Processing: Anatomy & Physiology of Speech Organs, The process of Speech Production, Acoustic Phonetics, Articulatory Phonetics, The Acoustic Theory of Speech Production- Uniform Lossless Tube Model, Effect of Losses In Vocal Tract, Effect of Radiation at Lips, Digital Models for speech Signals.

UNIT-II

ime Domain Models for Speech Processing: Introduction, Window Considerations, Short-Time-Energy and Average Magnitude Short Time Average Zero Crossing Rate, Speech Vs Silence Discrimination Using Energy and Zero Crossing, Pitch Period Estimation using a Parallel Processing Approach, The Short Time Autocorrelation Function, The Short Time Average Magnitude Difference Function, Pitch Period Estimation using The Autocorrelation Function.

UNIT-III

Linear Predictive Coding (LPC) Analysis: Basic Principles of Linear Predictive Analysis, The Autocorrelation Method, The Covariance Method, Solution of LPC Equations: Cholesky Decomposition Solution for Covariance Method, Durbin's Recursive Solution For the Autocorrelation Equations, Comparison between the Methods of Solution of the LPC Analysis Equations, Applications of LPC Parameters: Pitch Detection Using LPC Parameters, Formant Analysis Using LPC Parameters.

UNIT-IV

Homomorphic Speech Processing: Introduction, Homomorphic Systems for Convolution: Properties of the Complex Cepstrum, Computational Considerations, The Complex Cepstrum of Speech, Pitch Detection, Formant Estimation, The homomorphic Vocoder Speech Enhancement: Nature of Interfering Sounds, Speech Enhancement Techniques: Single Microphone Approach: Spectral Subtraction, Enhancement by Re-synthesis, Combo Filter, Wiener Filter, Multi Microphone Approach.

UNIT-V

Automatic Speech & Speaker Recognition: Basic Pattern Recognition Approaches, Parametric Representation of Speech, Evaluating the Similarity of Speech Patterns, Isolated Digit Recognition System, Continuous Digit Recognition System, Hidden Markov Model (HMM) For Speech: Hidden Markov Model (HMM) for Speech Recognition, Viterbi algorithm, Training and Testing using HMMS, Speaker Recognition: Recognition techniques, Features That Distinguish Speaker, Speaker Recognition Systems: Speaker Verification System, Speaker Identification System.

TEXT BOOKS:

1. Digital Processing of Speech Signals: L.R Rabiner and R W Jhaung, 1978, Pearson Education.
2. Digital Processing of Speech Signals: L.R. Rabiner and S. W. Schafer, Pearson Education.
3. Speech Communications: Human & Machine - Douglas O'Shaughnessy, 2nd Ed., Wiley India, 2000.

REFERENCE BOOKS:

1. Discrete Time Speech Signal Processing: Principles and Practice - Thomas F. Quateri, 1st Ed., PE.
2. Speech & Audio Signal Processing: Ben Gold & Nelson Morgan, 1st Ed., Wiley.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe the mechanisms of speech production

CO2: Recognize speech sound from the acoustic characteristics

CO3: Apply the speech signal in time and frequency domains, and in terms of the parameters of a source-filter model

CO4: Examine methods for speech enhancement and design a simple speech processing System

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PROFESSIONAL ELECTIVE-I
(CS0655) PRINCIPLES OF PROGRAMMING LANGUAGES

PRE-REQUISITES:

1. A course on "Mathematical Foundations of Computer Science"
2. A course on "Computer Programming and Data Structures"

COURSE OBJECTIVE:

This course aims at introducing the important paradigms of programming languages and also provides conceptual understanding of high level language design and implementation

SYLLABUS:

UNIT-I

Preliminary Concepts: reasons for studying concepts of programming languages, programming domains, language evaluation criteria, influences on language design, language categories, language design trade-offs, implementation methods, programming environments Major Programming Languages –LISP, ALGOL-60, COBOL, BASIC, PL/I, APL, SNOBOL, SIMULA67, ALGOL 68, Prolog, Ada, C++, Java, Scripting Languages, C#, Markup/Programming Hybrid Languages.

Syntax and Semantics: general problem of describing syntax and semantics, formal methods of describing syntax attribute grammars, describing the meanings of programs.

UNIT-II

Names, Bindings, and Scopes: introduction, names, variables, concept of binding, scope, scope and lifetime, referencing environments, named constants

Data types: introduction, primitive, character string types, user defined ordinal types, array, associative arrays, record, union, tuple types, list types, pointer and reference types, type checking, strong typing, type equivalence

Expressions and Statements: arithmetic expressions, overloaded

Operators, type conversions, relational and Boolean expressions, short circuit evaluation, assignment statements, mixed-mode assignment

Control Structures – introduction, selection statements, and iterative statements, unconditional branching, guarded commands.

UNIT-III

Subprograms and Blocks: Fundamentals of sub-programs, design issues for subprograms, local referencing environments, parameter passing methods, parameters

that are subprograms, calling subprograms indirectly, overloaded subprograms, generic subprograms, design issues for functions, user defined overloaded operators, closures, co routines Implementing subprograms: general semantics of calls and returns, implementing simple subprograms, implementing subprograms with stack-dynamic local variables, nested subprograms, blocks, implementing dynamic scoping.
Abstract Data types: The concept of abstraction, introductions to data abstraction, design issues, language examples, parameterized ADT, encapsulation constructs, naming encapsulations.

UNIT-IV

Concurrency: introduction, introduction to subprogram level concurrency, semaphores, monitors, message passing, Java threads, concurrency in function languages, statement level concurrency.
Exception Handling and Event Handling: Introduction, exception handling in Ada, C++, Java, introduction to event handling, event handling with Java and C#.

UNIT-V

Functional Programming Languages: Introduction, mathematical functions, fundamentals of functional programming language, LISP, support for functional programming in primarily imperative languages, comparison of functional and imperative languages
Logic Programming Language: Introduction, an overview of logic programming, basic elements of prolog, applications of logic programming.
Scripting Language: Pragmatics, Key Concepts, Case Study: Python – Values and Types, Variables , Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library. (Text Book 2)

TEXT BOOKS:

1. Concepts of Programming Languages Robert .W. Sebesta 10/e, Pearson Education.
2. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech, 2007.

REFERENCE BOOKS:

1. Programming Languages, 2nd Edition, A.B. Tucker, R.E. Noonan, TMH.
2. ProgrammingLanguages,K.C.Louden,2nd Edition, Thomson,2003.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Acquire the skills for expressing syntax and semantics in formal notation

CO2: Identify and apply a suitable programming paradigm for a given computing application

CO3: Compare the features of various programming languages

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III Year B.Tech. II –Sem

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PROFESSIONAL ELECTIVE-II
(CS0656) MACHINE LEARNING AND PATTERN RECOGNITION

PRE-REQUISITES:

1. Students are expected to have knowledge in linear signals and systems, Fourier Transform, basic concepts of linear algebra, probability theory and programming techniques; knowledge of Digital Signal Processing is desirable.
2. A course on “Computational Mathematics”
3. A course on “Computer Oriented Statistical Methods”

COURSE OBJECTIVE:

This course provides a comprehensive study of application-oriented machine learning and pattern recognition techniques

SYLLABUS:

UNIT-I

Introduction: What is Pattern Recognition, Data Sets for Pattern Recognition, and Different Paradigms for Pattern Recognition?

Representation: Data Structures for Pattern Representation, Representation of Clusters, Proximity Measures, Size of Patterns, Abstractions of the Data Set, Feature Extraction, Feature Selection, Evaluation of Classifier, Evaluation of Clustering.

UNIT-II

Nearest Neighbor Based Classifier: Nearest Neighbor Algorithm, Variants of the NN Algorithm use of the Nearest Neighbor Algorithm for Transaction Databases, Efficient Algorithms, Data Reduction, Prototype Selection.

Bayes Classifier: Bayes Theorem, Minimum Error Rate Classifier, Estimation of Probabilities, Comparison with the NNC, Naïve Bayes Classifier, Bayesian Belief Network.

UNIT-III

Hidden Markov Models: Markov Models for Classification, Hidden Morkov Models, Classification using HMMs. **Decision Trees:** Introduction, Decision Tree for Pattern Classification, Construction of Decision Trees, Splitting at the Nodes, Overfitting and Pruning, Examples of Decision Tree Induction.

UNIT-IV

Support Vector Machines: Introduction, Learning the Linear Discriminant Functions, Neural Networks, SVM for Classification.

Combination of Classifiers: Introduction, Methods for Constructing Ensembles of Classifiers, Methods for Combining Classifiers.

UNIT-V

Clustering: Why is Clustering Important, Hierarchical Algorithms, Partitional Clustering, Clustering Large Data Sets.

An Application-Hand Written Digit Recognition: Description of the Digit Data, Pre-processing of Data, Classification Algorithms, Selection of Representative Patterns, Results

TEXT BOOK:

1. Pattern Recognition: An Algorithmic Approach: Murty, M. Narasimha, Devi, V. Susheela, Spinger Pub,1st Ed.

REFERENCE BOOKS:

1. Machine Learning - Mc Graw Hill, Tom M. Mitchell.
2. Fundamentals Of Speech Recognition: Lawrence Rabiner and Biing- Hwang Juang. Prentice-Hall Pub.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Identify the theory, benefits, inadequacies and possible applications of various machine learning and pattern recognition algorithms

CO2: Employ suitable machine learning techniques in classification

CO3: Contrast the categorization of clustering and decision problems

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PROFESSIONAL ELECTIVE-II
(CS0657) SOFTWARE TESTING METHODOLOGIES

PRE-REQUISITE:

1. A course on “Software Engineering”

COURSE OBJECTIVE:

This course is intended to discuss various software testing issues and solutions in software and thus gain software testing experience

SYLLABUS:

UNIT-I

Introduction:- Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.

Flow graphs and Path testing:- Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT-II

Transaction Flow Testing:-transaction flows, transaction flow testing techniques.

Dataflow testing:- Basics of data flow testing, strategies in data flow testing, application of dataflow testing.

Domain Testing:-domains and paths, nice & ugly domains, domain testing, domains and interfaces’ testing, domain and interface testing, domains and testability.

UNIT-III

Paths, Path products and Regular expressions:- path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing:- overview, decision tables, path expressions, kv charts, specifications.

UNIT-IV

State, State Graphs and Transition testing:- state graphs, good & bad state graphs, state testing, Testability tips.

UNIT-V

Graph Matrices and Application:-Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

TEXT BOOKS:

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr.K.V.K.K.Prasad, Dreamtech.

REFERENCE BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define software testing, engineering methods and modern software testing tools

CO2: Identify and conduct a test process for a software testing project

CO3: Analyze the process of testing and various methodologies in testing for developing software

CO4: Design and develop the best test strategies in accordance to the development model

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III Year B.Tech. II –Sem

L	T	P	C
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PROFESSIONAL ELECTIVE-II
(CS0658) SOCIAL NETWORK ANALYSIS

PRE-REQUISITES:

1. A course on “Web Technologies”
2. A course on “Computer Networks”
3. A course on “Data Warehousing and Data Mining”
4. A course on “Network Security & Cryptography”
5. A course on “Human Values and Professional Ethics”

COURSE OBJECTIVE:

This course introduces the concepts of social media and provides the mechanisms for social network analysis that allow for better visualization and analysis of widely used services such as email, Wikis, Twitter, flickr, YouTube, etc.

SYLLABUS:

UNIT-I

Introduction: Social Media and Social Networks

Social Media: New Technologies of Collaboration

Social Network Analysis: Measuring, Mapping, and Modeling collections of Connections.

UNIT-II

NodeXL, Layout, Visual Design, and Labeling, Calculating and Visualizing Network Metrics, Preparing Data and Filtering, Clustering and Grouping.

UNIT-III

CASE STUDIES-I:

Email: The lifeblood of Modern Communication**.**

Thread Networks: Mapping Message Boards and Email Lists

Twitter: Conversation, Entertainment and Information.

UNIT-IV

CASE STUDIES-II:

Visualizing and Interpreting Face Book Networks, WWW Hyperlink Networks

Flickr: Linking People, Photos, Tags

UNIT-V

CASE STUDIES-III:

You Tube: Contrasting Patterns of Content Interaction, and Prominence**.**

Wiki Networks: Connections of Creativity and Collaboration

TEXT BOOKS:

1. Hansen, Derek, Ben Sheiderman, Marc Smith, Analyzing Social Media Networks with NodeXL: Insights from a Connected World, Morgan Kaufmann, 2011.
2. Avinash Kaushik, Web Analytics 2.0: The Art of Online Accountability, Sybex, 2009.
3. Marshall Sponder, Social Media Analytics: Effective Tools for Building, Interpreting and Using Metrics, 1stEdition, MGH, 2011.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define the concepts of social media and be aware of mappings & connections in networks

CO2: Classify the layout, design and processing of data in social network

CO3: Analyze the case studies

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III Year B.Tech. II –Sem

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PROFESSIONAL ELECTIVE-II
(EC0652) DIGITAL IMAGE PROCESSING

PRE-REQUISITES: NIL

COURSE OBJECTIVES:

1. To comprehend the relation between human visual system and machine perception and processing of digital images.
2. To provide a detailed approach towards image processing applications like enhancement, segmentation and compression.

SYLLABUS:

UNIT-I

Digital Image Fundamentals & Image Transforms: Digital Image Fundamentals, Sampling and Quantization, Relationship between Pixels.

Image Transforms: 2-D FFT, Properties, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar Transform, Slant Transform, Hotelling Transform.

UNIT-II

Image Enhancement (Spatial Domain): Introduction, Image Enhancement in Spatial Domain, Enhancement Through Point Processing, Types of Point Processing, Histogram Manipulation, Linear and Non – Linear Gray Level Transformation, Local or Neighborhood creterion, Median Filter, Spatial Domain High-Pass Filtering.

Image Enhancement (Frequency Domain): Filtering in Frequency Domain, Low Pass (Smoothing) and High Pass (Sharpening) Filters in Frequency Domain.

UNIT -III

Image Restoration: Degradation Model, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT -IV

Image Segmentation: Detection of Discontinuities, Edge Linking And Boundary Detection, thresholding, Region Oriented Segmentation.

Morphological Image Processing: Dilation and Erosion: Dilation, Structuring Element Decomposition, Erosion, Combining Dilation and Erosion, Opening and Closing, Hit or Miss Transformation.

UNIT -V

Image Compression: Redundancies and their Removal Methods, Fidelity Criteria, Image Compression Models, Huffman and Arithmetic Coding, Error Free Compression, Lossy Compression, Lossy and Lossless Predictive Coding, Transform Based Compression, JPEG 2000 Standards.

TEXT BOOKS:

1. Digital Image Processing - Rafael C. Gonzalez, Richard E. Woods, 3rd Edition, Pearson, 2008
2. Digital Image Processing- S Jayaraman, S Esakkirajan, T Veerakumar- TMH, 2010.

REFERENCE BOOKS:

1. Digital Image Processing and Analysis-Human and Computer Vision Application with using CVIP Tools - Scotte Umbaugh, 2nd Ed, CRC Press, 2011
2. Digital Image Processing using MATLAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Eddings, 2nd Edition, TMH, 2010.
3. Fundamentals of Digital Image Processing – A.K.Jain , PHI, 1989
4. Digital Image Processing and Computer Vision – Somka, Hlavac, Boyle- Cengage Learning (Indian edition) 2008.
5. Introductory Computer Vision Imaging Techniques and Solutions- Adrian low, 2008, 2nd Edition
6. Introduction to Image Processing & Analysis – John C. Russ, J. Christian Russ, CRC Press, 2010.
7. Digital Image Processing with MATLAB & Labview – Vipula Singh, Elsevier.

COURSE OUTCOMES:

1. Exploration of the limitations of the computational methods on digital images.
2. Expected to implement the spatial and frequency domain image transforms on enhancement and restoration of images.
3. Elaborate understanding on image enhancement techniques.
4. Expected to define the need for compression and evaluate the basic compression algorithms.

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III YEAR B.Tech -II Sem

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OPEN ELECTIVE -II
(CE0661) ESTIMATION, QUANTITY SURVEY & VALUATION

PRE-REQUISITES:

Surveying, Concrete Technology, Reinforced Concrete Design

COURSE OBJECTIVES:

1. Subject provides the methods for estimation of various construction items in a structure.
2. Cost estimate of buildings requires the knowledge of using SOR & SSR for analysis of rates on various works.

SYLLABUS:

UNIT – I

General items of work in Building – Standard UNITs Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Detailed Estimates of Buildings.

UNIT – II

Reinforcement bar bending and bar requirement schedules

UNIT – III

Earthwork for roads and canals.

UNIT – IV

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT-V

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation -Standard specifications for different items of building construction.

NOTE:

NUMBER OF EXERCISES PROPOSED:

1. Three in flat Roof & one in Sloped Roof
2. Exercises on Data – three Nos.

TEXT BOOKS:

1. Estimating and Costing by B.N. Dutta, UBS publishers, (2012).
2. Estimating and Costing by G.S. Birdie. (2014)

REFERENCE BOOKS:

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1993/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications. (2015).

COURSE OUTCOMES:

Student estimates the cost of different items in Civil Engineering structures and evaluates the total cost.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

III YEAR B.Tech -II Sem

L	T	P	C
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OPEN ELECTIVE-II
(EE0661) DESIGN ESTIMATION AND COSTING OF ELECTRICAL SYSTEMS

PRE-REQUISITE : Power systems-I and Power Systems-II

COURSE OBJECTIVES:

1. To emphasize the estimating and costing aspects of all electrical equipment, installation and designs to analyze the cost viability.
2. To design and estimation of wiring,
3. To design overhead and underground distribution lines, substations and illumination design.

SYLLABUS:

UNIT - I

DESIGN CONSIDERATIONS OF ELECTRICAL INSTALLATIONS: Electric Supply System, Three phase four wire distribution system, Protection of Electric Installation against over load, short circuit and Earth fault, Earthing, General requirements of electrical installations, testing of installations, Indian Electricity rules, Neutral and Earth wire, Types of loads, Systems of wiring, Service connections , Service Mains, Sub-Circuits, Location of Outlets, Location of Control Switches, Location of Main Board and Distribution board, Guide lines for Installation of Fittings, Load Assessment, Permissible voltage drops and sizes of wires, estimating and costing of Electric installations.

UNIT - II

ELECTRICAL INSTALLATION FOR DIFFERENT TYPES OF BUILDINGS AND SMALL INDUSTRIES: Electrical installations for residential buildings – estimating and costing of material, Electrical installations for commercial buildings, Electrical installations for small industries.

UNIT - III

OVERHEAD AND UNDERGROUND TRANSMISSION AND DISTRIBUTION LINES: Introduction, Supports for transmission lines, Distribution lines – Materials used, Underground cables, Mechanical Design of overhead lines, Design of underground cables.

UNIT - IV

SUBSTATIONS: Introduction, Types of substations, Outdoor substation – Pole mounted type, Indoor substations – Floor mounted type.

UNIT – V

DESIGN OF ILLUMINATION SCHEMES: Introduction, Terminology in illumination, laws of illumination, various types of light sources, Practical lighting schemes LED, CFL and OCFL differences.

TEXT BOOKS:

1. Electrical Design Estimating and Costing, K. B. Raina, S. K. BhattAcharya, New Age International Publisher.
2. Design of Electrical Installations, Er. V. K. Jain, Er. Amitabh Bajaj, University Science Press.

REFERENCE BOOKS:

1. Code of practice for Electrical wiring installations,(System voltage not exceeding 650 volts), Indian Standard Institution, IS: 732-1983.
2. Guide for Electrical layout in residential buildings, Indian Standard Institution, IS: 4648-1968.
3. Electrical Installation buildings Indian Standard Institution, IS: 2032.
4. Code of Practice for selection, Installation of Maintenance of fuse (voltage not exceeding 650V), Indian Standard Institution, IS: 3106-1966.
5. Code of Practice for earthling, Indian Standard Institution, IS:3043-1966.
6. Code of Practice for Installation and Maintenance of induction motors, Indian Standard Institution, IS: 900-1965.
7. Code of Practice for electrical wiring, Installations (system voltage not exceeding 650 Volts), Indian Standard Institution, IS: 2274-1963.
8. Electrical Installation, estimating and costing, Gupta J. B., Katson, Ludhiana.

COURSE OUTCOMES:

Students are in a position to understand the design considerations of electrical installations.

1. To design electrical installation for buildings and small industries.
2. To identify and design the various types of light sources for different applications.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
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III YEAR B.Tech -II Sem

L	T	P	C
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OPEN ELECTIVE-II
(EE0662) ENERGY STORAGE SYSTEMS

PRE-REQUISITE: None

COURSE OBJECTIVES:

To enable the student to understand the need for energy storage, devices and technologies available and their applications

SYLLABUS:

UNIT - I

Electrical Energy Storage Technologies: Characteristics of electricity, Electricity and the roles of EES, High generation cost during peak-demand periods, Need for continuous and flexible supply, Long distance between generation and consumption, Congestion in power grids, Transmission by cable.

UNIT - II

Needs for Electrical Energy Storage: Emerging needs for EES, More renewable energy, less fossil fuel, Smart Grid uses, The roles of electrical energy storage technologies, The roles from the viewpoint of a utility, The roles from the viewpoint of consumers, The roles from the viewpoint of generators of renewable energy.

UNIT - III

Features of Energy Storage Systems: Classification of EES systems , Mechanical storage systems, Pumped hydro storage (PHS), Compressed air energy storage (CAES), Flywheel energy storage (FES), Electrochemical storage systems, Secondary batteries, Flow batteries, Chemical energy storage, Hydrogen (H2), Synthetic natural gas (SNG).

UNIT - IV

Types of Electrical Energy Storage systems: Electrical storage systems, Double-layer capacitors (DLC) ,Superconducting magnetic energy storage (SMES),Thermal storage systems ,Standards for EES, Technical comparison of EES technologies.

UNIT - V

Applications: Present status of applications, Utility use (conventional power generation, grid operation & service) , Consumer use (uninterruptable power supply for large consumers), New trends in applications ,Renewable energy generation, Smart Grid, Smart Micro grid, Smart House, Electric vehicles, Management and control hierarchy of storage systems, Internal configuration of battery storage systems, External connection of EES systems , Aggregating EES systems and distributed generation (Virtual Power Plant), Battery SCADA– aggregation of many dispersed batteries.

TEXT BOOKS:

1. Energy Storage Benefits and Market Analysis' by James M. Eyer, Joseph J. Iannucci and Garth P. Corey.
2. The Electrical Energy Storage by IEC Market Strategy Board.

REFERENCE BOOKS:

1. Jim Eyer, Garth Corey: Energy Storage for the Electricity Grid: Benefits and Market Potential Assessment Guide, Report, Sandia National Laboratories, Feb 2010.

COURSE OUTCOMES:

After this course, the student

- Can analyze the characteristics of energy from various sources and need for storage
- Can classify various types of energy storage and various devices used for the purpose
- Can apply the same concepts to real time problems.

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III YEAR B.Tech -II Sem

L	T	P	C
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OPEN ELECTIVE-II
(EE0663) MECHATRONICS

SYLLABUS:

UNIT – I

INTRODUCTION: Definition – Trends - Control Methods: Standalone , PC Based (Real Time Operating Systems, Graphical User Interface , Simulation) - Applications: identification of sensors and actuators in Washing machine, Automatic Camera, Engine Management, SPM, Robot, CNC, FMS, CIM.

SIGNAL CONDITIONING : Introduction – Hardware - Digital I/O , Analog input – ADC , resolution, Filtering Noise using passive components – Registors, capacitors - Amplifying signals using OP amps –Software - Digital Signal Processing – Low pass , high pass , notch filtering

UNIT – II

PRECISION MECHANICAL SYSTEMS: Modern CNC Machines – Design aspects in machine structures, guideways, feed drives, spindle and spindle bearings, measuring systems, control software and operator interface, gauging and tool monitoring.

ELECTRONIC INTERFACE SUBSYSTEMS: TTL, CMOS interfacing - Sensor interfacing – Actuator interfacing – solenoids , motors Isolation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers, over current sensing, resetable fuses, thermal dissipation - Power Supply - Bipolar transistors / MOSFETs

UNIT – III

ELECTROMECHANICAL DRIVES: Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives , PWM's - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

MICROCONTROLLERS OVERVIEW: 8051 Microcontroller , micro processor structure – Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications. Programming – Assembly, C (LED Blinking , Voltage measurement using ADC).

UNIT – IV

PROGRAMMABLE LOGIC CONTROLLERS: Basic Structure - Programming : Ladder diagram -Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling -Analog input/output - PLC Selection - Application.

UNIT – V

PROGRAMMABLE MOTION CONTROLLERS: Introduction - System Transfer Function – Laplace transform and its application in analyzing differential equation of a control system - Feedback Devices: Position , Velocity Sensors - Optical Incremental encoders - Proximity Sensors : Inductive , Capacitive, Infrared - Continuous and discrete processes - Control System Performance & tuning - Digital Controllers - P , PI , PID Control - Control modes – Position , Velocity and Torque - Velocity Profiles – Trapezoidal- S. Curve - Electronic Gearing - Controlled Velocity Profile - Multi axis Interpolation , PTP , Linear , Circular - Core functionalities – Home , Record position , GOTO Position - Applications : SPM, Robotics.

TEXT BOOKS:

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
2. Mechatronics by M.D.Singh, J.G.Joshi PHI.
3. Mechatronics HMT

REFERENCE BOOKS :

1. “Designing Intelligent Machines”. open University, London.
2. Michel B. Histand and David G. Alciatore,”
3. Introduction to Mechatronics and Measurement systems, “Tata MC Graw Hill
4. I. C.W. Desi ha, “Control sensors and actuators,” Prentice Hall.
5. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
6. Mechatronics – N. Shanmugam / Anuradha Agencies Publisers.
7. Mechatronics System Design / Devdas shetty /Richard / Thomson.

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III YEAR B.Tech -II Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-II
(ME0661) JET PROPULSION AND ROCKET ENGINEERING

PRE-REQUISITES: None

SYLLABUS:

UNIT - I

Turbo Jet Propulsion System:

Gas turbine cycle analysis – layout of turbo jet engine. Turbo machinery- compressors and turbines, combustor, blade aerodynamics, engine off design performance analysis.

Flight Performance:

Forces acting on vehicle – Basic relations of motion – multi stage vehicles.

UNIT - II

Principles of Jet Propulsion and Rocketry:

Fundamentals of jet propulsion, Rockets and air breathing jet engines – Classification – turbo jet , turbo fan, turbo prop, rocket (Solid and Liquid propellant rockets) and Ramjet engines.

Nozzle Theory and Characteristics Parameters:

Theory of one dimensional convergent – divergent nozzles – aerodynamic choking of nozzles and mass flow through a nozzle – nozzle exhaust velocity – thrust, thrust coefficient, A_c / A_t of a nozzle, Supersonic nozzle shape, non-adapted nozzles, summer field criteria, departure from simple analysis – characteristic parameters – 1) characteristic velocity, 2) specific impulse 3) total impulse 4) relationship between the characteristic parameters 5) nozzle efficiency, combustion efficiency and overall efficiency.

UNIT - III

Aero Thermo Chemistry of The Combustion Products:

Review of properties of mixture of gases – Gibbs – Dalton laws – Equivalent ratio, enthalpy changes in reactions, heat of reaction and heat of formation – calculation of adiabatic flame temperature and specific impulse – frozen and equilibrium flows.

Solid Propulsion System:

Solid propellants – classification, homogeneous and heterogeneous propellants, double base propellant compositions and manufacturing methods. Composite propellant oxidizers and binders. Effect of binder on propellant properties. Burning rate and burning rate laws, factors influencing the burning rate, methods of determining burning rates.

UNIT - IV

Solid propellant rocket engine – internal ballistics, equilibrium motor operation and equilibrium pressure to various parameters. Transient and pseudo equilibrium operation, end burning and burning grains, grain design. Rocket motor hard ware design. Heat transfer considerations in solid rocket motor design. Ignition system, simple pyro devices.

Liquid Rocket Propulsion System:

Liquid propellants – classification, Mono and Bi propellants, Cryogenic and storage propellants, ignition delay of hypergolic propellants, physical and chemical characteristics of liquid propellant. Liquid propellant rocket engine – system layout, pump and pressure feed systems, feed system components. Design of combustion chamber, characteristic length, constructional features, and chamber wall stresses. Heat transfer and cooling aspects. Uncooled engines, injectors – various types, injection patterns, injector characteristics, and atomization and drop size distribution, propellant tank design.

UNIT - V

Ramjet and Integral Rocket Ramjet Propulsion System:

Fuel rich solid propellants, gross thrust, gross thrust coefficient, combustion efficiency of ramjet engine, air intakes and their classification – critical, super critical and sub-critical operation of air intakes, engine intake matching, classification and comparison of IIRR propulsion systems.

TEXT BOOKS:

1. Gas Turbines and propulsive systems-P.Khajuria& S.P.Dubey/Dhanpatrai pub.
2. Gas Dynamics & Space Propulsion M.C.Ramaswamy / Jaico Publishing House.

REFERENCE BOOKS:

1. Rocket propulsion –Sutton
2. Gas Turbines /Cohen, Rogers & Sarvana Muttoo/Addision Wesley & Longman.
   Gas Turbines-V.Ganesan /TMH.

COURSE OUTCOMES:

After doing this course, student should be in position to

1. Understand Turbo Jet Propulsion System
2. Analyse the flight performance
3. Understand Principles of Jet Propulsion and Rocketry & Nozzle Theory and Characteristics
4. Learn the Aero thermo chemistry of the combustion products
5. Understand the physics of Solid propellant rocket engine, Liquid Rocket Propulsion System & Ramjet and Integral Rocket Ramjet Propulsion System

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III YEAR B.Tech -II Sem

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3	0	0	3

OPEN ELECTIVE-II
(ME0662) ERGONOMICS

PRE-REQUISITES: None

COURSE OBJECTIVES:

Provide a broad based introduction to ergonomic principles and their application in the design of work, equipment and the workplace. Consideration is given to musculo-skeletal disorders, manual handling, and ergonomic aspects of the environment as well as to the social and legal aspects.

SYLLABUS:

UNIT - I

Introduction to Ergonomics, Human, Machine Systems, Basic Work Systems, Human Relations and Occupational Psychology, Hawthrone Experiments, Participation, Occupational Medicine, Human Performance Psychology, FMJ versus FJM, Human Factors and Ergonomics. Modern Work Systems and Neo, Taylorism, Attempts to Humanize Work, Generic Tools in Ergonomics, Effectiveness and Cost Effectiveness of Ergonomics in General.

UNIT - II

Design and Evaluation of Manual Handing Tasks, Anatomy and Biomechanics of Manual Handling, Prevention of Manual Handling Injuries in the Workplace, Design of Manual Handling Tasks.

Body Mechanics at Work: Risk Assessment and Design, Low Back Pain, Biomechanics of Spinal Loading, Ergonomics and Musculoskeletal System in General, Effectiveness and Cost Effectiveness.

UNIT - III

Physically Demanding Work: Stress and Fatigue, Physically and Psychologically Demanding Work, Muscles, Structure and Function, and Capacity, Physical work capacity.User, Cantered Workspace Design Anthropometric Data, Statistical Essentials, Types of Anthropometric Data, Applications Of Anthropometry in Design, Multiple Workspace Configurations, Status of Anthropometry in Ergonomics.

UNIT - IV

Human Error, Accidents, and Safety, Micro ergonomics, Human Error, and Accidents, Prevention of Error in Human, Machine Interaction, Macroergonomices: Performance Shaping Factors.

UNIT - V

Visual Environment: Measurements and Design, Vision and the Eye, Measurement of Light, Lighting Design Considerations, Visual figure, Eyestrain, and Near Work, Status of Methods in Risk Assessment and Task design.Hearing, Sound, Noise and Vibration, Measurement of Sound, Hearing Protection, Design of Acoustic Environment.

TEXT BOOK:

1. Introduction to Ergonomics(Third Edition)/ R.S.Bridger/CRC Press , Taylor & Francis Group

REFERENCE BOOKS:

1. Human factors in Engineering and Design/E.J.McCormick/ TMH Edison.
2. Motion and Time Design and Measurement of work/ Barnes Ralph., / John Wiley & sons Newyork, 2002

COURSE OUTCOMES:

On completing this course successfully the student will be able to:

1. Understand and apply ergonomic principles to the creation of safer, healthier and more efficient and effective activities in the workplace;
2. Understand ergonomic risk assessments and appropriate control measures;
3. Understand the causes of upper limb disorders and how to reduce them;
4. Appreciate workplace layout and equipment design;
5. Appreciate environmental aspects of good ergonomic design.

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III YEAR B.Tech -II Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE – II
(EC0661) PRINCIPLES OF ELECTRONIC COMMUNICATIONS

PRE-REQUISITE: Nil

COURSE OBJECTIVES:

The objective of this subject is to:

1. Introduce the students to modulation and various analog and digital modulation schemes.
2. They can have a broad understanding of satellite, optical, cellular, mobile, wireless and telecom concepts.

SYLLABUS:

UNIT - I

INTRODUCTION: Need for Modulation, Frequency translation, Electromagnetic spectrum, Gain, Attenuation and decibels.

UNIT - II

SIMPLE DESCRIPTION ON MODULATION: Analog Modulation-AM, FM, Pulse Modulation-PAM, PWM, PCM, Digital Modulation Techniques-ASK, FSK, PSK, QPSK modulation and demodulation schemes.

UNIT - III

TELECOMMUNICATION SYSTEMS: Telephones Telephone system, Paging systems, Internet Telephony.

NETWORKING AND LOCAL AREA NETWORKS: Network fundamentals, LAN hardware, Ethernet LANs, Token Ring LAN.

UNIT - IV

SATELLITE COMMUNICATION: Satellite Orbits, satellite communication systems, satellite subsystems, Ground Stations Satellite Applications, Global Positioning systems.

OPTICAL COMMUNICATION: Optical Principles, Optical Communication Systems, Fiber –Optic Cables, Optical Transmitters & Receivers, Wavelength Division Multiplexing.

UNIT - V

CELLULAR AND MOBILE COMMUNICATIONS: Cellular telephone systems, AMPS, GSM, CDMA, WCDMA.

WIRELESS TECHNOLOGIES: Wireless LAN, PANs and Bluetooth, ZigBee and Mesh Wireless networks, Wimax and MANs, Infrared wireless, RFID communication, UWB.

TEXT BOOKS:

1. Principles of Electronic Communication Systems, Louis E. Frenzel, 3e, McGraw Hill publications, 2008.
2. Kennady, Davis, Electronic Communications systems, 4e, TMH, 1999

REFERENCE BOOKS:

1. Tarmo Anttalainen, Introduction to Telecommunications Network Engineering, Artech House Telecommunications Library.
2. Theodore Rappaport, Wireless Communications-Principles and practice, Printice Hall, 2002.
3. Roger L. Freeman, Fundamentals of Telecommunications, 2e, Wiley publications.
4. Wayne Tomasi, Introduction to data communications and networking, Pearson Education, 2005.

COURSE OUTCOMES:

By completing this subject, the student can

1. Work on various types of modulations.
2. Should be able to use these communication modules in implementation.
3. Will have a basic understanding of various wireless and cellular, mobile and telephone communication systems.

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III YEAR B.Tech -II Sem

L	T	P	C
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OPEN ELECTIVE-II
(CS0661) CYBER SECURITY

(OFFERED TO OTHER DEPARTMENTS)

PRE-REQUISITE:
1. A Course on “Network Security and Cryptography”

COURSE OBJECTIVE:

The purpose of the course is to educate on cyber security and the legal perspectives of cyber crimes and cyber offenses

SYLLABUS:

UNIT-I

Introduction to Cybercrime:

Introduction, Cybercrime and Information security, who are cyber criminals, Classification of Cyber crimes, Cybercrime: The legal Perspectives and Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cyber crimes. Cyber offenses: How criminals Plan Them Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing.

UNIT-II

Cybercrime: Mobile and Wireless Devices

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops.

Tools and Methods Used in Cyber Crime:

Introduction, Proxy services and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks.

UNIT-III

Cyber crimes and Cyber Security: the LegalPerspectives Introduction Cyber Crime and Legal Landscape around the world, Why Do We Need Cyber laws: The Indian Context, The Indian IT Act, Challenges to Indian Law and Cybercrime Scenario In India, Digital signatures and the Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment Cyber law, Technology and Students: Indian Scenario.

Understanding Computer Forensics:

Introduction, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics Analysis of Email, Digital Forensics Lifecycle, Chain of Custody concept, Network Forensics, Approaching a computer, Forensics Investigation, Challenges in Computer Forensics, Special Tools and Techniques Forensics Auditing.

UNIT-IV

Cyber Security: Organizational Implications

Introduction, cost of cyber crimes and IPR issues, web threats for organizations, security and privacy implications, social media marketing: security risks and perils for organizations, social computing and the associated challenges for organizations.Cybercrime and Cyber terrorism: Introduction, intellectual property in the cyberspace, the ethical dimension of cyber crimes the psychology, mindset and skills of hackers and other cyber criminals.

UNIT-V

Cybercrime: Illustrations, Examples and Mini-Cases Examples:Official Website of Maharashtra Government Hacked, Indian Banks Lose Millions of Rupees, Parliament Attack, Pune City Police Bust Nigerian Racket, e-mail spoofing instances.Mini-Cases:

The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Illustrations of Financial Frauds in Cyber Domain, Digital Signature-Related Crime Scenarios.

TEXT BOOK:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole and Sunil Belapure, Wiley INDIA.

REFERENCE BOOK:

1. Cyber Security Essentials, James Graham, Richard Howard and Ryan Otson, CRC Press.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define the basics of cyber security

CO2: Identify the Indian and Global Act concerning cyber crimes

CO3: Employ security and privacy methods in the development of modern applications such that personal data is protected; and provide safe Internet usage

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

III YEAR B.Tech -II Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-II
(CS0662) DATA BASE MANAGEMENT SYSTEMS

(OFFERED TO OTHER DEPARTMENTS)

PRE-REQUISITE:

1. A course on "Advanced Data Structures"

COURSE OBJECTIVE:

This course aims at providing the basic concepts and the applications of database systems and masters the basics of SQL through query processing

SYLLABUS:

UNIT-I

Database System Applications: database system Vs. file system, view of data, data abstraction, instances and schemas, data models, the ER model, relational model, other models, database languages, DDL, DML, database access for application programs, database users and administrator, transaction management, database system structure, storage manager, the query processor, history of data base systems, data base design and ER diagrams, beyond ER design entities, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER Model, conceptual design for large enterprises.

UNIT-II

Introduction to the Relational Model: integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering**,** tables and views, form of basic SQL query, examples of basic SQL queries, introduction to nested queries, correlated nested queries, set comparison operators, aggregation operators, NULL values, comparison using null values, logical connectivity's, AND, OR and NOT, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL, triggers and active data bases, Oracle, SQL Server, DB2.

UNIT-III

Relational Algebra: Selection and projection, set operations, renaming, Joins, Division, Examples of Algebra overviews, Relational calculus, Tuple relational Calculus, Domain relational calculus, Expressive Power of Algebra and calculus. Schema refinement: Problems caused by redundancy,

decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, dependency preserving decomposition, schema refinement in database design, multi valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT-IV

Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation- Based Protocols, Multiple Granularity. Recovery and Atomicity, Log–Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with loss of nonvolatile storage, Advance Recovery systems, Remote Backup systems.

UNIT-V

Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, Mc Graw hill, V edition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J. Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL,Shah,PHI.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe the fundamentals of DBMS, database design and normal forms

CO2: Identify basics of SQL for retrieval and management of data.

CO3: Choose the basics of transaction processing and concurrency control.

CO4: Model database storage structures and access techniques

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III YEAR B.Tech -II Sem

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OPEN ELECTIVE-II
(MB0661) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES:

Students in this course will be able to

1. Get a holistic understanding of the complexities involved in the process of attributing intellectual property rights to people.
2. Learn the legalities of intellectual property to avoid plagiarism and other IPR relates crimes like copyright infringements, etc.

SYLLABUS:

UNIT-I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international Organizations, agencies and treaties, importance of intellectual property rights.

UNIT-II

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter,
Selecting and evaluating trade mark, trade mark registration processes.

UNIT-III

LAW OF COPY RIGHTS: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right owner ship issues, copy right registration, notice of copy right , international copy right law.
Law of Patents: Foundation of patent law, patent searching process, owner rights and transfer.

UNIT-IV

TRADE SECRETS: Trade secret law, determination of trade secrete status' liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.
UNFAIR COMPETITION: Misappropriation right of publicity, false advertising.

UNIT-V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: new developments in trade mark law; copy right law, patent law, intellectual property audits. International overview on intellectual property, international-trade mark law, copy right law, international patent law, and international development in trade secrets law.

TEXT BOOKS & REFERENCE BOOKS:

1. Intellectual property right, Deborah, E. Bouchoux, cengage learning.
2. Intellectual property right - Unleashing the knowledge economy, prabuddha ganguli, Tata Mc Graw Hill Publishing Company Ltd.

COURSE OUTCOMES:

- Students will be able to understand the basics of the four primary forms of intellectual property rights.
- Students will be able to compare and contrast the different forms of intellectual property protection in terms of their key differences and similarities.
- Students will be able to assess and critique some basic theoretical justifications for each form of intellectual property protection.

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

B.Tech (CSE) III Year II – Sem

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(CS0642) DATA WAREHOUSING AND DATA MINING LAB

PRE-REQUISITE:

1. A course on "Database Management Systems"

CO-REQUISITE:

1. A course on " Data Warehousing and Data Mining"

COURSE OBJECTIVE:

This lab course is intended to provide a hands-on experience using data mining tool, which gives a practical exposure of the concepts involved in data mining algorithms

LIST OF EXPERIMENTS:

Experiments using Weka & Clementine Tools

1. Data Processing Techniques:
   (i) Data cleaning (ii) Data transformation - Normalization
   (iii) Data integration
2. Partitioning - Horizontal, Vertical, Round Robin, Hash based
3. Data Warehouse schemas – star, snowflake, fact constellation
4. Data cube construction – OLAP operations
5. Data Extraction, Transformations & Loading operations
6. Implementation of Attribute oriented induction algorithm
7. Implementation of apriori algorithm
8. Implementation of FP – Growth algorithm
9. Implementation of Decision Tree Induction
10. Calculating Information gain measures
11. Classification of data using Bayesian approach
12. Classification of data using K – nearest neighbour approach
13. Implementation of K – means algorithm
14. Implementation of BIRCH algorithm
15. Implementation of PAM algorithm
16. Implementation of DBSCAN algorithm

TEXT BOOKS:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER, Elsevier.
2. Data Warehousing, Data Mining &OLAP- Alex Berson and Stephen J. Smith- Tata McGraw-Hill Edition, Tenth reprint 2007.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO1: Select the appropriate data sets useful for the application

CO2: Apply preprocessing statistical methods for the selected data sets

CO3: Analyze the interesting patterns obtained by the application of various algorithms

CO4: Evaluate the accuracy of supervised and unsupervised models and algorithms

B.Tech (CSE) III Year II – Sem

L	T	P	C
0	0	3	2

(IT0642) WEB TECHNOLOGIES LAB

CO-REQUISITE:

A course on "Web Technologies"

COURSE OBJECTIVES:

- To provide hands-on experience on web technologies
- To develop client-server application using web technologies
- To introduce server side programming with Java servlets and JSP
- To introduce client side scripting with Javascript and AJAX

LIST OF EXPERIMENTS:

1. Develop static pages (using Only HTML) of an online book store. The pages should resemble: www.amazon.com. The website should consist the following pages.
    a. Home page
    b. Registration and user Login
    c. User Profile Page
    d. Books catalog
    e. Shopping Cart
    f. Payment By credit card
    g. Order Conformation
2. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
3. Create and save an XML document on the server, which contains 10 users information. Write a program, which takes User Id as an input and returns the user details by taking the user information from the XML document.
4. Bean Assignments
    a. Create a JavaBean which gives the exchange value of INR (Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
    b. Create a simple Bean with a label - which is the count of number of clicks. Then create a BeanInfo class, such that only the "count" property is visible in the Property Window.
    c. Create two Beans- a)KeyPad. b)DisplayPad.
    After that integrate the two Beans to make it work as a Calculator.
    d. Create two Beans: Traffic Light(Implemented as a Label with only three background colours - Red,Green,Yellow) and Automobile (Implemented as a TextBox which states its state/movement). The state of the Automobile should depend on the following Light Transition Table.

Light Transition	Automobile State
Red ---> Yellow	Ready
Yellow ---> Green	Move
Green --> Red	Stopped

5. Install TOMCAT web server. Convert the static web pages of assignments 2 into dynamic web pages using servlets and cookies. Hint: Users information (user id, password, credit card number) would be stored in web.xml. Each user should have a separate Shopping Cart.
6. Redo the previous task using JSP by converting the static web pages of assignments 2 into dynamic web pages. Create a database with user information and books information. The books catalogue should be dynamically loaded from the database. Follow the MVC architecture while doing the website.

TEXT BOOK:

1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education

REFERENCE BOOKS :

1. Deitel H.M. and Deitel P.J., “Internet and World Wide Web How to program”, Pearson International, 2012, 4th Edition.
2. J2EE: The complete Reference By James Keogh, McGraw-Hill
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson
4. Paul Dietel and Harvey Deitel, “Java How to Program”, Prentice Hall of India, 8th Edition
5. Web technologies, Black Book, Dreamtech press.
6. Gopalan N.P. and Akilandeswari J., “Web Technology”, Prentice Hall of India

COURSE OUTCOMES:

1. Design and develop interactive and dynamic web applications using HTML, CSS, JavaScript and XML.
2. Apply client-server principles to develop scalable and enterprise web applications.

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B.Tech (CSE) III Year II – Sem

L	T	P	C
0	0	3	1

(HE0631) ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

2. INTRODUCTION

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

- Gathering ideas and information to organize ideas relevantly and coherently.
- Engaging in debates.
- Participating in group discussions.
- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

COURSE OBJECTIVES:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

LEARNING COURSE OUTCOMES:

- Accomplishment of sound vocabulary and its proper use contextually.
- Flair in Writing and felicity in written expression.
- Enhanced job prospects.
- Effective Speaking Abilities

SYLLABUS:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.
2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

MINIMUM REQUIREMENT:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- Spacious room with appropriate acoustics
- Round Tables with movable chairs
- Audio-visual aids
- LCD Projector
- Public Address system
- P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ
- T. V, a digital stereo & Camcorder
- Headphones of High quality

PRESCRIBED LAB MANUAL: A book titled ***A Course Book of Advanced Communication Skills (ACS) Lab*** published by Universities Press, Hyderabad.

SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used:

- **Oxford Advanced Learner's Compass**, 8th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE** (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - **Preparing for being Interviewed**
  - **Positive Thinking**
  - **Interviewing Skills**
  - **Telephone Skills**
  - **Time Management**

BOOKS RECOMMENDED:

1. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. **Advanced Communication Skills Laboratory Manual** by Sudha Rani, D, Pearson Education 2011.
4. **Technical Communication** by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. **Business and Professional Communication:** Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
6. **The Basics of Communication: A Relational Perspective**. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
7. **English Vocabulary in Use** series, Cambridge University Press 2008.
8. **Management Shapers Series** by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
9. **Handbook for Technical Communication** by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
10. **Communication Skills** by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
11. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
12. **Job Hunting** by Colm Downes, Cambridge University Press 2008.
13. **Master Public Speaking** by Anne Nicholls, JAICO Publishing House, 2006.
14. **English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.**
15. Books on **TOEFL/GRE/GMAT/CAT/ IELTS** by Barron's/DELTA/Cambridge University Press.
16. **International English for Call Centres** by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

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IV Year B.Tech. CSE I-Sem

L	T	P	C
3	1	0	4

(CS0741) NETWORK SECURITY & CRYPTOGRAPHY

PRE-REQUISITE:
A Course on "Computer Networks"

COURSE OBJECTIVE:

This course is intended to impart knowledge on network security issues, services, goals and mechanisms and security of communication systems, networks and protocols

SYLLABUS:

UNIT-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.

UNIT-II
Conventional Encryption: Principles, Conventional encryption algorithms (DES, AES, RC4, and Blowfish), cipher block modes of operation, location of encryption devices, key distribution Approaches of Message Authentication, Secure Hash Functions and HMAC.

UNIT-III
Number Theory: Modular Arithmetic, Euclid's Algorithm, Fermat's and Euler's Theorem, Chinese Remainder Theorem, Public key cryptography principles, public key cryptography algorithms, digital signatures, digital Certificates, Certificate Authority and key management Kerberos, X.509 Directory Authentication Service.

UNIT-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.

UNIT-V

Web Security: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET).

Intruders, Viruses and related threats, Firewall Design principles, Trusted Systems, Intrusion Detection Systems.

TEXT BOOKS:

1. "Cryptography and Network Security" by William Stallings 3rd Edition, Pearson Education.
2. "Applied Cryptography" by Bruce Schneier.

REFERENCE BOOK:

1. Cryptography and Network Security by Behrouz A.Forouzan.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define cryptography and network security concepts

CO2: Explain security principles in system design

CO3: Choose and investigate vulnerabilities, security threats and mechanisms to counter them

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IV Year B.Tech. CSE I-Sem **L T P C**
3 1 0 4

(CS0742) GRID & CLOUD COMPUTING

PRE-REQUISITES:

1. A course on “Database Management Systems”
2. A course on “Network Security and Cryptography”
3. A course on “Computer Networks”
4. A course on “Operating Systems”

COURSE OBJECTIVE:

This course provides a comprehensive study of design of cloud computing platforms, service oriented architectures and also concentrates on software environments, grid computing and resource management

SYLLABUS:

UNIT-I

Distributed System Models and Enabling Technologies: scalable computing services over the Internet, technologies for network-based computing, system models for distributed and cloud computing, software environments for distributed systems and clouds, performance, security, and energy-efficiency.

UNIT-II

Design of Cloud Computing Platforms: cloud computing and service models, datacenter design and interconnection networks, architecture design of compute and storage clouds, public cloud platforms, cloud resource management and exchanges, cloud security and trust management.

UNIT-III

Service Oriented Architectures: message-oriented middleware, portals and science gateways, discover, registries, metadata, and databases, workflow in service-oriented architectures.

UNIT-IV

Cloud Programming and Software Environments: features of cloud and grid platforms parallel and distributed programming paradigms, programming support of Google App engine, Amazon Web Services programming, Microsoft Azure programming support, emerging cloud software environments.

UNIT-V

Grid Computing and Resource Management: grid architecture and service modeling, case studies of grid computing systems, grid resource management and brokering, middleware support for grid resource management, grid security infrastructure in GT4.

TEXT BOOK:

1. Kai Hwang, Geoffery C. Fox and Jack J. Dongarra, "Distributed and Cloud Computing: Clusters, Grids, Clouds and the Future of Internet", First Edition, Morgan Kaufman Publisher, an imprint of Elsevier, 2012.

REFERENCE BOOKS:

1. Tom White, "Hadoop The Definitive Guide", First Edition. O'Reilly, 2009.
2. Ian Foster, Carl Kesselman, "The Grid: Blueprint for a New Computing Infrastructure", 2nd Edition, Morgan Kaufmann.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Identify various service delivery models of a cloud computing architecture

CO2: Explain the ways in which the cloud can be programmed and deployed

CO3: Discover the security challenges and address them

CO4: Examine how grid computing helps in solving large scale scientific problems

IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE -III
(IT0758) DESIGN PATTERNS

COURSE OBJECTIVES:

- The aim of the course is to appreciate the idea behind Design Patterns in handling common problems faced during building an application
- This course covers all pattern types from creational to structural, behavioral to concurrency and highlights the scenarios when one pattern must be chosen over others.

SYLLABUS:

UNIT-I

INTRODUCTION: What is a design pattern? design patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT-II

DESIGNING A DOCUMENT EDITOR: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look-and-Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation, Summary.

UNIT-III

CREATIONAL PATTERNS: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.

UNIT-IV

STRUCTURAL PATTERN: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy

UNIT-V

BEHAVIORAL PATTERNS: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, State, Strategy, Template Method, Visitor.

TEXT BOOK:

1. Design Patterns, Erich Gamma, Pearson Education

REFERENCE BOOKS:

1. Pattern's in Java, Vol-I, Mark Grand, Wiley DreamTech.
2. Patterns in Java, Vol-II, Mark Grand, Wiley DreamTech.
3. Java Enterprise Design Patterns Vol-III, Mark Grand, Wiley DreamTech.
4. Head First Design Patterns, Eric Freeman, O'reily publications.

COURSE OUTCOMES:

1. Create software designs that are scalable and easily maintainable
2. Understand the best use of Object Oriented concepts for creating truly OOP programs
3. Use creational design patterns in software design for class instantiation
4. Use structural design patterns for better class and object composition
5. Use behavioral patterns for better organization and communication between the objects
6. Use refactoring to compose the methods for proper code packaging
7. Use refactoring to better organize the class responsibilities of current code

IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE -III
(CS0751) ADVANCED DATABASES

PRE-REQUISITE:

1. A course on “Database Management Systems”

COURSE OBJECTIVE:

The purpose of this course is to enrich the previous knowledge of database systems, prominence the need for distributed database technology and equip students with principles and knowledge of parallel and object oriented databases

SYLLABUS:

UNIT-I

Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.

Distributed DBMS Architecture: Architectural Models for Distributed DBMS, DDMBS Architecture.

Distributed Database Design: Alternative Design Strategies, Distribution Design issues,

Fragmentation, Allocation.

UNIT-II

Query processing and decomposition: Query processing COURSE OBJECTIVES, characterization of query processors, layers of query processing, query decomposition, localization of distributed data.

Distributed query Optimization: Query optimization, centralized query optimization, distributed query optimization algorithms.

UNIT-III

Transaction Management: Definition, properties of transaction, types of transactions, distributed concurrency control: serializability, concurrency control mechanisms & algorithms, time - stamped & optimistic concurrency control Algorithms, deadlock Management.

UNIT –IV

Distributed DBMS Reliability: Reliability concepts and measures, fault-tolerance in distributed systems, failures in Distributed DBMS, local & distributed reliability protocols, site failures and network partitioning.

Parallel Database Systems: Parallel database system architectures, parallel data placement, parallel query processing, load balancing, database clusters.

UNIT-V

Distributed object Database Management Systems: Fundamental object concepts and models, object distributed design, architectural issues, object management, distributed object storage, object query Processing.

Object Oriented Data Model: Inheritance, object identity, persistent programming languages, persistence of objects, comparison OODBMS and ORDBMS.

TEXT BOOKS:

1. M.Tamer OZSU and Patuck Valduriez: Principles of Distributed Database Systems,
   Pearson Edn. Asia, 2001.
2. Stefano Ceri and Giuseppe Pelagatti: Distributed Databases, McGraw Hill.

REFERENCE BOOK:

1. Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom: “Database Systems: The Complete Book”, Second Edition, Pearson International Edition.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Identify theoretical and practical aspects of distributed database systems

CO2: Discuss various issues related to the development of distributed database system

CO3: Analyze the design aspects of object oriented database system and related development

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IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE -III
(CS0752) MOBILE COMPUTING

PRE-REQUISITE:

1. A course on "Computer Networks"

COURSE OBJECTIVE:

The aim of this course is to define the mobile computing paradigm, its novel applications and limitations; describe the typical mobile networking infrastructure through a popular GSM protocol

SYLLABUS:

UNIT-I

Introduction Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS, CSHSD, DECT.

UNIT-II

(Wireless) Medium Access Control (MAC), Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

Mobile Network Layer: IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT-III

Mobile Transport Layer, Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.

Database Issues: Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT-IV

Data Dissemination and Synchronization, Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols

UNIT-V

Mobile Ad hoc Networks (MANETs), Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, Mobile Agents, Service Discovery. Protocols and Platforms for Mobile Computing, WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices, Android.

TEXT BOOKS:

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

REFERENCE BOOKS :

1. "Introduction to Wireless and Mobile Systems" by Dharma Prakash Agarwal and Qing An Zeng.
2. "Mobile Communications Engineering: Theory and Applications" by Willim C Y Lee
3. "Mobile Communications" by Jochen Schiler

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Identify and design new mobile application

CO2: Discuss any new technical issue related to this new paradigm and come up with solution(s)

CO3: Analyze any existing or new protocol related to the mobile environment

CO4: Develop new adhoc network applications and/or algorithms/protocols

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IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE -III
(CS0753) BUSINESS INTELLIGENCE & BIG DATA

PRE-REQUISITE:

1. A course on “Data Mining”

COURSE OBJECTIVE:

The purpose of this course is to provide the students with the knowledge of business intelligence principles & techniques and provide an exposure of the frontiers of bi-intensive big data computing

SYLLABUS:

UNIT-I

Business Intelligence, Data mining and Decision making, Business Intelligence Architecture, Distributed Computing, Cloud and Big Data, Cloud Storage , Virtualization, Cloud Models, Cloud Services.

UNIT-II

Introduction Big Data, Big Data Storage, Big Data Architecture, Big Data Computation, Relational database in Big Data, Google Big Data Services, Open Stock, Microsoft AZURE, Integrating Data source.

UNIT-III

Information Management, Big Data Management, Geo-Spatial Intelligence, Business Analytics, Data Analytics, Big data Analytics, Big Data Technology.

UNIT-IV

Exploring the World of HADOOP, HDFS, Name Nodes, Data Nodes, Map Reduce Programming

UNIT-V

Advanced Analytics, Operational Analytics, Monetizing Analytics, NOKIA, NASA, Consumption of Analytics, 360 Modeling

TEXT BOOKS:

1. Big Data and Big Analytics by Michael Minelli and Michell Chambers
2. Big Data for DUMMIES by Alan Nugent Dr. Fern Halper

REFERENCE BOOKS:

1. Business Intelligence Data Miming and Optimization for decision making [Author: Carlo-Verellis] [Publication: (Wiley)]

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Explain the foundations, definitions, and capabilities of Big Data and Business Intelligence

CO2: Apply Big Data technologies in Business Intelligence

CO3: Write program using HADOOP

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IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE-IV
( ) INFORMATION RETRIEVAL SYSTEMS

COURSE OBJECTIVES:

1. The purpose of the course is to introduce the techniques for retrieving useful information from repositories such as the Web, documents, etc.
2. The course first introduces standard concepts in information retrieval such as documents, queries, collections, and relevance.
3. The course then covers a selection of application areas such as Web search, multimedia searching and indexing.

SYLLABUS:

UNIT-I

INTRODUCTION: Motivation, Basic Concepts, Past-Present and Future, the Retrieval Process

MODELING: Introduction, A Taxonomy of Information retrieval Models, Retrieval: Ad hoc and Filtering, A Formal Characteristics of IR Models, Classic Information Retrieval, Alternative Set Theoretic Models, Alternative Probabilistic Models, Structured Text Retrieval Models, Models for Browsing.

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

TEXT OPERATIONS: Introduction, Document Preprocessing, Document Clustering, Text Compression, Comparing Text Compression Techniques

UNIT-III

INDEXING AND SEARCHING: Introduction, Inverted Files, Other Indices for Text, Boolean queries, Sequential Searching, pattern Matching, Structural Queries, Compression

SEARCHING THE WEB: Introduction, Challenges, Characterizing the Web, Search Engines, Browsing, Met searchers, finding the Needle in the Haystack, Searching Using Hyperlinks

UNIT-IV

USER INTERFACES AND VISUALIZATION: Introduction, human-Computer Interaction, The Information Access Process, Starting Points, Query Specification, Context, User Relevance Judgments, Interface Support for the Search Process.

UNIT-V

MULTIMEDIA IR: Models and Languages: Introduction, Data Modeling, Query Languages

MULTIMEDIA IR: Indexing and Searching: Introduction, Background-Spatial Access Methods, A Generic Multimedia Indexing Approach, One Dimensional Time Series, Two Dimensional Color Images, Automatic Feature Extraction.

TEXT BOOK:

1. Modern Information Retrieval by Yates and Neto Pearson Education.

REFERENCE BOOKS:

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
3. Information Storage & Retrieval by Robert Korfhage - John Wiley & Sons.

COURSE OUTCOMES:

- Gain the knowledge of solving computational search problems
- Understand the inadequacies of different information retrieval techniques
- Understand how to evaluate search engines
- Able to comprehend and appreciate the different applications of information retrieval Techniques in the Internet or Web environment.

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(AUTONOMOUS)

IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE-IV
(CS0754) AD HOC & SENSOR NETWORKS

PRE-REQUISITES:

1. A course on “Computer Networks”
2. A course on “Mobile Computing”

COURSE OBJECTIVE:

This course is intended to describe the concepts of sensor networks, MAC and transport protocols for ad hoc networks, security of sensor networks, applications of adhoc and sensor networks

SYLLABUS:

UNIT-I

Introduction to Ad Hoc Networks - Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs - Criteria for classification, Taxonomy of MANET routing algorithms,

Topology-based routing algorithms-**Proactive**: DSDV, WRP; **Reactive**: DSR, AODV, TORA; Hybrid: ZRP; *Position-based* routing algorithms-**Location Services**-DREAM, Quorum-based, GLS; **Forwarding Strategies:** Greedy Packet, Restricted Directional Flooding-DREAM, LAR; **Other routing algorithms**-QoS Routing, CEDAR.

UNIT-II

Data Transmission - Broadcast Storm Problem, **Rebroadcasting Schemes**-Simple-flooding, Probability-based Methods, Area-based Methods, Neighbour Knowledge-based: SBA, Multipoint Relaying, AHBP. **Multicasting: Tree-based:** AMRIS, MAODV; **Mesh-based:** ODMRP, CAMP; **Hybrid:** AMRoute**,** MCEDAR and **Geocasting:** Data-transmission Oriented-LBM; Route Creation Oriented-GeoTORA, MGR**.**

UNIT-III

TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Adhoc.

Basics of Wireless, Sensors and Applications

Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer.

UNIT-IV

Data Retrieval in Sensor Networks

Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

UNIT-V

Security - Security in Ad Hoc networks, Key management, Secure routing, Cooperation in MANETs, Intrusion Detection systems.

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P.Aggarwal, World Scientific Publications, March 2006, ISBN – 981-256-681-3
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978-1-55860-914-3 (Morgan Kauffman)

REFERENCE BOOKS:

1. “Ad Hoc and Sensor Networks: Theory and Applications” by Carlos de Morais Cordeiro and Dharma Prakash Agrawal
2. “Advanced Technologies in Ad Hoc and Sensor Networks” by Xue Wang and Li Cui
3. “Security in Ad-hoc and Sensor Networks” by Claude Castelluccia and Hannes Hartenstein

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Identify state of the art research in the emerging subject of Adhoc and Wireless Sensor Networks

CO2: Solve the issues in real-time application development based on ASN

CO3: Plan for further research in the domain of ASN

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IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE-IV
(EC075B) EMBEDDED SYSTEMS

PRE-REQUISITES:

1. A course on “Digital Logic Design and Microprocessors”
2. A course on “Computer Organization and Architecture”

COURSE OBJECTIVES:

1. The aim of the course is to introduce the hardware and software design aspects of embedded systems.
2. To equip the students with the knowledge and skills necessary to design and develop embedded applications by means of real-time operating systems.
3. The course includes the basics of embedded systems, interfacing, embedded programming and real-time operating systems.

SYLLABUS:

UNIT I

INTRODUCTION TO EMBEDDED SYSTEMS

Definition and Classification - Overview of Processors and hardware UNITs in an embedded system - Software embedded into the system - Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits.

UNIT II

DEVICES AND BUSES FOR DEVICES NETWORK

I/O Devices - Device I/O Types and Examples - Synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - '12C', 'USB',

UNIT III

PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls – Multiple function calls in a Cyclic Order in the Main Function Pointers - Function Queues and Interrupt Service Routines Queues Pointers

UNIT IV

REAL TIME OPERATING SYSTEMS - PART - 1

Definitions of process, tasks and threads - Clear cut distinction between functions - ISRs and tasks by their characteristics - Operating System Services- Goals - Structures- Kernel - Process Management - Memory Management - Device Management - File System Organisation and Implementation - I/O Subsystems - Interrupt Routines Handling in RTOS, RTOS Task scheduling models.

INTER PROCESS COMMUNICATION AND SYNCHRONIZATION - Shared data problem - Use of Semaphore(s)- Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key - Message Queues - Mailboxes – Pipes.

UNIT V

REAL TIME OPERATING SYSTEMS - PART - 2

Study of Micro C/OS-II or Vx Works or Any other popular RTOS - RTOS System Level Functions - Task Service Functions - Time Delay Functions - Memory Allocation Related Functions - Semaphore Related Functions - Mailbox Related Functions - Queue Related Functions.

TEXT BOOK:

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw-Hill, First reprint Oct. 2003

REFERENCE BOOKS:

1. Steve Heath, Embedded Systems Design, Second Edition-2003
2. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.
3. Wayne Wolf, Computers as Components: Principles of Embedded Computing System Design - Harcourt India, Morgan Kaufman Publishers, First Indian Reprint 2001
4. Frank Vahid and Tony Givargis, Embedded Systems Design - A Unified Hardware/Software Introduction, John Wiley, 2002.

COURSE OUTCOMES :

1. Ability to design a system, component, or process that meets the requirements within realistic constraints
2. Gain the skills in programming embedded systems.
3. Gain the knowledge of typical interfacing standards and be able to interface to peripherals
4. Ability to design and develop embedded applications by means of real-time operating systems

GURU NANAK INSTITUTIONS TECHNICAL CAMPUS
(AUTONOMOUS)

IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE-IV
(CS0755) NATURAL LANGUAGE PROCESSING

PRE-REQUISITES:

1. A course on “Formal Languages and Automata Theory”
2. A course on “Compiler Design”

COURSE OBJECTIVE:

This course is intended to introduce the fundamental concepts and ideas in Natural Language Processing (NLP), and the algorithms available for the processing of linguistic information and the underlying computational properties of natural languages

SYLLABUS:

UNIT-I

INTRODUCTION: Knowledge in speech and language processing - Ambiguity - Models and Algorithms - Language, Thought and Understanding. Regular Expressions and Automata: Regular expressions - Finite-State automata. Morphology and Finite-State Transducers: Survey of English morphology - Finite- State Morphological parsing - Combining FST lexicon and rules - Lexicon-Free FSTs: The porter stammer - Human morphological processing.

UNIT-II

Word Classes and Part-of-Speech Tagging: English word classes – Tag sets for English - Part-of-speech tagging - Rule-based part-of-speech tagging - Stochastic part-of-speech Tagging - Transformation-based tagging - Other issues.

Context-Free Grammars for English: Constituency - Context-Free rules and trees - Sentence-level constructions - The noun phrase - Coordination - Agreement - The verb phase and sub categorization - Auxiliaries - Spoken language syntax - Grammars equivalence and normal form - Finite-State and Context-Free grammars - Grammars and human processing.

Parsing with Context-Free Grammars: Parsing as search - A Basic Top-Down parser - Problems with the basic Top-Down parser - The early algorithm - Finite-State parsing methods.

UNIT-III

Features and Unification: Feature structures - Unification of feature structures – Features structures in the grammar - Implementing unification - Parsing with unification constraints - Types and Inheritance. Lexicalized and Probabilistic Parsing: Probabilistic context-free grammar - problems with PCFGs - Probabilistic lexicalized CFGs - Dependency Grammars - Human parsing.

UNIT-IV

Representing Meaning: Computational desiderata for representations - Meaning structure of language - First order predicate calculus - Some linguistically relevant concepts – Related representational approaches - Alternative approaches to meaning.
Semantic Analysis: Syntax-Driven semantic analysis - Attachments for a fragment of English - Integrating semantic analysis into the early parser - Idioms and compositionality - Robust semantic analysis. Lexical semantics: relational among lexemes and their senses - WordNet: A database of lexical relations - The Internal structure of words - Creativity and the lexicon.

UNIT-V

Word Sense Disambiguation and Information Retrieval: Selection restriction-based disambiguation - Robust word sense disambiguation - Information retrieval – other information retrieval tasks.Natural Language Generation: Introduction to language generation - Architecture for generation - Surface realization - Discourse planning - Other issues. Machine Translation: Language similarities and differences - The transfer metaphor – The interlingua idea: Using meaning - Direct translation - Using statistical techniques - Usability and system development.

TEXT BOOKS:

1. Daniel Jurafsky & James H.Martin, " Speech and Language Processing", Pearson Education (Singapore) Pte. Ltd., 2002.
2. Chris Manning and Hinrich Schuetze, “Foundations of Statistical Natural Language Processing”, 1st Kindle Edition.

REFERENCE BOOKS:

1. James Allen, "Natural Language Understanding", Pearson Education, 2003.
2. Dafydd Gibbon, “Natural Language Processing and Speech Technology”

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe the basic mathematical and linguistic concepts of NLP

CO2: Identify and classify algorithms for NLP problems

CO3: Apply part-of-speech tagging, word sense disambiguation

CO4: Analyze information retrieval and extraction, natural language generation and machine translation

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IV Year B.Tech. I-Sem

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4	0	0	4

PROFESSIONAL ELECTIVE-V
(CS0756) ETHICAL HACKING

PRE-REQUISITES:

1. A course on “Operating Systems”
2. A course on” Computer Networks”
3. A course on Network Security and Cryptography”

COURSE OBJECTIVE:

The aim of the course is to introduce the methodologies and framework of ethical hacking for enhancing the security

SYLLABUS:

UNIT-I

Introduction: Hacking Impacts, The Hacker

Framework: Planning the test, Sound Operations, Reconnaissance, Enumeration, Vulnerability Analysis, Exploitation, Final Analysis, Deliverable, Integration

Information Security Models: Computer Security, Network Security, Service Security, Application Security, Security Architecture

Information Security Program: The Process of Information Security, Component Parts of Information Security Program, Risk Analysis and Ethical Hacking.

UNIT-II

The Business Perspective: Business COURSE OBJECTIVES, Security Policy, Previous Test Results, Business Challenges

Planning for a Controlled Attack: Inherent Limitations, Imposed Limitations, Timing is Everything, Attack Type, Source Point, Required Knowledge, Multi-Phased Attacks, Teaming and Attack Structure, Engagement Planner, The Right Security Consultant, The Tester, Logistics, Intermediates, Law Enforcement.

UNIT-III

Preparing for a Hack: Technical Preparation, Managing the Engagement

Reconnaissance: Social Engineering, Physical Security, Internet Reconnaissance.

UNIT-IV

Enumeration: Enumeration Techniques, Soft Objective, Looking Around or Attack, Elements of Enumeration, Preparing for the Next Phase.

Exploitation: Intutive Testing, Evasion, Threads and Groups, Operating Systems, Password Crackers, RootKits, applications, Wardialing, Network, Services and Areas of Concern.

UNIT-V

Deliverable: The Deliverable, The Document, Overal Structure, Aligning Findings, Presentation

Integration: Integrating the Results, Integration Summary, Mitigation, Defense Planning, Incident Management, Security Policy, Conclusion.

TEXT BOOK:

1. James S. Tiller, “The Ethical Hack: A Framework for Business Value Penetration Testing”, Auerbach Publications, CRC Press

REFERENCE BOOKS:

1. EC-Council, “Ethical Hacking and Countermeasures Attack Phases”, Cengage Learning
2. Michael Simpson, Kent Backman, James Corley, “Hands-On Ethical Hacking and Network Defense”, Cengage Learning.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe the use and availability of tools to support an ethical hack

CO2: Interpret the results of a controlled attack

CO3: Acquaint the role of politics, inherent and imposed limitations and metrics for planning of a test

CO4: Comprehend the dangers associated with penetration testing

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IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE-V
(CS0757) WEB MINING

PRE-REQUISITES:

1. A course on “Web Technologies”
2. A course on “Advanced Data Structures”
3. A course on “Database Management Systems”
4. A course on “Data Warehousing and Data Mining”

COURSE OBJECTIVE:

The purpose of the course is to introduce the concepts of extracting knowledge from web data and the mechanisms for effective web search

SYLLABUS:

UNIT-I

Introduction to Web Data Mining and Data Mining Foundations

Introduction – World Wide Web (WWW), A Brief History of the Web and the Internet, Web Data Mining -Data Mining, Web Mining. Data Mining Foundations – Association Rules and Sequential Patterns – Basic Concepts of Association Rules,Apriori Algorithm- Frequent Item set Generation, Association Rule Generation, Data Formats for Association Rule Mining, Mining with multiple minimum supports – Extended Model, Mining Algorithm, Rule Generation, Mining Class Association Rules, Basic Concepts of Sequential Patterns, Mining Sequential Patterns on GSP, Mining Sequential Patterns on Prefix Span, Generating Rules from Sequential Patterns.

UNIT-II

Supervised and Unsupervised Learning

Supervised Learning - Basic Concepts, Decision Tree Induction – Learning Algorithm, Impurity Function, Handling of Continuous Attributes, Classifier Evaluation, Rule Induction – Sequential Covering, Rule Learning, Classification Based on Associations, Naive Bayesian Classification, Naive Bayesian Text Classification - Probabilistic Framework, Naive Bayesian Model. Unsupervised Learning – Basic Concepts, K-means Clustering – K-means Algorithm, Representation of Clusters, Hierarchical Clustering – Single link method , Complete link Method, Average link method, Strength and Weakness.

UNIT-III

Information Retrieval and Web Search

Basic Concepts of Information Retrieval, Information Retrieval Methods - Boolean Model, Vector Space Model and Statistical Language Model, Relevance Feedback, Evaluation Measures, Text and Web Page Preprocessing – Stop word Removal,

Stemming, Web Page Preprocessing, Duplicate Detection, Inverted Index and Its Compression – Inverted Index, Search using Inverted Index, Index Construction, Index Compression, Latent Semantic Indexing – Singular Value Decomposition, Query and Retrieval, Web Search, Meta Search, Web Spamming.

UNIT-IV

Link Analysis and Web Crawling

Link Analysis - Social Network Analysis, Co-Citation and Bibliographic Coupling, Page Rank Algorithm, HITS Algorithm, CommUNITy Discovery-Problem Definition, Bipartite Core CommUNITies, Maximum Flow CommUNITies, Email CommUNITies.

Web Crawling – A Basic Crawler Algorithm- Breadth First Crawlers, Preferential Crawlers, Implementation Issues – Fetching, Parsing, Stop word Removal, Link Extraction, Spider Traps, Page Repository, Universal Crawlers, Focused Crawlers, Topical Crawlers, Crawler Ethics and Conflicts.

UNIT-V

Opinion Mining and Web Usage Mining

Opinion Mining - Sentiment Classification – Classification based on Sentiment Phrases, Classification Using Text Classification Methods , Feature based Opinion Mining and Summarization – Problem Definition, Object feature extraction, Feature Extraction from Pros and Cons of Format1, Feature Extraction from Reviews of Format 2 and 3, Comparative Sentence and Relation Mining,Opinion Search and Opinion Spam.

Web Usage Mining - Data Collection and Preprocessing- Sources and Types of Data, Key Elements of Web usage Data Preprocessing, Data Modeling for Web Usage Mining, Discovery and Analysis of Web usage Patterns -Session and Visitor Analysis, Cluster Analysis and Visitor Segmentation, Association and Correlation Analysis, Analysis of Sequential and Navigation Patterns.

TEXT BOOK:

1. Web Data Mining: Exploring Hyperlinks, Contents, and Usage Data by Bing Liu (Springer Publications)

REFERENCE BOOKS:

1. Data Mining: Concepts and Techniques, Second Edition Jiawei Han, Micheline Kamber (Elsevier Publications)
2. Web Mining:: Applications and Techniques by Anthony Scime
3. Mining the Web: Discovering Knowledge from Hypertext Data by Soumen Chakrabarti

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Define algorithms for generating association and classification rules from web data

CO2: Classify algorithms for clustering and managing the web documents

CO3: Choose algorithms for web searching and crawling

CO4: Apply sentiment analysis, opinion mining needed for recommendation systems

CO5: Contrast web usage mining concepts for customization and personalization

IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE-V
(CS0758) BIO-INFORMATICS

PRE-REQUISITES:

1. A course on “Database Management Systems”
2. A course on “Data Warehousing and Data Mining”
3. A course on “Computer Programming and Data Structures”

COURSE OBJECTIVE:

The aim of this course is to impart knowledge of theoretical and practical concepts of bioinformatics, develop skills in designing biological database and retrieving, and apply appropriate sequence analysis methods for analyzing bio-molecular sequences

SYLLABUS:

UNIT-I

INTRODUCTION:- Definition – Overview- Major databases in Bio Informatics- Molecular biology – Central Dogma- Data retrieval tools – Data mining of Databases – Gene Analysis – Prokaryotic and Eukaryotic Genomes – Sequence Assembly – Gene mapping – Physical maps – cloning – ORF – amino acids – DNA, RNA sequences – Genetic code.

UNIT-II

DNA and PROTEIN SEQUENCES:-DNA: working with single DNA sequence : removing vector sequences- verifying restriction maps – PCR design – GC content – counting words –internal repeats – protein coding regions – ORFing – Genome scan, Protein: predicting properties – primary structure analysis – transmembrane segments – PROSITE patterns – interpreting scanprosite results- finding domains – CD server results – pfscan results.

UNIT-III

ALIGNMENT OF PAIR OF SEQUENCES:- Terminology – Global and Local alignment – Dot matrix – dynamic programming – using scoring matrices –PAM matrices – BLOSUM,Working with FASTA – Algorithm – output – E-values – Histogram, Working with BLAST– algorithm – output – services – gapped BLAST- PSIBLAST – comparison of FASTA and BLAST.

UNIT- IV

MULTIPLE SEQUENCE ALIGNMENT:- Criteria for Multiple sequence alignment – applications – choosing the right sequences; FASTA, ClustalW, TCoffee methods – interpreting multiple sequence alignment – getting in right format – converting formats – using Jalview – preparing for publication.

UNIT- V

PROTEIN CLASSIFICATION & STRUCTURE PREDICTION:- Structure of amino acids – primary structure – secondary structure – folds and motifs – alpha and beta helix – structure based protein classification – protein structure Data bases – folding problem –

PROPSEARCH –primary structure analysis and prediction – secondary structure analysis and prediction – motifs – profiles –patterns and fingerprints.

TEXT BOOKS:

1. S.C Rostogi , Mendiratta, P.Rasogi, " *BioInformatics: methods and applications*",second edition, PHI 2006.
2. Jean Mickel Clavere & Cadrienotredom "*Bio Informatics– A beginners guide*" Wiley DreamTech, 2003.

REFERENCE BOOKS:

1. T.K. Attwood and D.J Perry Smith, *"Introduction to Bio Informatics*", Pearson Education, 1st Edition, 2001.
2. Dan E.Krane, Michael L.Raymer, "*fundamental concepts of BioInformatics* ", Pearson Education, 2004.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe the basic concepts of biological databases, genomes and proteome

CO2: Explain biological database management system

CO3: Apply appropriate techniques and tools to manage the biological data

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IV Year B.Tech. I-Sem

L	T	P	C
4	0	0	4

PROFESSIONAL ELECTIVE-V
(CS0759) INTERNET OF THINGS

PRE-REQUISITES:

1. A course on “Computer Programming”
2. A course on “Computer Networks”
3. A course on “Grid & Cloud Computing”

COURSE OBJECTIVE:

This course is intended to introduce the terminology, technology and platforms dealing with the applications of machine to machine with necessary protocols

SYLLABUS:

UNIT-I

What is the Internet of Things? – History of IoT, About IoT, Overview and Motivations, Examples of Applications, Internet of Things Definitions and Frameworks : IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities.

UNIT-II

Identification of IoT Objects and Services, Structural Aspects of the IoT, Environment Characteristics, Traffic Characteristics, Scalability, Interoperability, Security and Privacy, Open Architecture, Key IoT Technologies, Device Intelligence, Communication Capabilities, Mobility Support.

UNIT-III

Physical Design of IoT – IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates.

UNIT-IV

Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle, IoT and M2M – Software defined networks, network function virtualization.

UNIT-V

IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

TEXT BOOKS:

1. Daniel Minoli, “Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications”, Wiley Publications.
2. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015.
3. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014.

REFERENCE BOOKS:

1. Bernd Scholz-Reiter, Florian Michahelles, “Architecting the Internet of Things”, Springer.
2. Parikshit N. Mahalle& Poonam N. Railkar, “Identity Management for Internet of Things”, River Publishers.
3. Peter Waher, 'Learning Internet of Things', Packt Publishing, 2015.

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO 1: Gain the basics of Internet of Things

CO 2: Identify the key technologies in IoT

CO 3: Comprehend the architecture and framework of IoT

CO 4: Analyze the domain specific applications of IoT

CO 5: Master the interfacing and programming for IoT devices

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IV Year B.Tech. CSE I-Sem

L	T	P	C
0	0	3	2

(CS0743) NETWORK SECURITY & CRYPTOGRAPHY LAB

CO-REQUISITE:

1. A Course on “Network Security and Cryptography”

COURSE OBJECTIVE:

This lab course is intended to impart practical knowledge on network security concepts and mechanisms, practically analyze and monitor network communication in order to overcome security threats and analyze the network protocols, and configure applications for enhancing security

LAB EXERCISES:

1. Write a program to perform encryption and decryption using the following substitution ciphers.
2. Caeser cipher
3. Play fair cipher
4. Hill Cipher
5. Write a program to implement the DES algorithm.
6. Write a program to implement the Blowfish algorithm.
7. Write a program to implement RSA algorithm.
8. Implement the Diffie-Hellman Key Exchange mechanism.
9. Calculate the message digest of a text using the SHA-1 algorithm.
10. Calculate the message digest of a text using the MD5 algorithm.
11. Working with sniffers for monitoring network communication (Wireshark).
12. Configuring S/MIME for email communication.
13. Using Snort, perform real time traffic analysis and packet logging.

TEXT BOOKS:

1. “Cryptography and Network Security” by William Stallings 3rd Edition, Pearson Education.
2. “Applied Cryptography” by Bruce Schneier.

REFERENCE BOOK:

1. Cryptography and Network Security by Behrouz A.Forouzan.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO1: Identify the various network security algorithms and protocols

CO2: Classify the network protocols and communication network

CO3: Apply the network protocols, and configure applications for enhancing security

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IV Year B.Tech. CSE I-Sem

L	T	P	C
0	0	3	2

(CS0744) GRID & CLOUD COMPUTING LAB

CO-REQUISITE:

1. A course on "Grid and Cloud Computing"

COURSE OBJECTIVE:

This lab course is introduced to provide hands-on experience using Hadoop, Amazon EC2, Google Compute Engine, Windows Azure and Globus toolkit.

LAB EXERCISES:

1. Installation and configuration of Hadoop
2. Using Hadoop for counting word frequency using map reduce
3. Create an Amazon EC2 instance and set up a web-server on the instance and associate an IP address with the instance.
4. Repeat Exercise-3 using Google Compute Engine.
5. Repeat Exercise-3 using Windows Azure Virtual Machine.
6. Create a database instance in the cloud using Amazon RDS.
7. Create a database instance in the cloud using Google Cloud SQL
8. Installation and Configuration of Globus Toolkit
9. Build and deploy a grid server, then build the client and execute the Application

TEXT BOOK:

1. Arshadeep Bahga, Vijay Madisetti, "Cloud Computing: A Hands-on Approach", University press

REFERENCE BOOKS :

1. B. Sotomayor. The Globus Toolkit 3 Programmers's Tutorial, http://www.casasotomayor.net/gt3-tutorial/.
2. Berstis, Viktors, et al. Introduction to grid computing with globus. IBM Corporation, International Technical Support Organization, 2003.

COURSE OUTCOMES:

Upon successful completion of this Lab, students will be able to:

CO1: describe the installation and configure Hadoop
CO2: categorize the installation and configure Globus Toolkit
CO3: Produce an instance using Amazon EC2, Google Compute Engine and Windows Azure
CO4: Create a database instance on the cloud

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B.Tech (CSE) IV Year II – Sem

L	T	P	C
4	0	0	4

(MB0831) MANAGEMENT SCIENCE

PRE-REQUISITE: Nil

COURSE OBJECTIVE:

1. The course introduces the basic concepts of Management Science and Operations Management and its application to business.
2. The topics include human resource management, project and strategic management; the course develops problem solving and spreadsheet skills, an invaluable tool for modern business.

SYLLABUS:

UNIT-I

Introduction to Management & Organisation: Concepts of Management and organization- nature, importance and Functions of Management, Systems Approach to Management - Leadership Styles. Basic concepts related to Organisation - Types and Evaluation of Organisation structures.

UNIT-II

Operations & Marketing Management: Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement –Statistical Quality Control: control charts, (simple Problems) and Acceptance Sampling, TQM, Six Sigma, JIT System, Supply Chain Management- Functions of Marketing, Marketing Mix, and Marketing Strategies based on Product Life Cycle, Channels of distribution.

UNIT-III

Human Resources Management (HRM): Concepts of HRM- Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

UNIT-IV

Project Management *(PERT/CPM)*: PERT Vs CPM- Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT-V

***Strategic Management*:** Mission, Goals, COURSE OBJECTIVES, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

TEXT BOOKS:

1. Aryasri: *Management Science*, McGraw Hill, 2015.
2. P.Vijay Kumar and N.Appa Rao *Management Science*, Cengage, 2014.

REFERENCE BOOKS:

1. Kotler Philip & Keller Kevin Lane: Marketing Management, Pearson, 2014.
2. Koontz & Weihrich: *Essentials of Management*, McGraw Hill, 2014.
3. Thomas N.Duening & John M.Ivancevich *Management—Principles and Guidelines,* Biztantra, 2014.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2014.
5. Samuel C.Certo: *Modern Management*, 2014.

COURSE OUTCOMES:

1. To enable students see that many managerial decisions making situations can be addressed using standard techniques and problem structuring methods
2. Students will be able to gain an understanding of the core concepts of Management Science and Operations Management;
3. To discuss applications in many functional areas (operations and Human resources, strategy, marketing,)
4. To get familiar with Project management techniques and strategic management

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IV Year B.Tech. II-Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-III
(CE0861) ENVIRONMENTAL IMPACT ASSESSMENT

PRE REQUISITES: Environmental Engineering

COURSE OBJECTIVES:
This subject will cover various aspects of Environment Impact Assessment methodologies, impact of development activities. Impact on surface water, Air and Biological Environment. Environment protection and legislation is studied.

SYLLABUS:

UNIT-I
Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact Evaluation and analysis, preparation of Environmental Base map, Classification of environmental Parameters' I Methodologies: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method, Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT-II
Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT-III
Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures.

UNIT – IV
Environmental Audit & Environmental legislation, COURSE OBJECTIVES of Environmental Audit, Types\ of environmental Audit, Audit protocol, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report, Post Audit activities.

UNIT - V
The Environmental Protection Act, The water Act, The Air (Prevention & Control of pollution Act.), Motor Act, Wild life Act. Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:

1. Larry Canter – Environmental Impact Assessment, McGraw-Hill Publications (1999)
2. Barthwal, R. R. B. – Environmental Impact Assessment, New Age International Publications (2012)

REFERENCE BOOKS:

1. Glynn, J. and Gary, W. H. K. - Environmental Science and Engineering, Prentice Hall Publishers (2015)
2. Suresh K. Dhaneja - Environmental Science and Engineering, S.K.,Katania & Sons Publication., New Delhi. (2014)
3. Bhatia, H. S. - Environmental Pollution and Control, Galgotia Publication(P) Ltd, Delhi. (2003)
4. Wathern, P. – Environmental Impact Assessment: Theory & Practice, Publishers-Routledge, London, (1992)

COURSE OUTCOMES:

Student understands various methods of assesment of environmental impact and Environmental protection act and legislation.

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IV Year B.Tech. II-Sem

L	T	P	C
3	0	0	3

OPEN ELECTIVE-III
(MB0861) ENTERPRISE RESOURCE PLANNING

Course Aim:

It enables the student to understand the foundations of Enterprise planning and ERP System Options.

Learning Outcome: The student understands the challenges in implementation of ERP system, ERP System Implementation options, and functional modules of ERP.

Unit 1:

Introduciton to ERP- Foundation for Understanding ERP systems-Buisiness benefits of ERP-The challenges of impelmenting ERP system-ERP modules and Historical Developement.

Case: Response top RFP for ban ERP system (Mary Sumner).

Unit 2:

ERP system options & Selection methods-Measurement of project Inpact- information Technology Selection-ERP proposal evaluvation-Project Evaluvation Technique.(David L.olson).

Case: Atlantic Manufacturing (Mary Sumner).

Unit 3:

ERP system Installation Options- IS/IT Management results-Risk Identificatioon analysis-System Projects- Demonstation of the system-Failure method-system Architecture & ERP (David L.Olson)

Case: DataSolutiions & Technology Knowledge (Mary Sumner).

Unit 4:

ERP - sales and Marketing- Managment control process in sales and markring-ERP custoemr relatonship managment-ERP systems- Accounting & Fiance control processes. Fiancial modules in ERP systems.

Case: atalantic manufacturing (Mary Sumner).

Unit 5:

ERP – Produciton and Material Managment-Control process on produciton and manuifacturing-Produciton module in ERP- supply chain Managmeent & e-market place-e-businesss & ERP-e supply chian & ERP- Future directions for ERP.

Case: HR in atalntic manufacturing. (Mary Sumner).

Text Book:

1. Mary Sumner " Enterprice Resource Planning" Pearson, 2012.

References:

1. David L.Olson " Managerial Issues in ERP systems" TMH 2012.
2. Ellen Monk "Enterprice Resource Planning" Cengage, 2012.
3. Alexis Leon "Enterprice Resource Planning" 2e, TMH ,2012
4. Goyal "Enterprice Resource Planning" TMH, 2012
5. Jagan Nathan Vaman "ERP Srategies for Steering Orgnizationsal competence and competetive Advantage" TMH, 2012.

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IV Year B.Tech. II-Sem

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OPEN ELECTIVE-III
(MB0862) MANAGEMENT INFORMATION SYSTEM

COURSE OBJECTIVES:

The objective of the course is to provide the basic concepts of Enterprise Resource Planning and Management of Information System.

SYLLABUS:

UNIT – I

Introduction to IS Models and Types of Information systems – Nolan Stage Hypothesis, IS Strategic Grid, Wards Model, Earl's Multiple Methodology, Critical Success Factors, Soft Systems Methodology, Socio-Technical Systems Approach (Mumford), System Develop Life Cycle, Prototype and End User Computing, Application Packages, Outsourcing, Deciding Combination of Methods. Types of Information Systems

UNIT-II

IS Security, Control and Audit– System Vulnerability and Abuse, business value of security and control, Need for Security, Methods of minimizing risks IS Audit, ensuring system quality.

UNIT-III

Induction to ERP: Overview of ERP, MRP, MRPII and Evolution of ERP, Integrated Management Systems, Reasons for the growth of ERP, Business Modeling, Integrated Data Model, Foundations of IS in Business, Obstacles of applying IT, ERP Market-ERP Modules: Finance, Accounting Systems, Manufacturing and Production Systems, Sales and Distribution Systems, , Human Resource Systems, Plant Maintenance System, Materials Management System, Quality Management System, ERP System Options and Selection, ERP proposal Evaluation.

UNIT-IV

Benefits of ERP: Reduction of Lead Time, On-Time Shipment, Reduction in Cycle Time, Improved Resource Utilization, Better Customer Satisfaction, Improved Supplier Performance, Increased Flexibility, Reduced Quality Costs, Improved Information Accuracy and Design Making Capabilities.

UNIT-V

ERP Implementation and Maintenance: Implementation Strategy Options, Features of Successful ERP Implementation, Strategies to Attain Success, User Training, Maintaining ERP & IS**.** Case Studies.

REFERENCE BOOKS:

1. Gordon B. Davis & Margrethe H.Olson: Management Information Systems, TMH, 2009.
2. C Laudon and Jane P.Laudon, et al: Management Information Systems, Pearson Education, 2009.
3. Alexis Leon: ERP (Demystified), 5/E, Tata McGraw-Hill, 2009.
4. C.S.V.Murthy: Management Information System, Himalaya,2009
5. James A. Obrein: Management Information Systems, TMH, 2009
6. David L Olson: Managerial Issues of Enterprise Resource Planning Systems, McGraw Hill, International Edition-2009.
7. Rainer, Turban, Potter: Introduction to Information Systems, WILEY-India, 2009.
8. Vaman, ERP in Practice, TMH, 2009
9. Dharminder and Sangeetha: Management Information Systems, Excel, 2009
10. Gerald V.Post, David L Anderson: Management Information Systems, Irvin McGraw Hill, 2009.
11. Monk: Concepts in ERP, Cengage, 2009

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OPEN ELECTIVE-III
(MB0863) ORGANIZATIONAL BEHAVIOUR

COURSE OBJECTIVES:

The objective of the course is to provide the students with the conceptual framework and the theories underlying Organizational Behavior.

SYLLABUS:

UNIT-I

Introduction to OB - Definition, Nature and Scope –Environmental and organizational context – Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organisational Behaviour. Cognitive Processes-I : Perception and Attribution: Nature and importance of Perception – Perceptual selectivity and organization - Social perception – Attribution Theories – Locus of control –Attribution Errors –Impression Management.

UNIT-II

Cognitive Processes-II: Personality and Attitudes - Personality as a continuum – Meaning of personality - Johari Window and Transactional Analysis - Nature and Dimension of Attitudes – Job satisfaction and organizational commitment-Motivational needs and processes- Work-Motivation Approaches Theories of Motivation- Motivation across cultures - Positive organizational behaviour: Optimism – Emotional intelligence – Self-Efficacy.

UNIT-III

Dynamics of OB-I: Communication – types - interactive communication in organizations – barriers to communication and strategies to improve the follow of communication - Decision Making: Participative decision making techniques – creativity and group decision making . Dynamics of OB –II Stress and Conflict: Meaning and types of stress –Meaning and types of conflict - Effect of stress and intra-individual conflict - strategies to cope with stress and conflict.

UNIT-IV

Dynamics of OB –III Power and Politics: Meaning and types of power – empowerment - Groups Vs. Teams – Nature of groups –dynamics of informal groups – dysfunctions of groups and teams – teams in modern work place.

UNIT-V

Leading High performance: Job design and Goal setting for High performance- Quality of Work Life- Socio technical Design and High performance work practices - Behavioural performance management: reinforcement and punishment as principles of Learning –Process of Behavioural modification - Leadership theories - Styles, Activities and skills of Great leaders.

REFERENCE BOOKS:

1. Luthans, Fred: Organizational Behaviour 10/e, McGraw-Hill, 2009
2. McShane: Organizational Behaviour, 3e, TMH, 2008
3. Nelson: Organizational Behaviour, 3/e, Thomson, 2008.
4. Newstrom W.John & Davis Keith, Organisational Behaviour-- Human Behaviour at Work, 12/e, TMH, New Delhi, 2009.
5. Pierce and Gardner: Management and Organisational Behaviour: An Integrated perspective, Thomson, 2009.
6. Robbins, P.Stephen, Timothy A. Judge: Organisational Behaviour, 12/e, PHI/Pearson , New Delhi, 2009.
7. Pareek Udai: Behavioural Process at Work:,Oxford &IBH, New Delhi, 2009.

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OPEN ELECTIVE-III
(ME0861) FUNDAMENTALS OF ROBOTICS

PRE-REQUISITES: None

SYLLABUS:

UNIT 1

Robotics-Introduction-classification with repect to geometrical configuration (Anatomy) , Controled system & chain type:. Serial manipulator & Parallel Manipulator. Components of Industrail robotics-Precesion of movement-resolution, accuracy & repeatability-Dynamic characteristics- speed of motion, load carrying capacity & speed of response-Sensors-Internal sensors: Position sensors,& Velocity sensors,External sensors: Proximity sensors, Tactile Sensors, & Force or Torque sensors.

UNIT 2

Grippers - Mechanical Gripper-Grasping force-Engelberger-g-factors-mechanisms for actuation, Magnetic gripper , vaccume cup gripper-considerations in gripper selection & design . Industrial robots spefications.Selection based on the Application.

UNIT 3

Kinematics-Manipulators Kinematics, Rotation Matrix, Homogenous Transformation Matrix, D-H transformation matrix, D-H method of assignment of frames. Direct and Inverse Kinematics for industrial robots. Differential Kinematicsfor planar serial robots

UNIT 4

Trajectory planning: Joint space scheme- Cubic polynomial fit-Obstacle avoidance in operation space-cubic polynomial fit with via point, bleding scheme. Introduction Cartesian space scheme.

ontrol- Interaction control, Rigid Body mechanics, Control architecture- position, path velocity and force control systems, computed torque control, adaptive control, and Servo system for robot control.

UNIT 5

Programming of Robots and Vision System-Lead through programming methods-Teach pendent- overview of various textual programming languages like VAL etc.

Machine (robot) vision:

TEXT BOOKS:

1. Fu, K.S., Gonzalez, R.C., and Lee, C.S.G., *Robotics control, Sensing, Vision and Intelligence*, McGraw-Hill Publishing Company, New Delhi, 2003.
2. Industrail Robotics/Grover/ McGraw hill
3. Robotics/ Mittal and Nagarath/ TMH

REFERENCE BOOKS:

1. Robot Dynamics and Controls / Spony and Vidyasagar / John Wiley
2. Robot Analysis and control Asada and Slotine / Wiley Inter-Science
3. Introduction to Robotics / John J Craig / Pearson Education

COURSE OUTCOMES:

After this completion of this course, the student should be able to understand the basic components of robots, differentiate types of robots and robot grippers, model forward and inverse kinematics of robot manipulators, analyze forces in links and joints of a robot, programme a robot to perform tasks in industrial applications, design intelligent robots using sensors.

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OPEN ELECTIVE-III
(ME0862) NON CONVENTIONAL ENERGY SOURCES

PRE-REQUISITES: None

SYLLABUS:

UNIT – I

PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power - Physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, Solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, solar radiation data.

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

UNIT - II

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, sensible, latent heat and stratified storage, solar ponds. Solar applications - solar heating/cooling techniques, solar distillation and drying, photovoltaic energy conversion.

WIND ENERGY: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

UNIT - III

BIO-MASS: Principles of Bio-Conversion, Anaerobic /aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation, and economic aspects.

UNIT – IV

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India.

OCEAN ENERGY – OTEC, Principles, utilization, setting of OTEC plants, thermodynamic cycles. Tidal and Wave energy: Potential and conversion techniques, mini-hydel power plants, their economics.

UNIT –V

DIRECT ENERGY CONVERSION: Need for DEC, Carnot cycle, limitations, Principles of DEC. Thermo-electric generators, Seebeck, Peltier and Joule Thompson effects, figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principle, faraday's laws, thermodynamic aspects, selection of fuels and operating conditions.

TEXT BOOKS:

1. Renewable Energy Resources / Tiwari and Ghosal / Narosa
2. Non- conventional Energy Sources / G.D. Rai
3. Biological Energy Resources/ Malcolm Fleischer & Chris Lawis.

REFERENCE BOOKS:

1. Renewable Energy Sources / Twidell & Weir
2. Solar Energy / Sukhame
3. Solar Power Engineering / B.S. Magal Frank Kreith & J.F. Kreith
4. Principles of Solar Energy / Frank Krieth & John F Kreider
5. Non-Conventional Energy / Ashok V Desai / Wiley Eastern
6. Non-Conventional Energy Systems / K Mittal / Wheeler
7. Renewable Energy Technologies / Ramesh & Kumar / Narosa

COURSE OUTCOMES:

At the end of the course, the student will be able to identify renewable energy sources and their utilization. Understand the basic concepts of solar radiation and analyze the working of solar and thermal systems. Understand principles of energy conversion from alternate sources including wind, geothermal, ocean, biomass, biogas and hydrogen. Understand the concepts and applications of fuel cells, thermoelectric convertor and MHD generator. Identify methods of energy storage for specific applications

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OPEN ELECTIVE-III
(ME0863) ASPECTS OF HEAT TRANSFER IN ELECTRICAL/ELECTRONICALLY CONTROLLED UNITS

PRE-REQUISITES: None

SYLLABUS:

UNIT-I

Conduction Heat transfer: Modes of heat transfer, Fourier's law of steady state heat conduction (one dimensional conduction), thermal conductivity and its UNIT, conduction through slab or plane wall, hollow cylinders and spheres conduction through composite walls and hollow cylinders and spheres with multi-layers, Convective heat transfer, Newton's law of cooling, electrical analogy and overall heat transfer coefficient, numerical problems

UNIT-II

Convective and radiation Heat transfer:

Dimensional analysis as a tool for experimental investigation, Buckingham pi theorem and method, radiation and radiation properties of surfaces, black body, emissive power, Stefan Boltzmann's law, emissivity, monochromatic emissive power and monochromatic emissivity, grey body, Kirchoff's law, Wien's displacement law, numerical problems.

UNIT – III

Cooling of Electronic equipment:

Introduction and history, manufacturing of electronic equipment, cooling load of electronic equipment, thermal environment, electronics cooling in different applications, conduction cooling, air cooling: natural convection and radiation, air cooling: forced convection, liquid cooling, immersion cooling, heat pipes, cooling of chips, PCBs, computers, logic chips etc.

UNIT – IV

Refrigeration and Air conditioning: Introduction to refrigeration, necessity and applications, UNIT of refrigeration and cop, Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room Air conditioner.

UNIT-V

Heat pipes: structure – operation - construction - thermal resistance- performance characteristics - effects of working fluid and operating temperature, wick - selection of material - pore size, applications.

TEXT BOOKS:

1. Heat Transfer- A practical approach by Yunus A. Cengel,Tata Mc Graw-Hill Edition
2. Heat Transfer – A conceptual approach – P.K.Sarma & K.Rama Krishna/New age
3. A course in Refrigeration and Air conditioning – SC Arora and & Domkundwar / Dhanpatrai

REFERENCE BOOKS:

1. Fundamentals of Engineering, Heat and mass transfer – R.C. Sachdeva/New Age
2. Heat & mass Transfer – D.S.Kumar/S.K.Kataria & sons

COURSE OUTCOMES: After the course student should be able to analyze conduction, convection and radiation heat transfer modes, heat generation, conduction and dissipation in electronically controlled units.

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OPEN ELECTIVE-III
(EC0861) PRINCIPLES OF COMPUTER COMMUNICATIONS AND NETWORKS

PRE-REQUISITE : Nil

COURSE OBJECTIVES:

- To understand the concept of computer communication.
- To learn about the networking concept, layered protocols.
- To understand various communications concepts.
- To get the knowledge of various networking equipment.

SYLLABUS:

UNIT-I

Overview of Computer Communications and Networking :

Introduction to Computer Communications and Networking , Introduction to Computer Network , Types of Computer Networks, Network Addressing, Routing , Reliability, Interoperability and Security, Network Standards, The Telephone System and Data Communications.

UNIT-II

Essential Terms and Concepts :

Computer Applications and application protocols, Computer Communications and Networking models, Communication Service Methods and data transmission modes, analog and Digital Communications , Speed and capacity of a Communication Channel, Multiplexing and switching, Network architecture and the OSI reference model.

UNIT-III

Analog and Digital Communication Concepts :

Representing data as analog signals, representing data as digital signals, data rate and bandwidth reduction Digital Carrier Systems.

UNIT-IV

Physical and data link layer Concepts:

The Physical and Electrical Characteristics of wire, Copper media, fiber optic media, wireless Communications. Introduction to data link Layer , the logical link control and medium access control sub layers.

UNIT-V

Network Hardware Components:

Introduction to Connectors, Transreceivers and media convertors, repeaters, network interference cards and PC cards, bridges, switches, switches Vs Routers.

TEXT BOOK:

1. Computer Communications and Networking Technologies, Michel A. Gallo and William H. Hancock, Thomson Brooks / Cole.

REFERENCE BOOK:

1. Principles of Computer Networks and Communications, M. Barry Dumas, Morris Schwartz, Pearson.

COURSE OUTCOMES:

1. The student can get the knowledge of networking of computers, data transmission between computers.
2. Will have the exposure about the various communication concepts.
3. Will get awareness about the structure and equipment of computer network structures.

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OPEN ELECTIVE-III
(IT0861) WEB TECHNOLOGIES

COURSE OBJECTIVES:

- To learn the basic web concepts and Internet protocols
- To introduce XML and processing of XML data
- To introduce client side scripting with Javascript and DHTML
- To introduce server side programming with Java Servlets and JSP

SYLLABUS:

UNIT-I

INTRODUCTION: Web Essentials - Clients, Servers and Communication:

The Internet, Basic Internet Protocols: TCP/IP, UDP, DNS, The World Wide Web: Hypertext Transport Protocol, HTTP Request Message, HTTP Response Message, Web Clients, Web Servers.

Markup Languages - HTML: Basic Tags, Forms, Style sheets

UNIT-II

Client-Side Programming - Introduction to JavaScript, JavaScript in Perspective, Basic Syntax, Variables and Data Types, Statements, Operators, Literals, Functions, Objects, Arrays, Built-in Objects, JavaScript Debuggers.

Host Objects - Browsers and the DOM: Introduction to the Document Object Model, Intrinsic Event Handling, Modifying Element Style, The Document Tree, DOM Event Handling.

UNIT-III

Server-Side Programming - Java Servlets: Servlet Architecture, Servlets Generating Dynamic Content, Servlet Life Cycle, Parameter Data, Sessions, Cookies, URL Rewriting, Case Study.

UNIT-IV

Representing Web Data XML: XML Documents and Vocabularies, XML Versions and the XML Declaration, XML Namespaces, DOM-Based XML Processing, Event-oriented Parsing: SAX, Transforming XML Documents, Selecting XML Data: XPath, Template-based Transformation: XSLT, Displaying XML Documents in Browsers, Case Study.

UNIT-V

Separating Programming and Presentation - JSP Technology: Introduction to Java Server Pages, Running JSP Applications, Basic JSP, JavaBeans Classes and JSP, Tag Libraries and Files, Support for the Model-View-Controller Paradigm, Case Study.

TEXT BOOK:

1. WEB TECHNOLOGIES: A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education.

REFERENCE BOOKS:

1. Deitel H.M. and Deitel P.J., "Internet and World Wide Web How to program", Pearson International, 2012, 4th Edition.
2. J2EE: The complete Reference By James Keogh, McGraw-Hill.
3. Bai and Ekedhi, The Web Warrior Guide to Web Programming, Thomson.
4. Paul Dietel and Harvey Deitel, "Java How to Program", Prentice Hall of India, 8th Edition.
5. Web Technologies, Black Book, Dreamtech Press.
6. Gopalan N.P and Akilandeswari J, "Web Technology", Prentice Hall of India.

COURSE OUTCOMES:

1. Ability to create dynamic and interactive web sites
2. Gain knowledge of client side scripting using javascript and DHTML.
3. Demonstrate understanding of what is XML and how to parse and use XML data
4. Able to do server side programming with Java Servlets and JSP

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OPEN ELECTIVE-III
(CS0861) SIMULATION & MODELING

(OFFERED TO OTHER DEPARTMENTS)

PRE-REQUISITE:

1. A course on “Computer Oriented Statistical Methods”

COURSE OBJECTIVES:

The aim of this course is to introduce the simulation and modeling techniques and the tools for modeling and simulation of continuous, discrete and combined systems

SYLLABUS:

UNIT-I

System Models and Studies

System Models: Concepts of a System, System Environment, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of Models, Static Physical Models, Dynamic Physical Models, Static Mathematical Models, Dynamic Mathematical Models, Principles Used in Modeling. System Studies: Subsystems, A Corporate Model, Environment Segment, Production Segment, Management Segment, The Full Corporate Model, Types of System Study, System Analysis, System Design, System Postulation.

UNIT-II

Random Numbers

Random Number Generation: Properties, Generation of Pseudo-Random Numbers, Techniques of generating random numbers, tests for random numbers Random-Variate Generation: Inverse-Transform Technique, Acceptance- Rejection Technique, Special Properties.

UNIT-III

Simulation of Continuous and Discrete Systems

Simulation of Continuous Systems: A chemical reactor, Numerical integration vs. continuous system simulation, Selection of an integration formula, Runge-Kutta integration formulas, Simulation of a servo system, Simulation of a water reservoir system, Analog vs. digital simulation.Discrete System Simulation: Fixed time-step vs. event-to-event model, On simulating randomness, Generation of random numbers, Generation of non-uniformly distributed random numbers, Monte- Carlo computation vs. stochastic simulation.

UNIT-IV
System Simulation

Simulation of Queuing Systems: Rudiments of queuing theory, Simulation of a single-server queue, Simulation of a two-server queue, Simulation of more general queues.

Simulation of a Pert Network: Network model of a project, Analysis of activity network, Critical path computation, Uncertainties in activity durations, Simulation of activity network, Computer program for simulation, Resource allocation and cost considerations.

UNIT-V
Simulation Experimentation

Design and Evaluation of Simulation Experiments: Length of simulation runs, Variance reduction techniques, Experimental layout, Validation. Simulation languages: continuous and discrete simulation languages, continuous simulation languages, block-structured continuous simulation languages, expression-based languages, discrete-system simulation languages, gpss.

TEXT BOOKS:

1. System Simulation, Geoffrey Gordon, Prentice-Hall of India Private Limited, Second Edition, 1978. (for UNIT-I: Chapters 1 and 2)
2. Discrete-Event System Simulation, Jerry Banks, John S. Carson II, Barry L. Nelson, David M.Nicol, Pearson, Fifth Edition, 2010. (for UNIT-II: Chapters 7 and 8)
3. System Simulation with Digital Computer, Narsingh Deo, Prentice-Hall of India Private Limited, 1979. (for UNIT-III to V: Chapters 2 to 5 and 7,8).

REFERENCE BOOK:

1. System Modeling and Simulation: An Introduction, Frank L. Severance, Wiley Publisher, 2005

COURSE OUTCOMES:

By the end of the course, students will be able to:

CO1: Describe a model for a given system/set of data

CO2: Generate and test random number variants and employ them in developing simulation models

CO3: Design and evaluation of simulation experiments

CO4: Create simulation models of various types