MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

B.Tech – Computer Science and Engineering - Cyber Security
COURSE STRUCTURE & SYLLABUS (R22)
Applicable From 2022-23 Admitted Batch
Structure Breakup

S.No	Category	Breakup of credits(Total 160 credits)
1	Humanities and social sciences including management courses (HSMC)	10
2	Basic Sciences Courses (BS)	20
3	Engineering sciences courses including workshop, drawing basics of electrical/mechanical/computer etc.(ES)	22
4	Professional core courses (PC)	62
5	Professional Electives (PE)	18
6	Open Electives (OE)	9
7	Project work, seminar and internship in industry or elsewhere (PS)	19
8	Mandatory Courses	-
	TOTAL	160

I YEAR I SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2210001	Matrix Algebra and Calculus	BS	3	1	0	4	40	60	100
2	2210009	Engineering Chemistry	BS	3	1	0	4	40	60	100
3	2210501	Programming for Problem Solving	ES	3	0	0	3	40	60	100
4	2210201	Basic Electrical Engineering	ES	2	0	0	2	40	60	100
5	2210371	Engineering Drawing Practice	ES	1	0	4	3	40	60	100
6	2210518	Elements of Computer Science and Engineering	ES	0	0	2	1	50	--	50
7	2210072	Engineering Chemistry Laboratory	BS	0	0	2	1	40	60	100
8	2210571	Programming for Problem Solving Laboratory	ES	0	0	2	1	40	60	100
9	2210271	Basic Electrical Engineering Laboratory	ES	0	0	2	1	40	60	100
		Induction Program	-	-	-	-	-	-	-	-
Total Credits				**12**	**2**	**12**	**20**	**370**	**480**	**850**

I YEAR II SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2220002	Differential Equations and Vector Calculus	BS	3	1	0	4	40	60	100
2	2220008	Applied Physics	BS	3	1	0	4	40	60	100
3	2220372	Engineering Workshop	ES	0	1	3	2.5	40	60	100
4	2220010	English for Skill Enhancement	HSMC	2	0	0	2	40	60	100
5	2220401	Electronic Devices and Circuits	ES	2	0	0	2	40	60	100
6	2220572	Data Structures Laboratory	ES	0	1	2	2	40	60	100
7	2220071	Applied Physics Laboratory	BS	0	0	3	1.5	40	60	100
8	2220073	English Language and Communication Skills Laboratory	HSMC	0	0	2	1	40	60	100
9	2220575	IT Workshop	ES	0	0	2	1	40	60	100
10	2220021	Environmental Science	MC	3	0	0	0	-	-	-
Total Credits				**13**	**4**	**12**	**20**	**360**	**540**	**900**

II Year I Semester

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2230507	Discrete Mathematics	PC	3	0	0	3	40	60	100
2	2230504	Database Management Systems	PC	3	0	0	3	40	60	100
3	2230512	Computer Networks	PC	3	0	0	3	40	60	100
4	2230004	Computer Oriented Statistical Methods	BS	3	0	2*	4	40	60	100
5	2230510	OOPS Through JAVA	PC	3	0	0	3	40	60	100
6	2230574	Database Management Systems Lab	PC	0	0	2	1	40	60	100
7	2230578	Computer Networks Lab	PC	0	0	2	1	40	60	100
8	2230576	OOPS Through JAVA Lab	PC	0	0	2	1	40	60	100
9	2230583	Skill Development Course (Data visualization- R Programming/PowerBI)	PC	0	0	2	1	40	60	100
10	2230022	Gender Sensitization	MC	3	0	0	0	-	-	-
Total Credits				**18**	**0**	**10**	**20**	**360**	**540**	**900**

II Year II Semester

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2240016	Business Economics and Financial Analysis	HSMC	3	0	0	3	40	60	100
2	2246201	Computer System Architecture	PC	2	0	0	2	40	60	100
3	2240506	Software Engineering	PC	3	1	0	4	40	60	100
4	2240503	Python Programming	PC	3	0	0	3	40	60	100
5	2240509	Operating Systems	PC	3	0	0	3	40	60	100
6	2240573	Python Programming Lab	PC	0	0	2	1	40	60	100
7	2240577	Operating Systems Lab	PC	0	0	2	1	40	60	100
8	2240591	Field based project	PS	0	0	4	2	50	0	50
9	2240584	Skill Development Course(NodeJS/ReactJS/ Django)	PC	0	0	2	1	40	60	100
10	2240023	Constitution of India	MC	3	0	0	0	-	-	-
Total Credits				**17**	**1**	**10**	**20**	**370**	**480**	**850**

III Year – I Semester

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2260511	Design and Analysis of Algorithm	PC	3	1	0	4	40	60	100
2	2250519	Cryptography and Network Security	PC	3	0	0	3	40	60	100
3	2250524	Web Technologies	pc	3	0	0	3	40	60	100
4		Professional Elective I	PE	3	0	0	3	40	60	100
5		Open Elective I	OE	3	0	0	3	40	60	100
6	2250579	Design and Analysis of Algorithms Lab	PC	0	0	2	1	40	60	100
7	2250581	Cryptography and Network Security Lab	PC	0	0	2	1	40	60	100
8	2250587	Web Technologies	PC	0	0	2	1	40	60	100
9	2250592	Internship*	PS	0	0	2	1	0	100	100
10	2250024	Intellectual Property Rights	MC	3	0	0	0	-	-	-
Total Credits				**18**	**1**	**8**	**20**	**320**	**580**	**900**

*** Students have to complete internship in summer break after II year II semester**

III Year – II Semester

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2260558	Cloud computing	PC	3	0	0	3	40	60	100
2	2266202	Database Security	PC	3	0	0	3	40	60	100
3	2260515	Formal Languages and Automata Theory	PC	3	0	0	3	40	60	100
4		Professional Elective II	PE	3	0	0	3	40	60	100
5		Open Elective II	OE	3	0	0	3	40	60	100
6	2260585	Skill Development Course(UI design- Flutter)	PC	0	0	2	1	40	60	100
7	2266273	Database Security Lab	PC	0	0	2	1	40	60	100
8	2260074	Advanced English communication lab	PC	0	0	2	1	40	60	100
9	2260593	Industry Oriented Mini Project	PS	0	0	4	2	0	100	100
10	2260021	*Environmental Science		3	0	0	0	-	-	-
Total Credits				**18**	**0**	**10**	**20**	**320**	**580**	**900**

IV Year – I Semester

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2270017	Fundamentals ofManagement	HSMC	3	0	0	3	40	60	100
2	2276203	Block Chain & Cryptocurrenc y	PC	3	0	0	3	40	60	100
3	22X0545	Ethical Hacking	PC	3	0	0	3	40	60	100
4		Professional Elective III	PE	3	0	0	3	40	60	100
5		Open Elective III	OE	3	0	0	3	40	60	100
6	2276274	Block Chain & Cryptocurrency Lab	PC	0	0	2	1	40	60	100
7	2276275	Ethical Hacking Lab	PC	0	0	2	1	40	60	100
8	2270594	Project Stage – I	PS	0	0	6	3	100	-	100
Total Credits				**15**	**0**	**10**	**20**	**380**	**420**	**800**

IV Year – II Semester

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1		Professional Elective IV	PE	3	0	0	3	40	60	100
2		Professional Elective V	PE	3	0	0	3	40	60	100
3		Professional Elective VI	PE	3	0	0	3	40	60	100
4	2280595	Technical Seminar	PS	0	0	4	2	100	-	100
5	2280596	Project Stage – II	PS	0	0	18	9	40	60	100
Total Credits				**9**	**0**	**22**	**20**	**260**	**240**	**500**

PE I - Professional Elective I

S.No	Course Code	Course Title
1	22X6702	Data Ware Housing and Data Mining
2	22X6243	Intrusion Detection
3	22X0516	Artificial Intelligence
4	22X0565	Mobile Computing

PE II - Professional Elective II

S. No	Course Code	Course Title
1	22X1201	Linux Programming
2	22X0573	Ad-hoc Wireless Networks
3	22X0554	Data Analytics
4	22X0549	Web Security

PEIII – Professional Elective III

S. No	Course Code	Course Title
1	22X0517	Compiler Design
2	22X0514	Machine Learning
3	22X6244	Security Assessment & Risk Analysis
4	22X0547	Natural Language Processing

PE IV - Professional Elective IV

S. No	Course Code	Course Title
1	22X0550	Distributed Systems
2	22X0543	Soft computing
3	22X6245	Mobile & wireless security
4	22X0570	Digital Image Processing

PE V - Professional Elective V

S.No	Course Code	Course Title
1	22X1202	Software Project Management
2	22X0551	Deep Learning
3	22X6246	Enterprise Security
4	22X0544	Internet of Things

PE VI - Professional Elective VI

S. No	Course Code	Course Title
1	22X0559	Com uter Vision & Robotics
2	22X6247	High Performance Computing
3	22X0563	Cognitive Computing
4	22X0562	Business Intelligence

Open Electives

S. No	Course Code	Course Title
Open Elective - I		
1	22X0510	Java Programming
	22X0542	Network Programming
Open Elective - II		
2	22X0519	Cryptography and Network Security
	22X6202	Data Base Security
Open Elective - III		
3	22X6203	Block chain & Crypto currency
	22X6241	Intrusion Detection

I-I

2210001: MATRIX ALGEBRA AND CALCULUS(Common to all)

B.Tech. I Year- I Semester **L T P C**

3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- Types of matrices and their properties, concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of eigen values and eigen vectors and to reduce the quadratic form to canonical form
- Geometrical approach to the mean value theorems and their application to the mathematical problems. Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative and Finding maxima and minima of function of two and three variables
- Evaluation of multiple integrals and their applications

Course outcomes: After learning the contents of this paper the student must be able to

CO1: Write the matrix representation of a set of linear equations and to analyses the solution of the System of equations.

CO2: Find the Eigen values and Eigen vectors and reduce the quadratic form to canonical form using orthogonal transformations.

CO3: Solve the applications on the mean value theorems, and evaluate the improper integrals using Beta and Gamma functions.

CO4: Find the extreme values of functions of two variables with/ without constraints.

CO5: Evaluate the multiple integrals and apply the concept to find areas, volumes.

UNIT-I: Matrices **10 L**

Rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method, System of linear equations: Solving system of Homogeneous and Non-Homogeneous equations by Gauss elimination method, Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors **10 L**

Eigen values, Eigen vectors and their properties, Diagonalization of a matrix, Cayley-Hamilton Theorem (without proof), finding inverse and power of a matrix by Cayley-Hamilton Theorem, Quadratic forms and Nature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

UNIT-III: Calculus **10 L**

Mean value theorems: Rolle's Theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem, Taylor's Series (without proofs). Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-IV: Multivariable Calculus (Partial Differentiation and applications) 10 L

Partial Differentiation: Euler's Theorem, Total derivative, Jacobian, Functional dependence-independence. Applications: Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

UNIT-V: Multivariable Calculus (Integration) 8 L

Evaluation of Double Integrals (Cartesian and polar coordinates), change of order of integration (only Cartesian form), Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and triple integrals (Cartesian to Spherical and Cylindrical polar coordinates).Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals).

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition,2010.
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5thEditon,2016.

REFERENCE BOOKS:

1. Erwin kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley & Sons,2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9thEdition, Pearson, Reprint, 2002.
3. H. K. Dassand Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, NewDelhi.

2210009: ENGINEERING CHEMISTRY

B.Tech. I Year- I Semester **L T P C**
3 1 0 4

Course Objectives:

1. To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
2. To include the importance of water in industrial usage, fundamental aspects of battery chemistry, significance of corrosion it's control to protect the structures.
3. To imbibe the basic concepts of petroleum and its products.
4. To acquire required knowledge about engineering materials like cement, smart materials and Lubricants.

Course Outcomes:

1. Students will acquire the basic knowledge of electrochemical procedures related to corrosion and its control.
2. The students are able to understand the basic properties of water and its usage in domestic and industrial purposes.
3. They can learn the fundamentals and general properties of polymers and other engineering materials.
4. They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs.

UNIT - I: Water and its treatment: [8]

Introduction to hardness of water – Estimation of hardness of water by complexometric method and related numerical problems. Potable water and its specifications - Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and break - point chlorination. Defluoridation- Determination of F^- ion by ion- selective electrode method. Boiler troubles: Sludges, Scales and Caustic embrittlement. Internal treatment of Boiler feed water - Calgon conditioning - Phosphate conditioning - Colloidal conditioning, External treatment methods - Softening of water by ion- exchange processes. Desalination of water – Reverse osmosis.

UNIT – II Battery Chemistry & Corrosion [8]

Introduction - Classification of batteries- primary, secondary and reserve batteries with examples. Basic requirements for commercial batteries. Construction, working and applications of: Zn-air and Lithium ion battery, Applications of Li-ion battery to electrical vehicles. Fuel Cells- Differences between battery and a fuel cell, Construction and applications of Methanol Oxygen fuel cell and Solid oxide fuel cell. Solar cells - Introduction and applications of Solar cells.

Corrosion: Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods.

UNIT - III: Polymeric materials: [8]

Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples – Nylon 6:6, Terylene

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, Preparation, Properties and engineering applications of PVC and Bakelite, Teflon, Fiber reinforced plastics (FRP).

Rubbers: Natural rubber and its vulcanization.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT - IV: Energy Sources: [8]

Introduction, Calorific value of fuel – HCV, LCV- Dulongs formula. Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG, Biodiesel – Transesterification, advantages.

UNIT - V: **Engineering Materials: [8]**

Cement: Portland cement, its composition, setting and hardening.

Smart materials and their engineering applications

Shape memory materials- Poly L- Lactic acid. Thermoresponse materials- Polyacryl amides, Poly vinyl amides

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

TEXT BOOKS:

1. Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, 2010
2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, 2016
3. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala, Pearson Publications, 2021.
4. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley Publications.

REFERENCE BOOKS:

1. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
2. Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi (2011)

2210501: PROGRAMMING FOR PROBLEM SOLVING

B.Tech. I Year I Sem. **L T P C**
3 0 0 3

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of the C programming language.
- To learn the usage of structured programming approaches in solving problems.

Course Outcomes: The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in the C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

UNIT - I: Introduction to Programming

Compilers, compiling and executing a program.

Algorithm – Flowchart / Pseudocode with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.Command line arguments

UNIT - II: Arrays, Strings, Structures and Pointers:

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self- referential structures, usage of self referential structures in linked list (no implementation) Enumerationdata type

UNIT - III: Preprocessor and File handling in C:

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell andrewind functions.

UNIT - IV: Function and Dynamic Memory Allocation:

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays ofdifferent data types

UNIT - V: Searching and Sorting:

Basic searching in an array of elements (linear and binary search techniques), Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms), Basic concept of order of complexitythrough the example programs

TEXT BOOKS:

1. Jeri R. Hanly and Elliot B.Koffman, Problem solving and Program Design in C 7th Edition,Pearson
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rdEdition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall ofIndia
2. E. Balagurusamy, Computer fundamentals and C, 2nd Edition, McGraw-Hill
3. Yashavant Kanetkar, Let Us C, 18th Edition, BPB
4. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
5. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
6. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition
7. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill

(2210201)BASIC ELECTRICAL ENGINEERING

(Common for ECE, CSE, CSC,CSD, CSM, CSIT & IT)

B.Tech. I Year- I Semester

L	T	P	C
2	0	0	2

Course Prerequisites: Nil

Course Objectives:

- To analyse and solve electric circuits.
- To provide an understanding of basics in Electrical circuits.
- To identify the types of electrical machines for a given application.
- To explain the working principles of Electrical Machines and single phase transformers.

Course Outcomes

After completion of this course the student is able to

- Analyse Electrical circuits to compute and measure the parameters of Electrical Energy.
- Comprehend the working principles of Electrical DC Machines.
- Identify and test various electrical switchgear, single phase transformers and assess the ratings needed in given application.
- Comprehend the working principles of electrical AC machines.

UNIT-IDC Circuits:

Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin's and Norton's Theorems.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain the need of circuit elements. (L2)
- Analyse the resistive circuits with independent sources. (L4)
- Solve D.C. circuits by using KVL and KCL. (L3)
- Apply network theorems for solving D.C. circuit problems. (L3)

Unit-IIAC Circuits:

Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power and power factor. Analysis of single-phase ac circuits consisting of R, L, C, and RL, RC, RLC combinations (series only). Three phase balanced circuits, voltage and current relations in star and delta connections.

Learning Outcomes:

At the end of this unit, the student will be able to

- Develop an understanding of the fundamental laws and elements of A.C circuits. (L3)
- Learn the energy properties of electric elements and the techniques to measure voltage and current. (L2)
- Explain the concept of steady state. (L2)

UNIT-III Transformers:

Ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Learning Outcomes:

At the end of this unit, the student will be able to

- Demonstrate knowledge of construction and operating principles of single-phase transformers. (L3)
- Determine losses, efficiency, and voltage regulation of a transformer under specific operating conditions. (L5)
- Identify the connections of a three phase transformer. (L3)
- Illustrate the performance characteristics of different induction motors. (L3)

UNIT-IV: Electrical Machines:

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited dcmotor. Construction and working of synchronous generators.

Learning Outcomes:

At the end of this unit, the student will be able to

- Explain construction & working of induction motor - DC motor. (L2)
- Perform speed control of DC Motor. (L3)
- Explain principle and operation of DC Generator & Motor. (L2)

UNIT-V Electrical Installations:

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

Learning Outcomes:

At the end of this unit, the student will be able to

- Understand working principles of LT Switchgear components. (L2)
- Perform elementary calculations for energy consumption, power factor improvement and battery backup. (L3)

Text Books:

1. Basic Electrical Engineering - By M.S.Naidu and S. Kamakshaiah – TMH.
2. Basic Electrical Engineering –By T.K.Nagasarkar and M.S. Sukhija Oxford University Press.

Reference Books:

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
3. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin Pearson.

2210371: ENGINEERING DRAWING PRACTICE

B.Tech. I Year – I Semester

L	T	P	C
1	0	4	3

Pre-requisites: Knowledge in dimensions and units, Usage of geometrical instruments and analytical ability

COURSE OBJECTIVES

1. To provide basic concepts in engineering drawing.
2. To impart knowledge about standard principles of orthographic projection of objects.
3. To draw sectional views and pictorial views of solids.

COURSE OUTCOMES: After completion of the course the student is able to

1. Familiarize with BIS standards and conventions used in engineering graphics. (L3)
2. Draw various engineering curves e.g., ellipse, parabola, cycloids and involutes etc. andconstruct various reduced scales e.g., plain and diagonal scale. (L2)
3. Ability to draw orthographic projections and isometric projections of given engineering components. (L3)
4. Visualize different views like elevation and plan for a given line, plane figures or solid objects. (L2)
5. Develop the lateral surfaces of simple solids. (L5)
6. To know about isometric projection. (L2)

UNIT – 1 **CLASSES:12**

Introduction To Engineering Drawing

Principles of Engineering Graphics and their Significance-Drawing Instruments and their Uses-Conventions in Drawing-BIS -Lettering and Dimensioning.

Geometrical Constructions: Bisecting a Line, Arc. Dividing A Line into 'N' Equal Parts,Construction of Polygons, Division of Circle into Equal Parts (8 And 12)

Construction of Scales: Plain and Diagonal Scale.

Conic Sections: Ellipse, Parabola, Hyperbola and Rectangular Hyperbola- GeneralMethods only.

Engineering Curves: Cycloid, Epicycloid, Hypocycloid.

Involutes: For Circle, Triangle, Square, Pentagon and Hexagon.

LEARNING OUTCOME:

1. To understand the basic standards, conventions of engineering drawing and how to use the instruments in drawing. (L1)
2. Learn and draw the various types of curves used in engineering application. (L2)

UNIT – 2 **CLASSES:12**

Orthographic Projections

Principles- Assumptions- Different Angles of Projection.

Projections of Points- Located in all the quadrants

Projections of Lines- Parallel, Perpendicular, inclined to one plane and inclined to bothplanes.

Projections of Planes: Simple and auxiliary position of a plane.

LEARNING OUTCOME:

1. Knowledge in various planes of projections. (L1)
2. To draw the front view, top view and side views of the given geometrical elements. (L2)

UNIT – 3 **CLASSES :09**

Projections Of Solids

Classification of solids- simple and inclined to one plane position of Prisms, Pyramids, Cylinder and Cone

LEARNING OUTCOME:

1. To understand the various solid types. (L2)
2. To draw all the views of the given solid in all possible orientations. (L3)

UNIT – 4 **CLASSES :12**

Section Of Solids

Types of Section Planes, Sectioning of Prisms, Pyramids, Cylinders and Cones.

Development Of surfaces

Development of surfaces of right Regular Solids- Parallel Line Method, Radial Line Method.

LEARNING OUTCOME:

1. To identify the cut surfaces and represent the sectional views graphically when the solid is sectioned. (L4)
2. To develop the surfaces of solid using various methods. (L5)

UNIT – 5 **CLASSES :09**

Isometric Projections

Principles, Isometric Views of Planes, Solids- Box Method, Offset Method, Compound solids, Sectioned Solids. Conversion of Isometric to Multi view projection. And vice versa

LEARNING OUTCOME:

1. Knowledge in principles of isometric projection. (L2)
2. Conversion of isometric to orthographic and vice-versa. (L2)

TEXT BOOKS:

1. N.D.Bhatt, Elementary Engineering Drawing, Charotar Publishers,2012.
2. K.Veenugopal, –Engineering Drawing and Graphics + AutoCAD New Age International Pvt. Ltd, 2011.

REFERENCE BOOKS:

1. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishers Engineering Drawing- Johle/Tata Macgraw Hill.
2. Basanth Agrawal and C M Agrawal –Engineering Drawing 2nd Edition -McGraw-Hill Education (India) Pvt.Ltd

2210518:ELEMENTS OF COMPUTER SCIENCE AND ENGINEERING

B.Tech. I Year I Sem. **L T P C**

0 0 2 1

Course Objective: To provide an overview of the subjects of computer science and engineering.

Course Outcomes:

1. Know the working principles of functional units of a basic Computer
2. Understand program development, the use of data structures and algorithms in problem solving.
3. Know the need and types of operating system, database systems.
4. Understand the significance of networks, internet, WWW and cyber security.
5. Understand Autonomous systems, the application of artificial intelligence.

UNIT – I

Basics of a Computer – Hardware, Software, Generations of computers. Hardware - functional units, Components of CPU, Memory – hierarchy, types of memory, Input and output devices.

An Introduction to Computer Science:

The Definition of Computer Science, Algorithms, the Importance of Algorithmic Problem Solving, A Brief History of Computing

UNIT – II

Software development – waterfall model, Agile, Types of computer languages – Programming, markup, scripting Program Development – steps in program development.

UNIT – III

The Building Blocks: Binary Numbers, Boolean Logic, Introduction, The Binary Numbering System Binary Representation of Numeric and Textual Information, Binary Representation of Sound and Images. Computer Systems Organization: Introduction, Memory and Cache, Input/output and Mass Storage

UNIT – IV

Computer Networks, the Internet and the World Wide Web:

Introduction, Communication Links, Local Area Networks, Wide Area Networks, Overall Structure of the Internet, Communication Protocols.

A Brief History of the Internet and the World Wide Web: The Internet, The World Wide Web.

Security – information security, cyber security, cyber laws

UNIT – V

Autonomous Systems: IoT, Robotics, Drones, Artificial Intelligence – Learning, Game Development, natural language processing, image and video processing. Cloud Basics

TEXT BOOK:

1. Invitation to Computer Science, G. Michael Schneider, Macalester College, Judith L. Gersting University of Hawaii, Hilo, Contributing author: Keith Miller University of Illinois, Springfield.

REFERENCE BOOKS:

1. Fundamentals of Computers, ReemaThareja, Oxford Higher Education, Oxford University Press.
2. Introduction to computers, Peter Norton, 8th Edition, Tata McGraw Hill.
3. Computer Fundamentals, Anita Goel, Pearson Education India, 2010.
4. Elements of computer science, Cengage.

2210072:ENGINEERING CHEMISTRY LABARORARY

B.Tech. I Year – I Semester **L T P C**

0 0 2 1

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness of water to check its suitability for drinking purpose.
- Students are able to perform estimations of acids and bases using conductometry, potentiometry and pH metry methods.
- Students will learn to prepare polymers such as Bakelite and nylon-6 in the laboratory.
- Students will learn skills related to the lubricant properties such as saponification value, surface tension and viscosity of oils.

Course Outcomes: The experiments will make the student gain skills on:

- Determination of parameters like hardness of water and rate of corrosion of mild steel in various conditions.
- Able to perform methods such as conductometry, potentiometry and pH metry in order to find out the concentrations or equivalence points of acids and bases.
- Students are able to prepare polymers like bakelite and nylon-6.
- Estimations saponification value, surface tension and viscosity of lubricant oils.

List of Experiments:

I. **Volumetric Analysis:** Estimation of Hardness of water by EDTA Complexometry method.

II. **Conductometry:** Estimation of the concentration of an acid by Conductometry.

III. **Potentiometry:** Estimation of the amount of Fe^{+2} by Potentiomentry.

IV. **pH Metry:** Determination of an acid concentration using pH meter.

V. **Preparations:**

1. Preparation of Bakelite.
2. Preparation Nylon – 6.

II. **Lubricants:**

1. Estimation of acid value of given lubricant oil.
2. Estimation of Viscosity of lubricant oil using Ostwald's Viscometer.

III. **Corrosion:** Determination of rate of corrosion of mild steel in the presence and absence of inhibitor.

IV. **Virtual lab experiments**

1. Construction of Fuel cell and its working.
2. Smart materials for Biomedical applications
3. Batteries for electrical vehicles.
4. Functioning of solar cell and its applications.

REFERENCE BOOKS:

1. Lab manual for Engineering chemistry by B. Ramadevi and P. Aparna, S Chand Publications, New Delhi (2022)
2. Vogel's text book of practical organic chemistry 5th edition
3. Inorganic Quantitative analysis by A.I. Vogel, ELBS Publications.
4. College Practical Chemistry by V.K. Ahluwalia, Narosa Publications Ltd. New Delhi (2007).

2210571: PROGRAMMING FOR PROBLEM SOLVING LABORATORY

B.Tech. I Year I – Semester.

L	T	P	C
0	0	2	1

[Note: The programs may be executed using any available Open Source/ Freely available IDESome of the Tools available are:
CodeLite: https://codelite.org/ Code: Blocks:
http://www.codeblocks.org/
DevCpp: http://www.bloodshed.net/evcpp.html
Eclipse: http://www.eclipse.org
This list is not exhaustive and is NOT in any order of preference]

Course Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:

- Formulate the algorithms for simple problems
- Able to develop programs based on condition checking
- Implement pyramid programs
- Able to perform matrix applications
- Modularize the code with functions so that they can be reused
- Create, read and write to and from simple text and binary files

Simple numeric problems:

a. Write a program for the simple, compound interest.
b. Write a program to implement bit-wise operators.
c. Write a program for converting Fahrenheit to Celsius.
d. Write a simple program that converts one given data type to another using auto conversion and casting. Take the values from standard input.
e. Writeasimpleprogramtofindlargestoftwoandthreenumbersusingconditionaloperator.
f. Write a program for swapping two numbers with and without using third variable and using bitwise operators.

Condition branching and statements:

a. Write a program for finding larges of three numbers.
b. Write a program that declares Class awarded for a given percentage of marks, where marks<40%=Failed, 40% to<60% = Second class, 60% to<70%=First class, >=70%=Distinction. Read percentage from standard input.
c. Write a C program to find the roots of a Quadratic equation.
d. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %and use Switch Statement)

Condition branching and loops:

a. Write a program to find whether the given number is a prime or not.
b. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
c. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, number=5 and no. of rows = 3, the output should be:

5x1=5
5x2=10
5x3=15

d. Write a program that shows the binary equivalent of a given positive number between0to255.
e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
f. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
g. Write a C program to calculate the following ,where x is a fractional value.$1-x/2+x^2/4-x^3/6$
h. Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:$1+x+x^2+x^3+\ldots+x^n$. For example: if n=3 and x=5, then the program compute1+5+25+125.
i. Write a C program to construct a pyramid of numbers as follows:

1	*	1	1	*
12	**	23	22	**
123	***	456	333	***
			4444	**
				*

j. Write a C program to find given number is Armstrong number or not.
k. Write a C program to find given number is Perfect number or not.

Arrays, Strings, Pointers and Structures:

a. Write a C program to find the minimum, maximum and average in an array of integers.
b. Write a program to compute Mean, Variance, Standard Deviation, Sorting of n elements in single dimension array.
c. Write a C program that perform the following:
   i. Addition of Two Matrices
   ii. Multiplication of Two Matrices
   iii. Transposeofamatrixwithmemorydynamicallyallocatedforthenewmatrixasrowandcolumncounts may not be same.
d. Write a C program that sorts a given array of names.
e. Write a C program that perform the following operations:
   i. To insert a sub-string into a given main string from a given position.
   ii. To delete n Characters from a given position in a given string.
f. Write a program for reading elements using pointer in to array and display the values using array.
g. Write a program for display values reverse order from array using pointer.
h. Write a program through pointer variable to sum of n elements from array.
i. Write a program to implement student information by using structure to function.
j. Write a program to sort student id or name using structures.

Functions:

a. Write a C program to find factorial of a given number using functions.
b. Write a C program to perform swapping using functions.
c. Write a C program to find LCM, GCD of two numbers using functions.
d. Write a C program to implement sorting using functions.
e. Write a C program to create and print two dimensional array using functions.
f. Write a C program to find factorial of a given number using recursion.
g. Write a C program to find Fibonacci series using recursion
h. Write a C program to implement Towers of Hanoi problem using recursion.

Files:

a. Write a C program to display the contents of a file to standard out put device.
b. Write a C program which copies one file to another, replacing all lower case characters with their upper case equivalents.
c. Write a C program to count the occurrence of a character in a text file. The file name and the character are supplied as command line arguments.
d. Write a C program to merge two files in to a third file (i.e. ,the contents of the first file followed by those of these cond are put in the third file).

CASE STUDY I: Develop Sample Student Data base

Create a structure to specify data on students given below: Roll number, Name, Department, Course, Year of joining

Assume that there are not more than 15 students in the collage.

(a) Write a function to print names of all students who joined in a particular year.
(b) Write a function to print the data of a student whose roll number is given.

CASE STUDY 2: Perform simple Bank Transactions

Create a structure to specify data of customers in a bank. The data to be stored is: Account number, Name, Balance in account. Assume maximum of 20 customers in the bank.
(a) Write a function to print the Account number and name of each customer with balance below Rs. 100.
(b) If a customer request for withdrawal or deposit, it is given in the form: Acct. no, amount, code (1 for deposit, 0 for withdrawal)
Write a program to give a message, "The balance is insufficient for the specified with drawal".

CASE STUDY 3: Provide Serial Numbers for Engine parts

An automobile company has serial number for engine parts starting from AA0 to FF9. The other characteristics of parts to be specified in a structure are: Year of manufacture, material and quantity manufactured.
(a) Specify a structure to store information corresponding to a part.
(b) Retrieve information on parts with serial numbers between BB1 and CC6.

Reference Books

1. Byron Gottfried, Schaum"s Outline of Programming with C, Mc Graw-Hill
2. Let us C by YashavantKanetkar BPB publications(16th Edition)
3. B.A.ForouzanandR.F.GilbergCProgrammingandDataStructures,CengageLearning,(3rd Edition)
4. BrianW.KernighanandDennisM.Ritchie,TheCProgrammingLanguage,PrenticeHallofIndia
5. R. G. Dromey, How to solve It by Computer, Pearson(16th Impression)
6. Programming in C, Stephen G.Kochan, Fourth Edition, and Pearson Education.
7. Herbert Schildt, C:TheCompleteReference, McGrawHill,4th Edition.

(2210271)BASIC ELECTRICAL ENGINEERING LABORATORY

(ECE, CSE, CSC, CSD, CSM, CSIT& IT)

B.Tech I Year-I Semester **L T P C**
0 0 2 1

Course Objectives:

To analyze a given network by applying various electrical laws and network theorems

- To know the response of electrical circuits for different excitations
- To calculate, measure and know the relation between basic electrical parameters.
- To analyze the performance characteristics of DC and AC electrical machines

Course Outcomes:

- Get an exposure to basic electrical laws.
- Understand the response of different types of electrical circuits to different excitations.
- Understand the measurement, calculation and relation between the basic electrical parameters
- Understand the basic characteristics of transformers and electrical machines.

List of experiments/demonstrations:

1. Verification of Ohms Law
2. Verification of KVL and KCL
3. Verification of superposition theorem.
4. Verification of Thevenin's and Norton's theorem.
5. Resonance in series RLC circuit.
6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits.
7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single Phase Transformer.
8. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor.
9. Torque-Speed Characteristics of a Three-phase Induction Motor.

Any two experiments from the given list

10. Three Phase Transformer: Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta-star, Star-Star)
11. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation)
12. Measurement of Active and Reactive Power in a balanced Three-phase circuit
13. No-Load Characteristics of a Three-phase Alternator

TEXT BOOKS:

1. D.P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 4th Edition, 2019.
2. MS Naidu and S Kamakshaiah, "Basic Electrical Engineering", Tata McGraw Hill, 2nd Edition, 2008.

REFERENCE BOOKS:

1. P. Ramana, M. Suryakalavathi, G.T.Chandrasheker,"Basic Electrical Engineering", S. Chand, 2 nd Edition, 2019.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009
3. M. S. Sukhija, T. K. Nagsarkar, "Basic Electrical and Electronics Engineering", Oxford, 1st Edition, 2012.
4. Abhijit Chakrabarthi, Sudipta Debnath, Chandan Kumar Chanda, "Basic Electrical Engineering", 2nd Edition, McGraw Hill, 2021.
5. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
6. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
7. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

I-II

2220002: DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS(Common to all)

B.Tech. I Year-II Semester **L T P C**
3 1 0 4

Pre-requisites: Mathematical Knowledge at pre-university level

Course Objectives: To learn

- Methods of solving the differential equations of first order and first degree.
- Concept of higher order liner differential equations.
- Concept, properties of Laplace transforms, solving ordinary differential equations by using Laplace transforms techniques.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course outcomes: After learning the contents of this paper the student must be able to

CO1: Identify whether the given first order differential equation is exact or not.
CO2: Solve higher differential equation and apply the concept of differential equation to real world problems.
CO3: Use the Laplace transforms techniques for solving ODE's.
CO4: Apply the Del operator to scalar and vector point functions.
CO5: Evaluate the line, surface and volume integrals and converting them from one to another.

UNIT-I: First Order ODE **8L**

Exact differential equations, Equations reducible to exact differential equations, linear and Bernoulli's equations, Orthogonal Trajectories (only in Cartesian Coordinates). Applications: Newton's law of cooling, Law of natural growth and decay.

UNIT-II: Ordinary Differential Equations of Higher Order **10 L**

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax}, sin ax , cos ax, polynomials in x, e^{ax} V(x) and x V(x), method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III: Laplace transforms **10 L**

Laplace Transforms: Laplace Transform of standard functions, First shifting theorem, Second shifting theorem, Unit step function, Dirac delta function, Laplace transforms of functions when they are multiplied and divided by 't', Laplace transforms of derivatives and integrals of function, Evaluation of integrals by Laplace transforms, Laplace transform of periodic functions, Inverse Laplace transform by different methods, convolution theorem (without proof). Applications: solving Initial value problems by Laplace Transform method.

UNIT-IV: Vector Differentiation **10 L**

Vector point functions and scalar point functions, Gradient, Divergence and Curl, Directional derivatives, Vector Identities, Scalar potential functions, Solenoidal and Irrotational vectors.

UNIT-V:Vector Integration **10 L**

Line, Surface and Volume Integrals, Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition,2010
2. R.K. Jain and S.R.K. Iyengar, Advanced Engineering Mathematics, Narosa Publications, 5th Edition,2016.

REFERENCE BOOKS:

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9thEdition, John Wiley & Sons, 2006.
2. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3. H. K. Dassand Er. Rajnish Verma, Higher Engineering Mathematics, S Chand and Company Limited, NewDelhi.

2220008: APPLIED PHYSICS

B.Tech. I Year – II Semester **L T P C**

3 1 0 4

Prerequisites: 10 + 2 Physics

Course Objectives: The objectives of this course for the student are to:

1. Understand the basic principles of quantum physics and band theory of solids.
2. Understand the underlying mechanism involved in construction and working principles of various semiconductor devices.
3. Study the fundamental concepts related to the dielectric, magnetic and energy materials.
4. Identify the importance of nanoscale, quantum confinement and various fabrications techniques.
5. Study the characteristics of lasers and optical fibres.

Course Outcomes: At the end of the course the student will be able to:

1. Understand physical world from fundamental point of view by the concepts of Quantum
2. mechanics and visualize the difference between conductor, semiconductor, and an insulator by classification of solids.
3. Identify the role of semiconductor devices in science and engineering Applications.
4. Explore the fundamental properties of dielectric, magnetic materials and energy for their applications.
5. Appreciate the features and applications of Nanomaterials.
6. Understand various aspects of Lasers and Optical fiber and their applications in diverse fields.

UNIT - I: QUANTUM PHYSICS AND SOLIDS

Quantum Mechanics: Introduction to quantum physics, Blackbody radiation, Photoelectric effect, de-Broglie Hypothesis, Matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle, Born interpretation of the wave function, Time independent Schrodinger's wave equation, Particle in one dimensional potential box.

Solids: Free electron theory (Drude & Lorentz, Sommerfeld) (qualitative), Bloch's theorem -Kronig-Penney model, Effective mass of an electron, Origin of energy bands, Classification of solids.

UNIT - II: SEMICONDUCTORS AND DEVICES

Intrinsic and Extrinsic semiconductors, Hall effect, Direct and Indirect band gap semiconductors, Construction, Principle of operation and characteristics of P-N Junction diode, Zener diode and bipolar junction transistor (BJT) - LED, PIN diode, Avalanche photo diode (APD) and solar cells, their structure, Materials, Working principle and characteristics.

UNIT - III: DIELECTRIC, MAGNETIC AND ENERGY MATERIALS

Dielectric Materials: Basic definitions, Types of polarizations (qualitative), Ferroelectric, Piezoelectric, and Pyroelectric materials, Applications.

Magnetic Materials: Domain theory of ferromagnetism, Soft and Hard magnetic materials, Magnetostriction, Magnetoresistance, Applications.

Energy Materials: Conductivity of liquid and solid electrolytes, Superionic conductors, Materials and electrolytes for super capacitors.

UNIT - IV: NANOTECHNOLOGY

Nanoscale, Quantum confinement, Surface to volume ratio, Bottom-up fabrication: Sol-gel, precipitation methods, Top-down fabrication: Ball milling, Physical vapor deposition (PVD), Characterization techniques: XRD, SEM and TEM, Applications of nano materials.

UNIT - V: LASER AND FIBER OPTICS

Lasers: Laser beam characteristics, Three quantum processes, Einstein coefficients and their relations, Lasing action, Population inversion, Pumping methods, Ruby laser, He-Ne laser, Nd:YAG laser, Applications of laser.

Fiber Optics: Introduction to optical fibers, Total internal reflection, Construction of optical fiber, Classification of optical fibers, Acceptance angle - Numerical aperture, Losses in optical fibers, Optical fiber for communication system, Applications of optical fibers.

TEXT BOOKS:

1. M. N. Avadhanulu, P.G. Kshirsagar & TVS Arun Murthy" A Text book of Engineering Physics", S. Chand Publications, 11th Edition 2019.
2. Engineering Physics by Shatendra Sharma and Jyotsna Sharma, Pearson Publication,2019
3. Semiconductor Physics and Devices- Basic Principle – Donald A, Neamen, Mc Graw Hill, 4th Edition, 2021.
4. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage Learning, 2nd Edition,2022.
5. Essentials of Nanoscience & Nanotechnology by Narasimha Reddy Katta, Typical Creatives NANO DIGEST, 1st Edition, 2021.

REFERENCE BOOKS:

1. Quantum Physics, H.C. Verma, TBS Publication, 2nd Edition 2012.
2. Fundamentals of Physics – Halliday, Resnick and Walker, John Wiley &Sons,11th Edition, 2018.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Eastern, 2019.
4. Elementary Solid State Physics, S.L. Gupta and V. Kumar, Pragathi Prakashan, 2019.
5. A.K. Bhandhopadhya - Nano Materials, New Age International, 1stEdition, 2007.
6. Energy Materials a Short Introduction to Functional Materials for Energy Conversion and Storage Aliaksandr S. Bandarenka, CRC Press Taylor & Francis Group
7. Energy Materials, Taylor & Francis Group, 1st Edition, 2022.

2220372: ENGINEERING WORK SHOP

B.Tech. I Year - II – Semester. **L T P C**

0 1 3 2.5

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, Equipment and machines

Course Outcomes:

- Explain the design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint. (L4)
- Demonstrate the design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit. (L4)
- Understand to make various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder. (L4)
- Demonstrate the design and model various basic prototypes in the trade of Welding. (L4)
- Explain to make various basic prototypes in the trade of Black smithy such as J shape, and S shape. (L4)
- Understand to perform various basic House Wiring techniques such as connecting one lamp with one switch, connecting two lamps with one switch, connecting a fluorescent tube, Series wiring, Go down wiring. (L4)

UNIT I - CARPENTRY & FITTING

- **Carpentry** – Introduction, Carpentry tools, sequence of operations and applications (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
- **Fitting** – Introduction, fitting tools, sequence of operations and applications (V-Fit, Dovetail Fit & Semi-circular fit)

Learning Outcomes: Students should be able to,

- Understand the trade of carpentry and fitting. (L2)
- Explain the tools involved in manufacturing operations. (L3)
- Evaluate the applications of carpentry and fitting. (L4)

UNIT II - TIN SMITHY AND BLACKSMITHY

- **Tin-Smithy** – Introduction, Tin smithy tools, sequence of operations and applications (Square Tin, Rectangular Tray & Conical Funnel).
- **Blacksmithy**- Introduction, Blacksmithy tools, sequence of operations and applications (Round to Square, Fan Hook and S-Hook)

Learning Outcomes: Students should be able to,

- Understand the oldest manufacturing methods. (L2)
- Describe the sequence of operations involved. (L3)
- Explain the safety precautions and tools usage. (L4)

UNIT III - HOUSE WIRING AND WELDING

- **House-wiring** – Introduction, Electrical wiring tools, sequence of operations and applications (Parallel & Series, Two-way Switch and Tube Light)
- **Welding Practice** – Introduction, electrode, welding tools, and sequence of operations. Advantages and applications (Arc Welding)

Learning Outcomes:

- Students should be able to,
- Discuss the topic of Heat engines.(L3)
- Identify types of Heat engines cycles.(L5)
- Evaluate the Factors affecting routing procedure, Route Sheet.(L4)

Text Books:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

References:

1. Work shop Manual – P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP

2220010: English for Skill Enhancement

B.Tech I Year II Sem.

L	T	P	C
2	0	0	2

Course Objectives: This course will enable the students to:

1. Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
2. Develop study skills and communication skills in various professional situations.
3. Equip students to study engineering subjects more effectively and critically using thetheoretical and practical components of the syllabus.

Course Outcomes: Students will be able to:

1. Understand the importance of vocabulary and sentence structures.
2. Choose appropriate vocabulary and sentence structures for their oral and writtencommunication.
3. Demonstrate their understanding of the rules of functional grammar.
4. Develop comprehension skills from the known and unknown passages.
5. Take an active part in drafting paragraphs, letters, essays, abstracts, précis and reports invarious contexts.
6. Acquire basic proficiency in reading and writing modules of English.

UNIT - I

Chapter entitled '***Toasted English*' by R.K.Narayan** from ***"English: Language, Context andCulture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: The Concept of Word Formation -The Use of Prefixes and Suffixes - Acquaintance with Prefixes and Suffixes from Foreign Languages to form Derivatives - Synonyms and Antonyms

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Writing: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for Writing precisely – Paragraph Writing – Types, Structures and Features of a Paragraph - Creating Coherence- Organizing Principles of Paragraphs in Documents.

UNIT - II

Chapter entitled **'Appro JRD' by Sudha Murthy** from ***"English: Language, Context and Culture"published*** by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Misspelt - Homophones, Homonyms and Homographs

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreementand Subject-verb Agreement.

Reading: Sub-Skills of Reading – Skimming and Scanning – Exercises for Practice

Writing: Nature and Style of Writing- Defining /Describing People, Objects, Places andEvents – Classifying- Providing Examples or Evidence.

UNIT - III

Chapter entitled **'Lessons from Online Learning' by F.Haider Alvi, Deborah Hurst et al** from ***"English: Language, Context and Culture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Words Often Confused - Words from Foreign Languages and their Use in English. **Grammar:** Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-Skills of Reading – Intensive Reading and Extensive Reading – Exercises for Practice.

Writing: Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter ofRequisition, Email Etiquette, Job Application with CV/Resume.

UNIT - IV

Chapter entitled **'Art and Literature' by Abdul Kalam** from ***"English: Language, Context andCulture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Survey, Question, Read, Recite and Review (SQ3R Method) - Exercises for Practice

Writing: Writing Practices- Essay Writing-Writing Introduction and Conclusion -Précis Writing.

UNIT - V

Chapter entitled **'Go, Kiss the World' by Subroto Bagchi** from ***"English: Language, Context andCulture"*** published by Orient BlackSwan, Hyderabad.

Vocabulary: Technical Vocabulary and their Usage

Grammar: Common Errors in English (*Covering all the other aspects of grammar which were notcovered in the previous units*)

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing a Report.

Note: ***Listening and Speaking Skills which are given under Unit-6 in AICTE Model Curriculum arecovered in the syllabus of ELCS Lab Course.***

- **Note: 1**. As the syllabus of English given in AICTE *Model Curriculum-2018 for B.Tech First Year is* ***Open-ended***, besides following the prescribed textbook, it is required to prepare teaching/learning materials **by the teachers collectively** in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning in the class.

- **Note**: **2.**Based on the recommendations of NEP2020, teachers are requested to be flexible to adopt Blended Learning in dealing with the course contents .They are advised to teach 40 percent of each topic from the syllabus in blended mode.

TEXT BOOK:

1. "English: Language, Context and Culture" by Orient BlackSwan Pvt. Ltd, Hyderabad. 2022. Print.

REFERENCE BOOKS:

1. Effective Academic Writing by Liss and Davis (OUP)
2. Richards, Jack C. (2022) Interchange Series. Introduction, 1,2,3. Cambridge University Press
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Chaudhuri, Santanu Sinha. (2018). Learn English: A Fun Book of Functional Language,Grammar and Vocabulary. (2nd ed.,). Sage Publications India Pvt. Ltd.
5. (2019). Technical Communication. Wiley India Pvt. Ltd.
6. Vishwamohan, Aysha. (2013). English for Technical Communication for EngineeringStudents. Mc Graw-Hill Education India Pvt. Ltd.
7. Swan, Michael. (2016). Practical English Usage. Oxford University Press. Fourth Edit

2220401: BASICS OF ELECTRONIC DEVICES AND CIRCUITS

(Common to CSE, CSM, CSC, CSD, IT, CSIT)

I Year B.Tech. II - Semester

L	T	P	C
2	0	0	2

Course Objectives:

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of devices.
- To know the switching characteristics of devices.
- To understand the various types of transistor configurations
- To study the special purpose devices

Course Outcomes:

At the end of this course, students will demonstrate the ability to

- Understand the utilization of various semiconductor components
- Acquire the knowledge of various electronic devices and their use on real life.
- Understand the applications of various devices.
- Acquire the knowledge about the role of special purpose devices.
- Analyze different types of transistor characteristics

UNIT - I

Diodes: Diode - Static and Dynamic resistances, Equivalent circuit, Diffusion and Transition Capacitances, V-I Characteristics, Diode as a switch- switching times.

UNIT - II

Diode Applications: Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers with Capacitive and Inductive Filters, Clippers-Clipping at two independent levels, Clamper-Clamping Circuit Theorem, Clamping Operation, Types of Clampers.

UNIT - III

Bipolar Junction Transistor (BJT): Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Transistor as a switch, switching times.

UNIT - IV

Field Effect Transistor (FET): Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, FET as Voltage Variable Resistor, MOSFET, MOSTET as a capacitor.

UNIT – V

Special Purpose Devices: Zener Diode - Characteristics, Zener diode as Voltage Regulator, Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode, Photo diode, Solar cell, LED, Schottky diode.

TEXT BOOKS:

1. Jacob Millman, Christos C. Halkias, and Satyabrata Jit, "Electronic Devices and Circuits", 3rd Edition., Mc-Graw Hill Education, 2010.
2. Robert L. Boylestad, Louis Nashelsky, "Electronic Devices and Circuits theory" 11th Edition, Pearson**,** 2013.

REFERENCES:

1. Donald Neamen, Dhrubes Biswas, "Semiconductor Physics and Devices" 4th Edition, McGraw Hill Education, 2017.
2. Steven T. Karris, "Electronic Devices and Amplifier Circuits with MATLAB Applications" Orchard Publications, 3rd Edition 2005.
3. Paul Horowitz, Winfield Hill, "The Art of Electronics" 3rd Edition Cambridge University Press, 1994.

2220572: DATA STRUCTURES LABORATORY

B.Tech. I Year - II – Semester. **L T P C**
0 1 2 2

Prerequisites: A Course on "Programming for problem solving".

Course Objectives:

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues.

Course Outcomes:

- Ability to develop C programs for computing and real life applications using basic
- elements like control statements, arrays, functions, pointers and strings, and data
- structures like stacks, queues and linked lists.
- Ability to Implement searching and sorting algorithms

List of Experiments

1. Write a program that uses functions to perform the following operations on singly linked list.: i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.: i) Creation ii) Insertion iii) Deletion
3. Write a program that uses functions to perform the following operations on circular linked list: i) Creation ii) Insertion iii) Deletion
4. Write a program that implement stack operations using i) Arrays ii) Pointers
5. Write a c program to implement infix to postfix conversion using stack.
6. Write a c program to implement postfix evaluation.
7. Write a program that implement Queue operations using i) Arrays ii) Pointers
8. Write a program that implements the following sorting methods to sort a given list of Integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort
9. Write a program that implements the following sorting methods to sort a given list of Integers in ascending order i) Merge sort ii) Quick sort
10. Write a program that use both recursive and non-recursive functions to perform the Following searching operations for a Key value in a given list of integers: i) Linear search ii).Binary search
11. Write a program to implement the tree traversal methods
12. Write a program to implement the graph traversal methods.

CASE STUDY-1 Balanced Brackets

A bracket is considered to be any one of the following characters: (,), {, }, [, or].

Two brackets are considered to be a *matched pair* if the an opening bracket (i.e., (, [, or {) occurs to the left of a closing bracket (i.e.,),], or }) *of the exact same type*. There are three types of matched pairs of brackets: [], {}, and ().

A matching pair of brackets is *not balanced* if the set of brackets it encloses are not matched. For example, {[(])} is not balanced because the contents in between { and } are not balanced. The pair of square brackets encloses a single, unbalanced opening bracket, (, and the pair of parentheses encloses a single, unbalanced closing square bracket,].

By this logic, we say a sequence of brackets is *balanced* if the following conditions are met:

- It contains no unmatched brackets.
- The subset of brackets enclosed within the confines of a matched pair of brackets is also a matched pair of brackets.

Given strings of brackets, determine whether each sequence of brackets is balanced. If a string is balanced, return YES. Otherwise, return NO.

CASE STUDY-2 Minimum Average Waiting Time

Mr. Raju owns a pizza restaurant and he manages it in his own way. While in a normal restaurant, a customer is served by following the first-come, first-served rule, Raju simply minimizes the average waiting time of his customers. So he gets to decide who is served first, regardless of how sooner or later a person comes.

Different kinds of pizzas take different amounts of time to cook. Also, once he starts cooking a pizza, he cannot cook another pizza until the first pizza is completely cooked. Let's say we have three customers who come at time t=0, t=1, & t=2 respectively, and the time needed to cook their pizzas is 3, 9, & 6 respectively. If Raju applies first-come, first-served rule, then the waiting time of three customers is 3, 11, & 16 respectively. The average waiting time in this case is (3 + 11 + 16) / 3 = 10. This is not an optimized solution. After serving the first customer at time t=3, Raju can choose to serve the third customer. In that case, the waiting time will be 3, 7, & 17 respectively. Hence the average waiting time is (3 + 7 + 17) / 3 = 9.

Help Raju achieve the minimum average waiting time. For the sake of simplicity, just find the integer part of the minimum average waiting time.

Note:

- The waiting time is calculated as the difference between the time a customer orders pizza (the time at which they enter the shop) and the time she is served.
- Cook does not know about the future orders.

TEXT BOOKS:

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.
2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCES:

1. Data structures: A Pseudocode Approach with C, R.F.GilbergAndB.A.Forouzan, 2nd Edition, Cengage Learning.
2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, PEARSON

22200071: APPLIED PHYSICS LABORATORY

B.Tech. I Year-II Semester **L T P C**
0 0 3 1.5

Course Objectives: The objectives of this course for the student to

1. Capable of handling instruments related to the Hall effect and photoelectric effect Experiments and their measurements.
2. Understand the characteristics of various devices such as PN junction diode, Zener diode, BJT, LED, solar cell, lasers and optical fiber and measurement of energy gap and Resistivity of semiconductor materials.
3. Able to measure the characteristics of dielectric constant of a given material.
4. Study the behavior of B-H curve of ferromagnetic materials.
5. Understanding the method of least squares fitting.

Course Outcomes: The students will be able to:

1. Know the determination of the Planck's constant using Photo electric effect and identify the material whether it is n-type or p-type by Hall experiment.
2. Appreciate quantum physics in semiconductor devices and optoelectronics.
3. Gain the knowledge of applications of dielectric constant.
4. Understand the variation of magnetic field and behavior of hysteresis curve.
5. Carried out data analysis.

LIST OF EXPERIMENTS:

1. Determination of work function and Planck's constant using photoelectric effect.
2. Determination of Hall co-efficient and carrier concentration of a given semiconductor.
3. Characteristics of series and parallel LCR circuits.
4. V-I characteristics of a p-n junction diode and Zener diode.
5. Input and output characteristics of BJT (CE, CB & CC configurations).
6. V-I and L-I characteristics of light emitting diode (LED) and LASER.
7. V-I Characteristics of solar cell.
8. Determination of Energy gap of a semiconductor.
9. To determine the time constant of R-C circuit.
10. Determination of Acceptance Angle and Numerical Aperture of an optical fiber.
11. Understanding the method of least squares – Torsional pendulum as an example.
12. Determination of magnetic field induction along the axis of a current carrying coil.

REFERENCE BOOK:

1. S. Balasubramanian, M.N. Srinivasan "A Text book of Practical Physics"- S Chand Publishers, 2017.

2220073: English Language and Communication Skills Laboratory

B.Tech. I Year - II Semester.

L	T	P	C
0	0	2	1

The **English Language and Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and the students with the use of English in everyday situations both in formal and informal contexts.

Course Objective

- ✓ To facilitate computer-assisted multi-media instruction enabling individualized andindependent language learning
- ✓ To sensitize the students to the nuances of English speech sounds, word accent,intonation and rhythm
- ✓ To bring about a consistent accent and intelligibility in students' pronunciation ofEnglish by providing an opportunity for practice in speaking
- ✓ To improve the fluency of students in spoken English and neutralize the impact ofdialects.
- ✓ To train students to use language appropriately for public speaking, groupdiscussions and interviews

Course Outcomes: Students will be able to:

- ✓ Understand the nuances of English language through audio- visual experience and groupactivities
- ✓ Neutralise their accent for intelligibility
- ✓ Speak with clarity and confidence which in turn enhances their employability skills

Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

Listening Skills:

Objectives

1. To enable students develop their listening skills so that they may appreciate the role in theLSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening, so that they can comprehend the speechof people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professionalcontexts

- Oral practice
- Describing objects/situations/people
- Role play – Individual/Group activities
- Just A Minute (JAM) Sessions

The following course content is prescribed for the **English Language and Communication SkillsLab**.

Exercise – ICALL Lab:
Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening. *Practice*: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker- *Testing Exercises*

ICS Lab:
Understand: Spoken vs. Written language- Formal and Informal English.
Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave –Introducing Oneself and Others.

Exercise – IICALL Lab:
Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Stress pattern insentences – Intonation.
Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Stress patternin sentences – Intonation - *Testing Exercises*

ICS Lab:
Understand: Features of Good Conversation – Strategies for Effective Communication.
Practice: Situational Dialogues – Role Play- Expressions in Various Situations –Making Requestsand Seeking Permissions - Telephone Etiquette.

Exercise - IIICALL Lab:
Understand: Errors in Pronunciation-Neutralising Mother Tongue Interference (MTI).
Practice: Common Indian Variants in Pronunciation – Differences between British and AmericanPronunciation -*Testing Exercises*

ICS Lab:
Understand: Descriptions- Narrations- Giving Directions and Guidelines – Blog Writing
Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IVCALL Lab:
Understand: Listening for General Details.
Practice: Listening Comprehension Tests - *Testing Exercises*

ICS Lab:
Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication-Presentation Skills.
Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – VCALL Lab:
Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests -*Testing Exercises*

ICS Lab:
Understand: Group Discussion
Practice: Group Discussion

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the followingspecifications:

i) Computers with Suitable Configuration
ii) High Fidelity Headphones

2. **Interactive Communication Skills (ICS) Lab :**

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio- visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Source of Material (Master Copy):

- *Exercises in Spoken English. Part 1,2,3*. CIEFL and Oxford University Press

Note: Teachers are requested to make use of the master copy and get it tailor-made to suit the contents of the syllabus.

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- Grammar Made Easy by Darling Kindersley.
- Punctuation Made Easy by Darling Kindersley.
- Oxford Advanced Learner's Compass, 10th Edition.
- English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
- English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge UniversityPress.
- English Vocabulary in Use (Elementary, Intermediate, Advanced) Cambridge UniversityPress.
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).
- Digital All
- Orell Digital Language Lab (Licensed Version)

REFERENCE BOOKS:

1. (2022). *English Language Communication Skills – Lab Manual cum Workbook.* CengageLearning India Pvt. Ltd.
2. Shobha, KN & Rayen, J. Lourdes. (2019). *Communicative English – A workbook.* CambridgeUniversity Press
3. Kumar, Sanjay & Lata, Pushp. (2019). *Communication Skills: A Workbook.* Oxford UniversityPress
4. Board of Editors. (2016). *ELCS Lab Manual: A Workbook for CALL and ICS Lab Activities.* Orient Black Swan Pvt. Ltd.
5. Mishra, Veerendra et al. (2020). *English Language Skills: A Practical Approach.* CambridgeUniversity Press

22220575: IT WORKSHOP

B.Tech I Year II Sem **L T P C**

0 0 2 1

Course Objectives: The IT Workshop for engineers is a training lab course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, PowerPoint and Publisher.

Course Outcomes:

- Perform Hardware troubleshooting
- Understand Hardware components and inter dependencies
- Safeguard computer systems from viruses/worms
- Document/ Presentation preparation
- Perform calculations using spreadsheets

PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Task 3: Every student should individually install MS windows on the personal computer. Lab instructorshould verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both Windows and Linux. Lab instructorsshould verify the installation and follow it up with a Viva

Internet & World Wide Web

Task1: **Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Task 3: **Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to customize their browsersto block pop ups, block active x downloads to avoid viruses and/or worms.

LaTeX and WORD

Task 1 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office or equivalent (FOSS) tool word: Importance of LaTeX and MS office or equivalent (FOSS) tool Word asword Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 2: Using LaTeX and Word to create a project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Task 4: Creating a Newsletter: Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphsand Mail Merge in word.

Excel

Excel Orientation: The mentor needs to tell the importance of MS office or equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill,Formatting Text

Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task 3: Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditionalformatting

Power point

Task 1: Students will be working on basic power point utilities and tools which help them create basic power point presentations. PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in PowerPoint.

Task 2: Interactive presentations - Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

Task 3: Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Comdex Information Technology course tool kit Vikas Gupta, *WILEY Dreamtech*
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, *WILEYDreamtech*
3. Introduction to Information Technology, ITL Education Solutions limited, *Pearson Education.*
4. PC Hardware - A Handbook – Kate J. Chase *PHI* (Microsoft)
5. LaTeX Companion – Leslie Lamport, *PHI/Pearson*.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinsonand Ken Quamme. – *CISCO Press, Pearson Education.*
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan– CISCO Press, *Pearson Education.*

2220021:ENVIRONMENTAL SCIENCE

B.Tech. I Year – II Semester **L T P C**
3 0 0 0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

UNIT - I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In- Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil.

Noise Pollution: Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental**

Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion
and Ozone depleting substances (ODS). Deforestation and desertification. International conventions /
Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water,R22 B.Tech. ECE Syllabus JNTU HYDERABAD biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for
   University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI
   Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications

II – I

2230507: DISCRETE MATHEMATICS
(Common to CSE, IT, CSIT, CSM, CSD, CSC)

B.Tech. II Year I Sem **L T P C**

3 0 0 3

Prerequisites: A course A course on Data Structures and Mathematics.

Course Outcomes: The students should be able to

1. Apply mathematical logic to solve problems.
2. Understand sets, relations, functions, and discrete structures.
3. Use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
4. Formulate problems and solve recurrence relations.
5. Model and solve real-world problems using graphs and trees.

UNIT - I

Mathematical logic: Introduction, Statements and Notation, Connectives, well formed formula, Equivalence of formulas, Normal forms, Theory of inference for the statement calculus, predicate calculus, Inference theory of predicate calculu**s.**

UNIT - II

Set theory: Basic concepts of set theory, Set and Operations on sets, Relations and ordering, properties of binary relations in a set, Equivalence relation, Compatibility of relation, partial order relation, partial order set, Functions, Composition of functions, Inverse function, Recursive functions.

UNIT-III

Elementary Combinatorics: Basics of Counting, Combinations and Permutations, Enumeration of Combinations and permutations, Binomial Coefficients, Binomial and Multinational Theorems, Principle of Inclusion-Exclusion.

UNIT-IV

Recurrence Relations: Generating Functions of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relations by substitution and generating functions, Method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

UNIT – V

Graph Theory: Basic Concepts, Isomorphisms and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, Four color problems.

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited.(UNITS - I,II)
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed. (Units - III, IV, V)

REFERENCE BOOKS:

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 7th Edition, McGraw Hill education (India) Private Limited.

2230504: DATABASE MANAGEMENT SYSTEMS

B.Tech. II Year – I Sem

L	T	P	C
3	0	0	3

Prerequisites: Data Structures and Matrix Algebra and Calculus

Course Outcomes: The students should be able to

1. Gain knowledge of fundamentals of DBMS, Database Design
2. Understand Relational Model, Relational Algebra and Calculus
3. Master the basics of SQL for retrieval and management of data.
4. Be acquainted with the basics of transaction processing and concurrency control.
5. Familiarity with database storage structures and access techniques

UNIT - I

Database Systems: A Historical Perspective, File Systems versus a DBMS**,** Relational Model, Levels of Abstraction in a DBMS, Data Independence, Structure of DBMS.

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With ER Model.

UNIT - II

Relational Model: Introduction, Integrity constraints over relations, Enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views.

Relational Algebra and Calculus: Relational Algebra**,** Tuple relational Calculus, Domain relational calculus.

UNIT-III

SQL: Queries, Constraints, Triggers: Form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

Schema refinement: Problems caused by redundancy, Decompositions, problems related to decomposition, Reasoning about Functional Dependencies, FIRST, SECOND, THIRD normal forms, BCNF, Lossless join decomposition, Multi-valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT-IV

Transaction Management: ACID properties, Transactions and Schedules, Concurrent execution of transactions, Lock-based Concurrency control, Performance of locking, Transaction support in SQL, Introduction to crash recovery.

Concurrency control: Serializability and Recoverability, Introduction to lock management, Lock conversions, Dealing with dead locks, Specialized locking techniques, Concurrency control without locking.

UNIT – V

Storage and Indexing: 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 Tree structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Database Management Systems, Raghu Ramakrishanan, Johannes Gehrke, Tata McGraw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw hill, Vthedition.

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rdEdition,
3. Oracle for Professionals, The X Team, S.Shah and V. Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah,PHI.

2230512: COMPUTER NETWORKS

B.Tech II Year I Sem

L	T	P	C
3	0	0	3

Prerequisites: NIL

Course Outcomes: The students will be able to:

- Understand and explore the basics of computer networks and various protocols.
- Understand Data link Layer in OSI reference model
- Apply Routing protocols in real world applications
- Understand Basic concepts of Transport Layer
- Understand concepts of Application layer.

UNIT-I

Data Communications: Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, **Physical layer:** Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, and Virtual Circuit Networks.

UNIT-II

Data link layer: Introduction, Framing, and Error – Detection and Correction – Parity – LRC CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels, HDLC, Point to Point Protocols. 111 Medium Access sub layer: ALOHA, CSMA/CD, LAN Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access, Channelization.

UNIT–III

Network layer: Logical Addressing, Internetworking, Tunneling, Address mapping, ICMP, IGMP, Forwarding, Routing Protocols: Distance Vector Routing, Link state Routing, Path vector Routing.

UNIT–IV

Transport Layer: Process to Process Delivery, UDP, TCP: TCP Segments, TCP Connection, TCP sliding window, Data Traffic, Congestion, Congestion Control, QoS, QoS in Switched Networks.

UNIT-V

Application Layer: Domain name space, DNS in internet, electronic mail, SMTP, FTP, WWW, HTTP, SNMP.

TEXTBOOKS:

1. Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.
2. Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education.

REFERENCEBOOKS:

1. An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.

3. Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
4. Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
5. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

2230004: COMPUTER ORIENTED STATISTICAL METHODS
(CSE, IT, CSI, CSC, CSD, CSM)

B.Tech. II Year I Sem.

L	T	P	C
3	0	2	4

Pre-requisites: Mathematics courses of first year of study.

Course Objectives: To learn

- The theory of Probability, Probability distributions of single and multiple random variables
- The sampling theory, testing of hypothesis and making statistical inferences
- Stochastic process and Markov chains.

Course outcomes: After learning the contents of this paper the student must be able to

- Apply the concepts of probability and distributions to case studies.
- Formulate and solve problems involving random variables and apply statistical methods for analyzing experimental data.
- Apply concept of estimation and testing of hypothesis to case studies.
- Correlate the concepts of one unit to the concepts in other units.

UNIT-I: Random Variables **10 L**

Overview of the probability, Concept of a Random Variable, Discrete Probability Distributions, Continuous Probability Distributions. Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem.

UNIT-II: Probability distributions: **10L**

Discrete Probability Distributions**:** Binomial Distribution, Poisson distribution.
Continuous Probability Distributions**:** Uniform Distribution, Normal Distribution

UNIT-III: Sampling Distribution & Tests of Hypotheses **10L**

Sampling Distributions**:** Random Sampling, Some important Statistics, Sampling Distribution of Means and the Central Limit Theorem, t - Distribution,F-Distribution.

Statistical Hypotheses: General Concepts, Testing a Statistical Hypothesis, Single sample: Tests concerning a single mean, Two samples: tests on two means, One sample: test on a single proportion. Two samples: tests on two proportions,

Two-sample tests concerning variances.

UNIT-IV: Applied Statistics
10L

Curve fitting by the method of least squares, fitting of straight lines, second degree parabolas and more general curves, Correlation and regression(Linear and Non linear) Rank correlation(Repeated and Non Repeated).

UNIT-V: Stochastic Processes: **8L**

Introduction to Stochastic processes Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n-step transition probabilities, Markov chain, Steady state condition, Markov analysis.

TEXTBOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability & Statistics For Engineers & Scientists,9thEd. Pearson Publishers.
2. S C Gupta and V K Kapoor, Fundamentals of Mathematical statistics, Khanna publications.
3. S.D. Sharma, Operations Research, Kedarnath and Ramnath Publishers, Meerut, Delhi.

REFERENCEBOOKS:

1. T.T. Soong, Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, Ltd, 2004.
2. Sheldon M Ross, Probability and Statistics for Engineers and scientists, academic press.
3. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.

2230510: OOPS Through JAVA
(Common to all Branches)

B.Tech. II Year I Sem **L T P C**
3 0 0 3

Prerequisites: A course on Programming on problem solving

Course Outcomes: The students should be able to

1. Solve real world problems using OOP techniques.
2. Understand the use of abstract classes and Interfaces
3. Develop multithreaded applications with synchronization.
4. Solve problems using java collection framework
5. Develop applications using Event Handling

UNIT - I

Object Oriented Methodology: Introduction, Advantages and Disadvantages of Procedure Oriented Languages, what is Object Oriented? What is Object Oriented Development? Object Oriented Themes, Benefits and Application of OOPS.

Principles of OOPS: OOPS Paradigm, Objects, Classes and Methods, Abstraction, Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing.

Object oriented thinking: A way of viewing world – Agents, responsibility, messages, methods, Classes and instances, class hierarchies – inheritance, method binding, overriding and exceptions.

Introduction to JAVA: History of Java, Java buzzwords, data types, variables, scope and life time of variables, Type conversion and casting, arrays, operators, Operator Precedence, control statements.

UNIT - II

Classes: Class fundamentals, Declaring Objects, methods, Constructors, this keyword, garbage collection, Overloading methods and constructors, Recursion.

Inheritance, Packages and Interfaces – Inheritance basics, Using super, Creating a multilevel hierarchy, method overriding, Dynamic method dispatch, abstract classes, Using final with inheritance, Defining a package, Finding package and classpath, Access protection, importing packages, Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III

Exception handling and Multithreading- Exception types, uncaught exceptions, using try and catch, Multiple catch classes, nested try statements, throw, throws and finally. Java's built-in exceptions, chained exceptions, creating own exception sub classes. Java thread model, thread priorities, synchronization, messaging, thread class and runnable interface, creating thread, creating multiple threads, thread priorities, synchronizing threads, interthread communication, thread life cycle.

UNIT-IV

Java String Handling: String Constructors, Special string operations, Character Extraction, String Comparisons, Modifying a string, String Buffer.

Collections Framework: Overview, Collection Interfaces, Collection Classes, Accessing a

collection via Iterator, Working with Maps, Generics

UNIT – V

Event Handling : Events, Event sources, Event Listeners, Event classes, Event listener interface, Handling mouse and keyboard events, Adapter classes, The AWT class hierarchy, AWT controls- labels, buttons, scrollbars, text field, check box, check box groups, choices, handling lists, dialogs, Menubar, layout manager- Flow, Border, Grid, Card

TEXT BOOKS:

1. Java The complete reference, 12th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.

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. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

2230574: DATABASE MANAGEMENT SYSTEMS LAB

B.Tech. II Year I Sem. **L T P C**
0 0 2 1

Prerequisites: A course on Data Structures

Course Outcomes:. The students should be able to

1. Understand and draw ER diagrams.
2. Design database schema for a given application and apply normalization
3. Acquire skills in using SQL commands for data definition and data manipulation.
4. Apply aggregate functions
5. Develop solutions for database applications using procedures, cursors and triggers.

Problem statement

Roadway Travels

"Roadway Travels" is in business since 1997 with several buses connecting different places in India. Its main office is located in Hyderabad.

The company wants to computerize its operations in the following areas:

- Reservation and Ticketing
- Cancellations

Reservation & Cancellation:

Reservations are directly handled by booking office. Reservations can be made 30 days in advance and tickets issued to passenger. One Passenger/person can book many tickets (to his/her family).

Cancellations are also directly handed at the booking office.

In the process of computerization of Roadway Travels you have to design and develop a Database which consists the data of Buses, Passengers, Tickets, and Reservation and cancellation details. You should also develop query's using SQL to retrieve the data from database.

The above process involves many steps like 1. Analyzing the problem and identifying the Entities and Relationships, 2.E-R Model 3.Relational Model 4.Normalization 5.Creating the database 6.Querying.Students are supposed to work on these steps week wise and finally create a complete "Database System" to Roadway Travels. Examples are given at every experiment for guidance to students.

Experiment 1: E-R Model

Analyze the carefully and come up with the entities in it. Identify what data has to be persisted in the database. This contains the entities, attributes etc.

Identify the primary keys for all the entities. Identify the others keys like candidate keys, partial keys, if any.

Example: Entities:

1. BUS
2. Ticket
3. Passenger

Relationships:

1. Reservation
2. Cancellation

PRIMARY KEY ATTRIBUTES:

1. Ticket ID (Ticket Entity)
2. Passport ID (Passenger Entity)
3. Bus_No (Bus Entity)

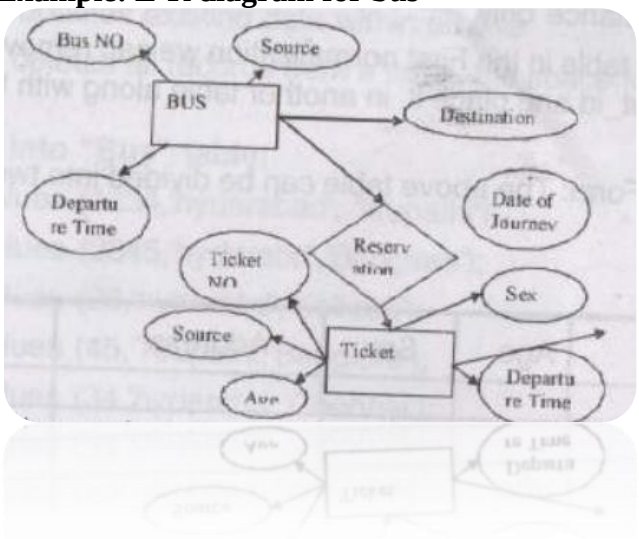
A part from the above mentioned entities you can identify more. The above mentioned are few.

Note: The students is required to submit a document by writing the Entities and keys to the lab teacher.

Experiment 2: Concept design with E-R Model

Relate the entities appropriately. Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

Example: E-R diagram for bus



Note: The students is required to submit a document by drawing the E-R Diagram.

Experiment 3: Relational Model

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

Example: The passenger tables look as below. This is an example. You can add more attributes based on E-R model. This is not a normalized table.

Passenger

Name	Age	Sex	Address	Ticket_id	Passport ID

Note: The students is required to submit a document by Represent relationships in a tabular fashion to the lab teacher.

Experiment 4: Normalization

Database normalization is a technique for designing relational database tables to minimize

duplication of information and, in so doing, to safeguard the database against certain types of logical or structural problems, namely data anomalies. For example, when multiple instances of a given piece of information occur in a table, the possibility exists that these instances will not be kept consistent when the data within the table is updated, leading to a loss of data integrity. A table that is sufficiently normalized is less vulnerable to problems of this kind, because its structure reflects the basic assumptions for when multiple instances of the same information should be represented by a single instance only.
For the above table in the First normalization we can remove the multiple valued attribute Ticket_id and place it in another table along with the primary key of passenger.
First Normal Form: The above table can divided into two tables as shown below.
Passenger

Name	Age	Sex	Address	Passport ID

Passport ID	**Ticket_id**

You can do the second and third normal forms if required. Any how Normalized tables are given at the end.

Experiment 5: Installation of MySQL and practice DDL commands

Installation of MySQL. In this week you will learn Creating databases, How to create tables, altering the database, dropping tables and databases if not required. You will also try truncate, rename commands etc.
Example for creation of a normalized "Passenger" table.

```
CREATE TABLE Passenger(
Passport_id INTEGER PRIMARY KEY,
   Name VARCHAR(50) NOT NULL,
   Age INTEGER NOT NULL,
   Sex CHAR,
   Address VARCHAR(50) NOT NULL
);
```

Similarly create all other tables.
Note: Detailed creation of tables is given at the end.

Experiment 6: Practicing DML commands

DML commands are used for managing data within schema objects. Some examples:

- SELECT - retrieve data from the database
- INSERT - insert data into a table
- UPDATE - updates existing data within a table
- DELETE - deletes all records from a table, the space for the records remain

insert values into "Bus" table:

```
insert into Bus values (1234, 'Hyderabad', 'tirupathi');
```

insert values into "Passenger" table:

```
insert into Passenger values(1, 45, 'ramesh', 45, 'M', 'abc123');
insert into Passenger values(56, 22, 'seetha', 32, 'F', 'abc55');
```

Few more Examples of DML commands:

```
SELECT * FROM Bus; (selects all the attributes and displays)
UPDATE Bus SET Bus_No = 1 WHERE Bus_No = 2;
```

Experiment 7: Querying
In this week you are going to practice queries(along with sub queries) using ANY, ALL, IN, EXISTS, NOT EXIST, UNION, INTERSECT, Constraints etc.

Practice the following Queries:

1. Display unique PNR_No of all passengers.
2. Display all the names of male passengers.
3. Display the ticket numbers and names of all the passengers.
4. Find the ticket numbers of the passengers whose name start with 'r' and ends with 'h'.
5. Find the names of passengers whose age is between 30 and 45.
6. Display all the passengers names beginning with 'A'
7. Display the sorted list of passengers names.

Experiment 8 and Experiment 9: Querying (continued...)
You are going to practice queries using Aggregate functions (COUNT, SUM, AVG, MAX,and MIN), GROUP BY, HAVING and Creation and dropping of VIEWS.

1. Write a Query to display the information present in the Passenger and cancellation tables. Hint: Use UNION Operator.
2. Display the number of days in a week on which the 9W01 bus is available.
3. Find number of tickets booked for each PNR_No using GROUP BY CLAUSE. Hint: Use GROUP BY on PNR_No.
4. Find the distinct PNR numbers that are present.
5. Find the number of tickets booked by a passenger where the number of seats is greater than 1. Hint: Use GROUP BY, WHERE and HAVING CLAUSES.
6. Find the total number of cancelled seats.

Experiment 10: Triggers
In this week you are going to work on Triggers. Creation of insert trigger, delete trigger, update trigger. Practice triggers using the above database.
E.g:

```
CREATE TRIGGER update check BEFORE UPDATE ON passenger FOR EACH ROW
BEGIN
   IF NEW.TickentNO> 60 THEN
      SET New.TickentNO = TicketNo;
   ELSE
      SET New.TicketNo = 0;
   END IF;
END
```

Experiment 11; Procedures
In this session you are going to learn Creation of stored procedure, Execution of procedure and modification of procedure. Practice procedures using the database.
E.g:

```
CREATE PROCEDURE myproc()
BEGIN
   SELECT     COUNT(Tickets)
   FROM     Ticket
   WHERE    age >= 40;
END;
```

Experiment 12: Cursors
In this week you need to do the following: Declare a cursor that defines a result set.

Open the cursor to establish the result set. Fetch the data into local variables as needed from the cursor, one row at a time. Close the cursor when done

```
CREATE PROCEDURE myproc(in_customer_id INT)
BEGIN
   DECLARE v_id INT;
   DECLARE v_nameVARCHAR(30);

   DECLARE c1 CURSOR FOR
   SELECT stdid, stdFirstname FROM studentsss WHERE stdid - in_customer_id;

   OPEN c1;
   FETCH c1 INTO v_id, v_name;
   CLOSE c1;
END;
```

Tables:

BUS

Bus No: VARCAHR : PK(primary key)
Source: VARCHAR
Destination: VARCHAR

Passenger

PPNO: VARCHAR(15) : PK
Name: VARCHAR(15)
Age: INT(4)
Sex: CHAR(10) : Male/Female
Address: VARCHAR(20)

Passenger_Tickets

PPNO: VARCHAR(15) : PK
Ticket_No: NUMERIC(9)

Reservation

PNR_No: NUMERIC(9) : FK
Journey_date: DATETIME(8)
No_of_seats: INT(8)
Address: VARCHRA(50)
Contact_No: NUMERIC(9) --> Should not less than 9 and Should not accept any other character other than interger
STATUS: CHAR(2) : Yes/No

Cancellation

PNR_No: NUMERIC(9) : FK
Journey_date: DATETIME(8)
No_of_seats: INT(8)
Address: VARCHRA(50)
Contact_No: NUMERIC(9) --> Should not less than 9 and Should not accept any other character other than interger
STATUS: CHAR(2) : Yes/No

Ticket

Ticket_No: NUMERIC(9) : FK
Journey_date: DATETIME(8)
Age: INT(4)
Sex: CHAR(10) : Male/Female
Source: VARCHAR
Destination: VARCHAR
Dep_time: VARCHAR

REFERENCE BOOKS:

1. Introduction to SQL, Rick F.vanderLans, Pearson education.

2. Oracle PL/SQL, B.Rosenzweig and E.Silvestrova, Pearson education.
3. Oracle PL/SQL Programming, Steven Feuerstein, SPD.
4. SQL & PL/SQL for Oracle 10g, Black Book, Dr. P.S. Deshpande, Dream Tech.
5. Oracle Database 11g PL/SQL Programming, M.Mc Laughlin, TMH.
6. SQL Fundamentals, J.J. Patrick, Pearson Education.

2230578: COMPUTER NETWORK LAB

B.Tech. II year I Sem **L T P C**
0 0 2 1

Course Outcomes: The students will be able to:

- Implement data link layer farming methods
- Analyze error detection and error correction codes.
- Implement and analyze routing and congestion issues in network design.
- Implement Encoding and Decoding techniques used in presentation layer
- Work with different network tools

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 andCRC-16
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-Nmechanism.
4. Implement Dijsktra‟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 distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers.
10. Wire shark

- Packet Capture Using Wire shark
- Starting Wire shark
- Viewing Captured Traffic
- Analysis and Statistics & Filters.

11. How to runNmapscan
12. Operating System Detection using Nmap
13. **Do the following usingNS2Simulator**

- **NS** 2 Simulator-Introduction
- Simulate to Find the Number of Packets Dropped
- Simulate to Fin the Number of Packets Dropped by TCP/UDP
- Simulate to Fin the Number of Packets Dropped due to Congestion
- Simulate to Compare Data Rate & Through put.
- Simulate to Plot Congestion for Different Source/Destination.
- Simulate to Determine the Performance with respect to Transmission of Packets**.**

TEXTBOOKS:

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

REFERENCEBOOKS:

1. An Engineering Approach to Computer Networks, S.Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking –Behrouz A. Forouzan.3rd Edition, TMH.

2230576: OOPS Through JAVA LAB

B.Tech. II Year I Sem. **L T P C**
0 0 2 1

Prerequisites: Programming for problem solving lab

Course Outcomes: The students should be able to

1. Solve real world problems using OOP techniques.
2. Understand the use of abstract classes and Interfaces
3. Develop multithreaded applications with synchronization.
4. Solve problems using java collection framework
5. Develop applications using Event Handling

List of Experiments

1. a) Use Eclipse or Net bean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.
   b) Write a java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$. Read in a, b, c and use the quadratic formula.
   c) Write a java program to implement Fibonacci series.

2. a) Write a java program to implement method overloading and constructors overloading.
   b) Write a java program to implement method overriding.

3. a) Write a java program to check whether a given string is palindrome.
   b) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle, and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape.
4. a) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num 2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.
   b).Write a java program to create user defined exception class and test this class.

5. a) Write a Java program to list all the files in a directory including the files present in all its subdirectories.
   b) Write a java program that displays the number of characters, lines and words in a text file.

6. a) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
   b) Write a Java program that correctly implements the producer – consumer problem using the concept of inter thread communication.

7. Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).

8. Write Java Programs to perform following:

   a) To count occurrence of each character in a string.
   b) To remove duplicate words from a string.
   c) To print all permutations of a string.

9. Write programs to implement following using Collection Framework:
   a) to add, retrieve & remove element from Array List
   b) to Sort & reverse the Linked List elements
   c) to sort Array List using Comparable and Comparator
10. Write programs to implement following using Collection Framework:
   a) to copy elements from Hash Set to Array
   b) to remove duplicate key from hash table
   c) to iterate Tree Map
11. Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.

12. a) Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
    b) Write a java program to demonstrate the key event handlers.

REFERENCE BOOKS:

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearsoneducation.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, CengageLearning.
4. Core Java, Volume 1, 9th edition, Cay S. Horstmann and GCornell,

2230583: SKILL DEVELOPMENT COURSE (DATA VISUALIZATION - R PROGRAMMING/ POWER BI)

B.Tech. II Year I Sem **L T P C**
0 0 2 1

Course Outcomes: student should be able to
- Understand How to import data into Power BI
- Understand Power BI concepts of Dimensions and Measures.
- Develop Programs and understand how to map Visual Layouts and Graphical Properties.
- Create a Dashboard that links multiple visualizations.
- Use graphical user interfaces to create Frames for providing solutions to real world problems.

Lab Problems:

1. Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?
2. Getting started with Power BI Software using Data file formats, connecting your Data to Power BI ,creating basic charts(line, bar charts, Tree maps),Using the Show me panel.
3. Power BI Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields.
4. Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Toolsand Menus, Formatting specific parts of the view.
5. Editing and Formatting Axes, Manipulating Data in Power BI data, Pivoting Power BI data.
6. Structuring your data, Sorting and filtering Power BI data, Pivoting Power BI data
7. Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tooltips, Formatting your data with colors.
8. Creating Dashboards, adding interactivity to your Dashboard, Distributing & Publishing your Visualization.
9. Power BI file types, publishing to Power BI Online, Sharing your visualizations, printing, and Exporting.
10. Creating custom charts, cyclical data and circular area charts, Dual Axis charts.

REFERENCE BOOKS:

1. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
2. R Programming for Data Science by Roger D. Peng (References)
3. The Art of R Programming by Norman MatloffCengage Learning India.

2230022: GENDER SENSITIZATION

(An Activity-based Course)

B.Tech. II Year I Sem. **L T P C**

3 0 0 0

COURSE DESCRIPTION

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions aboutsex, gender, and sexuality.

This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features several exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

Objectives of the Course:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT - I: UNDERSTANDING GENDER

Introduction: Definition of Gender-Basic Gender Concepts and Terminology-Exploring

Attitudes towards Gender-Construction of Gender-Socialization: Making Women, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT – II: GENDER ROLES AND RELATIONS

Two or Many? -Struggles with Discrimination-Gender Roles and Relations-Types of Gender Roles- Gender Roles and Relationships Matrix-Missing Women-Sex Selection and Its Consequences- Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary

UNIT – III: GENDER AND LABOUR

Division and Valuation of Labour-Housework: The Invisible Labor- "My Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and Unaccounted work. - Gender Development Issues-Gender, Governance and Sustainable Development-Gender and HumanRights-Gender and Mainstreaming

UNIT – IV: GENDER - BASED VIOLENCE

The Concept of Violence- Types of Gender-based Violence-Gender-based Violence from a Human Rights Perspective-Sexual Harassment: Say No! -Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "*Chupulu".*

Domestic Violence: Speaking OutIs Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life"

UNIT – V: GENDER AND CULTURE

Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues-Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks- The Brave Heart.

Note: **Since it is Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.**

- ***Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments. Apart from the above prescribed book, Teachers can make use of any authentic materials related to the topics given in the syllabus on "Gender".***

 ESSENTIAL READING: The Textbook, "*Towards a World of Equals: A Bilingual Textbook on Gender" written* by A.Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **published by Telugu Akademi, Telangana Government in 2015.**

ASSESSMENT AND GRADING:

- Discussion & Classroom Participation: 20%
- Project/Assignment: 30%
- End Term Exam: 50%

II - II

2230016: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

B.Tech. II Year II Sem.

L	T	P	C
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Course Objective: To learn the basic Business types, impact of the Economy on Business and Firmsspecifically. To analyze the Business from the Financial Perspective.

Course Outcome: The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

UNIT – I: Introduction to Business and Economics

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT – II: Demand and Supply Analysis

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT – III: Production, Cost, Market Structures & Pricing

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly,Monopolistic Competition.

Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, Cost Volume ProfitAnalysis.

UNIT – IV: Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts.

UNIT – V: Financial Analysis through Ratios: Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, InternationalBook House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata McGraw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata McGrawHill Education Pvt. Ltd. 2012.

REFERENCE BOOKS:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, VikasPublications, 2013.

2246201-Computer System Architecture

B.Tech. II Year II-Sem **L T P C**
2 0 0 2

Prerequisites Nil

Course Outcomes

The students should be able to

1. Understand logic gates and binary codes.
2. Design the sequential and combinational circuits.
3. Understand computer arithmetic and addressing modes
4. Understand and apply the concepts of memory units
5. Understand the concepts of I/O

UNIT- I

Basic Structure of Computers: Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Historical perspective.

Digital Systems and Binary Numbers:- Complements, Signed binary numbers, Binary codes, Binary storage and registers, binary logic.

Boolean algebra and logic gates, gate level minimization basic definitions axiomatic of Boolean algebra, basic thermos, canonical and standard forms, the map methods four variable map, five variable map.

UNIT- II

Combinational logic: - combination circuits, binary adder subtracter, decimal adder binary multiplier, Magnetic compotator, decoders, encoders, multiplexers.

Synchronous Sequential Logic: Sequential circuits, latches, Flip-Flops, Analysis of clocked sequential circuits, State Reduction and Assignment, Design Procedure.

Registers and Counters: Registers, shift Registers, Ripple counters, synchronous counters.

UNIT- III

Arithmetic: Addition and subtraction of signed numbers, Design of fast adder, Multiplication of positive Numbers, signed operand multiplication, fast multiplication, integer division, floating pointnumbers.

Machine Instruction and Programs: Memory Locations and Addresses, Memory operations, instructions and instruction sequencing, Addressing Modes

UNIT- IV

Basic Processing Unit: Multiple Bus Organization, Hardwired Control, Microprogrammed Control **Memory Systems**: Concept of Memory, RAM, ROM memories, cache memories, virtual memory, secondary storage, memory management requirements.

UNIT- V

Input / Output Organization: Introduction to I/O, Interrupts- Hardware, Enabling and disabling Interrupts, Device Control, Direct memory access, buses, interface circuits, standard I/O Interfaces.

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Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processor. Multi Processors: Characteristics of Multiprocessors

TEXT BOOKS:

1. Digital Design – Fourth Edition , M.Morris Mano, Pearson Education/PHI
2. Computer Organization – Carl Hamacher, Zvonko Vranesic, SafwatZaky, fifth edition, McGraw Hill.

REFERENCE BOOKS:

1. Computer Architecture and Organization- An Integrated Approach, Miles Murdocca, Vincent Heuring, Second Edition, WileyIndia.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition,Pearson.
3. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson
4. Computer- organization and Design- David A. Paterson and JohnL.Hennessy-Elsevier.
5. Fundamentals or Computer Organization and Design, - SivaramaDandamudi Springer Int. Edition.
6. Digital Design – Third Edition, M.Morris Mano, Pearson Education/PHI.
7. Fundamentals of Logic Design, Roth, 5th Edition,Thomson.

2230506: SOFTWARE ENGINEERING

B.Tech. II Year II Sem

L	T	P	C
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Prerequisites:

- A course on "Data Base Management Systems"

Course Outcomes: The students will be able to:

- Understand different process models
- Translate end-user requirements into system and software requirements, using e.g. UML, and structure the requirements in a Software Requirements Document (SRD).
- Identify and apply appropriate software architectures and patterns to carry out high level design of a system and be able to critically compare alternative choices.
- Develop a simple testing report
- Understand basics of Risk Management and Quality Management

UNIT-I

INTRODUCTION TO SOFTWARE ENGINEERING: The Evolving Role of Software, Characteristics of Software, The Changing Nature of Software, Legacy Software, Software Myths.

A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process, Agile models: Extreme Programming, Scrum, DSDM, FDD, CRYSTAL and Lean Software Development

UNIT-II

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.

UNIT–III

System models: Context models, behavioral models, data models, object models, structured methods

Design Engineering: Design process and design quality, design concepts, the design model, software architecture, Architectural styles and patterns.

Introduction to UML: Basic Building Blocks of UML- Things, Relationships and Diagrams.

UNIT–IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, verification and validation testing, system testing, the art of debugging.

Metrics for Process and Products: Software quality, metrics for analysis model, metrics for design model, metrics for source code, metrics for testing, metrics for maintenance, metrics for software quality.

UNIT-V

Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.

Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, software reliability, the ISO 9000 quality standards.

TEXTBOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, McGraw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modelling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCEBOOKS:

1. Software Engineering, an Engineering approach- James F. Peters, WitoldPedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The McGraw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.

2240503: PYTHON PROGRAMMING

B.Tech. II Year II Sem. **L T P C**
3 0 0 3

Prerequisites: Programming for Problem Solving

Course Outcomes: The students should be able to

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries.
3. Demonstrate proficiency in handling Exceptions, Functions and Modules.
4. Develop programs using graphical user interface.
5. Learn about Database Programming and Web development.

UNIT - I

Python Basics

Python Objects: Standard Types, Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types.

Python Numbers: Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions.

Conditionals and Loops-if, else, elif, for, while, break, continue, pass, List comprehensions, Generator expressions

UNIT - II

Sequences: Strings, Lists, and Tuples- Built-in Functions, Special features.

Mapping and Set Types: Dictionaries, Sets- Built-in Functions.

Files and Input / Output: File Objects, File Built-in Functions, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules.

UNIT-III

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Exceptions and the sys Module.

Functions and Functional Programming –Calling Functions , Creating Functions, Passing Functions , Formal Arguments, Variable-Length Arguments, Functional Programming.

Modules–Modules and Files, Namespaces, Importing Modules, Module Built-in Functions, Packages, Related modules.

UNIT-IV

Multithreaded Programming: Introduction, Threads and Processes, Python Threads, the Global Interpreter Lock, Thread Module, Threading Module.

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs.

UNIT – V

Database Programming: Introduction, The Python DB-API, ORMS, Non-Relational Databases.

WEB Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Prentice Hall PTR.
2. Core Python Programming, Wesley J. Chun, Third Edition, Prentice Hall PTR

REFERENCE BOOKS:

1. Think Python, Allen Downey, Green Tea Press
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Python Programming: A Modern Approach, VamsiKurama, Pearson
4. Learning Python, Mark Lutz, O'Really.

2240509 - OPERATING SYSTEMS

B.Tech. II Year II Sem.

L	T	P	C
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Prerequisites:

- A course on "Programming for Problem Solving".
- A course on "Computer Organization and Architecture".

Course Outcomes: The students will be able to:

- Control access to a computer and the files that may be shared
- Gain knowledge on process and Process Scheduling
- Understand Deadlock Prevention, Deadlock Handling and Synchronization
- Apply Memory Management techniques in OS.
- Understand File System.

UNIT-I

Operating System Introduction: What is an operating system do, computer system organization, computer system architecture, operating system structure- operating system operations, process management, memory management, operating system services, System Calls, types of system calls.

UNIT-II

Process:-process concepts, process scheduling, operations on processes, Inter processes communication, multithreading models, thread libraries. Process Scheduling:-Scheduling criteria, scheduling algorithms, thread scheduling Multiple-Processor Scheduling.

UNIT–III

Deadlocks - System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock.

Synchronization: - back ground, the critical section problem, peter's solution, Synchronization hardware, semaphores, Classical Problems of Synchronization, Monitors.

UNIT–IV

Memory Management and Virtual Memory –background, Swapping, Contiguous Allocation, Paging structure of the page table, Segmentation.

Virtual memory:-back ground, demand paging page replacement allocation of frames thrashing.

UNIT-V

File System: –File system and implementing file system, file concept access methods, directory and file system structure, File system implementation, Directory implementation, Allocation methods, Free-space Management, efficiency and performance, recovery, NFS.

TEXTBOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, JohnWiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCEBOOKS:

1. Operating Systems – Internals and Design Principles, Stallings, 5th Edition, Pearson Education/PHI,2005.
2. Operating System A Design Approach-Crowley,TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Unix Internals The New Frontiers, U.Vahalia, Pearson Education

2240573: PYTHON PROGRAMMING LAB

B.Tech. II Year II Sem.

L T P C
0 0 2 1

Prerequisites: Programming for Problem Solving Lab

Course Outcomes: The students should be able to

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries.
3. Demonstrate proficiency in handling Exceptions, Functions and Modules.
4. Develop programs using graphical user interface.
5. Learn about Database Programming and Web development.

Exercise 1 –Python Numbers

a) Write a program to determine whether a given year is a leap year, using the following formula: a leap year is one that is divisible by four, but not by one hundred, unless it is also divisible by four hundred. For example, 1992, 1996, and 2000 are leap years, but 1967 and 1900 are not. The next leap year falling on a century is 2400.

b) Write a program to determine the greatest common divisor and least common multiple of a pair of integers.

c) Create a calculator application. Write code that will take two numbers and an operator in the format: N1 OP N2, where N1 and N2 are floating point or integer values, and OP is one of the following: +, -, *, /, %, **, representing addition, subtraction, multiplication, division, modulus/remainder, and exponentiation, respectively, and displays the result of carrying out that operation on the input operands.
Hint: You may use the string split() method, but you cannot use the exal () built-in function.

Exercise –2 Control Flow

a) Write a Program for checking whether the given number is a prime number or not.
b) Write a program to print Fibonacci series upto given n value.
c) Write a program to calculate factorial of given integer number.

Exercise 3 Control Flow -Continued

a) Write a program to calculate value of the following series $1+x-x^2+x^3-x^4+----x^n$.
b) Write a program to print Pascal triangle.

Exercise 4 – Python Sequences

a) Write a program to sort the numbers in ascending order and strings in reverse alphabetical order.
b) Given an integer value, return a string with the equivalent English text of each digit. For example, an input of 89 results in "eight-nine" being returned. Write a program to implement it.

Exercise 5– Python Sequences

a) Write a program to create a function that will return another string similar to the input string, but with its case inverted. For example, input of "Mr. Ed" will result in "mR.eD" as the output string.
b) Write a program to take a string and append a backward copy of that string, making a palindrome.

Exercise 6– Python Dictionaries

a) Write a program to create a dictionary and display its keys alphabetically.
b) Write a program to take a dictionary as input and return one as output, but the values are now the keys and vice versa.

Exercise - 7 Files

a) Write a program to compare two text files. If they are different, give the line and column numbers in the files where the first difference occurs.
b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 8 Functions

a) Write a function ball collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.
Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius
b) If (distance between two balls centers) <= (sum of their radii) then (they are colliding)
c) Find mean, median, mode for the given set of numbers in a list.
d) Write simple functions max2() and min2() that take two items and return the larger and smaller item, respectively. They should work on arbitrary Python objects. For example, max2(4, 8) and min2(4, 8) would each return 8 and 4, respectively.

Exercise - 9 Functions - Continued

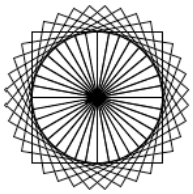
a) Write a function nearly equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single mutation on b.
b) Write a function dups to find all duplicates in the list.
c) Write a function unique to find all the unique elements of a list.

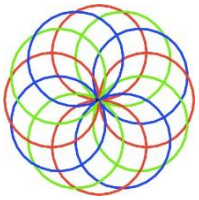
Exercise - 10 - Functions - Problem Solving

a) Write a function cumulative_ product to compute cumulative product of a list of numbers.
b) Write a function reverse to reverse a list. Without using the reverse function.
c) Write function to compute GCD, LCM of two numbers. Each function shouldn't exceed one line.

Exercise - 11 GUI, Graphics

a) Write a GUI for an Expression Calculator using tk
b) Write a program to implement the following figures using turtle





Exercise- 12 Data Bases

a) Develop a Python application to create a table, Insert rows into the table, Updates rows in the table, Delete rows from the table and Drops the table. [Use MySql]

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Core Python Programming, Wesley J. Chun, Third Edition, Pearson.

REFERENCE BOOKS:

1. Think Python, Allen Downey, Green Tea Press
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Python Programming: A Modern Approach, VamsiKurama, Pearson
4. Learning Python, Mark Lutz, O'Really.

2240577: OPERATING SYSTEM LAB

B.Tech. II Year II Sem.

L	T	P	C
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Prerequisites:

- A course on "Programming for Problem Solving"
- A course on "Computer Organization and Architecture".

Course Outcomes: The students will be able to:

- Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
- Implement C programs using Unix system calls.

LISTOFEXPERIMENTS

1. Write C programs to simulate the following CPU Scheduling algorithms
   a) FCFS b) SJF c) Round Robin d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system (open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.
5. Write C programs to illustrate the following IPC mechanisms
   a) Pipes b) FIFOs c) Message Queues d) Shared Memory
6. Write C programs to simulate the following memory management techniques

   a) Paging b) Segmentation

TEXTBOOKS:

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, Pearson education.

REFERENCEBOOKS:

1. Operating Systems – Internals and Design Principles Stallings, Fifth Edition– 2005,Pearson Education/PHI
2. Operating System A Design Approach-Crowley,TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition, Pearson/PHI
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. Unix Internals The New Frontiers, U.Vahalia, Pearson Education

2240584: SKILL DEVELOPMENT COURSE (NODE JS/ REACT JS/ DJANGO)

B.Tech. II Year II Sem. **L T P C**

0 0 2 1

Prerequisites: Object Oriented Programming through Java, HTML Basics.

Course Outcomes: The student will be able to,

1. Build a custom website with HTML, CSS, and Bootstrap and little JavaScript.
2. Demonstrate Advanced features of JavaScript and learn about JDBC
3. Develop Server – side implementation using Java technologies like
4. Develop the server – side implementation using Node JS.
5. Design a Single Page Application using React.

Exercises:

1. Build a responsive web application for shopping cart with registration, login, catalog and cartpages using CSS3 features, flex and grid.
2. Make the above web application responsive web application using Bootstrap framework.
3. Use JavaScript for doing client – side validation of the pages implemented in experiment 1 and experiment 2.
4. Explore the features of ES6 like arrow functions, callbacks, promises, async /await. Implement an application for reading the weather information from openweathermap.org and display the information in the form of a graph on the web page.
5. Develop a java stand alone application that connects with the database (Oracle / my Sql) and perform the CRUD operation on the database tables.
6. Create an xml for the bookstore. Validate the same using both DTD and XSD.
7. Design a controller with servlet that provides the interaction with application developed in experiment 1 and the database created in experiment 5.
8. Maintaining the transactional history of any user is very important. Explore the various session tracking mechanism (Cookies, HTTP Session)
9. Create a custom server using http module and explore the other modules of Node JS like OS, path, event.
10. Develop an express web application that can interact with REST API to perform CRUD operations on student data. (Use Postman)
11. For the above application create authorized end points using JWT (JSON Web Token).
12. Create a react application for the student management system having registration, login, contact, about pages and implement routing to navigate through these pages.
13. Create a service in react that fetches the weather information from openweathermap.org and the display the current and historical weather information using graphical representation usingchart.js
14. Create a TODO application in react with necessary components and deploy it into github.

REFERENCE BOOKS :

1. Jon Duckett, Beginning HTML, XHTML, CSS, and JavaScript, Wrox Publications, 2010
2. Bryan Basham, Kathy Sierra and Bert Bates, Head First Servlets and JSP, O'Reilly Media, 2ndEdition, 2008.
3. Vasan Subramanian, Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node, 2nd Edition, A Press.

2240023: CONSTITUTION OF INDIA

B.Tech. II Year II Sem. **L T P C**

3 0 0 0

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

Course content

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and theStates
8. Parliamentary Form of Government in India – The constitution powers and status of thePresident of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions: National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21

III-I

2250511: DESIGN AND ANALYSIS OF ALGORITHMS

B.Tech. III Year I Sem. **L T P C**
3 1 0 4

Prerequisites: Programming for Problem Solving, Data Structures
Course Outcomes: The students should be able to

- Analyze the performance of algorithms
- Apply Greedy methods to solve problems
- Use Dynamic Programming to handle real time applications
- Apply Backtracking to do problem solving
- Understand Branch and Bound, NP-Hard and NP-Complete problems

UNIT - I

Introduction: Algorithm, Performance Analysis-Space complexity, Time complexity, AsymptoticNotations- Big oh notation, Omega notation, Theta notation and little oh notation.

Disjoint Sets: Introduction, union and find Operations.

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen'smatrix multiplication

UNIT - II

Greedy method: General method, applications- knapsack problem, Job sequencing with deadlines,Minimum cost spanning trees, Single source shortest path problem.

UNIT-III

Dynamic Programming: General method, applications- All pairs shortest path problem, Optimal binary search trees, 0/1 knapsack problem, Reliability design ,Traveling sales person problem.

UNIT-IV

Backtracking: General method, applications, n-queen‟s problem, sum of subsets problem, graph coloring, Hamiltonian cycles, knapsack problem.

UNIT – V

Branch and Bound: General method, applications - 0/1 knapsack problem, LC Branch and Boundsolution, FIFO Branch and Bound solution, , Travelling sales person problem,

NP-Hard and NP-Complete problems: Basic concepts, non_deterministic algorithms, NP - Hard and NP- Complete classes, Cook‟s theorem.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharan, University Press. 3rd Edition

REFERENCES:

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
2. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons.

2250519: CRYPTOGRAPHY AND NETWORK SECURITY

B.Tech. III Year I Sem. **L T P C**

3 0 0 3

Prerequisites: Computer Networks

Course Out comes: The students will be able to:

- Demonstrate the knowledge of cryptography and network security concept sand applications.
- Understand and apply the concepts of symmetric encryption.
- Identify and investigate of Cryptographic Hash Functions.
- Understand the concept of mail security and PGP.
- Understand and apply web security mechanisms.

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 Internet work security, Cryptography Concepts and Techniques: Introduction,plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption,symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT-II

Symmetric key Ciphers : Block Cipher principles, DES, AES, Blowfish, RC4, RC5, Block cipher operation, Stream ciphers, Asymmetric key Ciphers : Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie – Hellman Key Exchange, Knapsack Algorithm.

UNIT–III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA512), Message authentication codes : Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme. Key Management and Distribution : Symmetric Key Distribution Using Symmetric & Asymmetric Encryption , Distribution of Public Keys ,Kerberos,
X. 509 Authentication Service, Public–Key Infrastructure

UNIT–IV

E mail privacy : Pretty Good Privacy (PGP) and S/MIME .IP Security : Over view, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Association sand 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.

TEXTBOOKS:

1. Cryptography and Net work Security by Atul Kahathe MC Graw Hill, 2nd edition.
2. Cryptography and Network Security by Will I am Stallings 6th Edition, Pearson Education.

REFERENCES:

1. Cryptography and Network Security by Behrouz A.Forouzan.
2. Applied Cryptography" by Bruce Schneier.

2250524: WEB TECHNOLOGIES

B.Tech. III Year I Sem. **L T P C**

3 0 0 3

Prerequisites: OOPS through JAVA, Data Base Management Systems

Course Outcomes: The students will be able to:

- Do server side scripting with PHP language
- Understand XML and how to parse and use XML data with java.
- Write server side programming with java servlets
- Do server side programming with JSP.
- Do Client side Programming

UNIT-I

Introduction to PHP: Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads. Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies.

File Handling in PHP: File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories.

UNIT-II

HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;

XML: Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemes, Document Object Model, XHTML Parsing XML Data – DOM and SAX Parsers in java

UNIT–III

Introduction to Servlets: Common Gateway Interface (CGI), Life cycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

UNIT–IV

Introduction to JSP: The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.

UNIT-V

Client-side Scripting: Introduction to JavaScript, JavaScript language – declaring variables, scope of variables, functions. event handlers (onclick, onsubmit etc.), Document Object Model, Form validation.

TEXT BOOKS:

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP — Steven Holzner, Tata McGraw-Hill

REFERENCES:

1. Web Programming, building internet applications, Chris Bates 2″edition, Wiley Dreamtech
2. Java Server Pages —Hans Bergsten, SPD O'Reilly,
3. Java Script, D.Flanagan
4. Beginning Web Programming-Jon Duckett WROX

2250579: DESIGN AND ANALYSIS OF ALGORITHMS LAB

B.Tech. III Year I Sem. **L T P C**
0 0 2 1

Prerequisites: Programming for Problem Solving Lab, Java Programming Lab, Python Programming Lab

Course Outcomes: The students should be able to

- Develop the feasible and optimal solutions using Greedy method
- Develop the feasible and optimal solutions using dynamic programming.
- Develop the feasible and optimal solutions using Backtracking
- Develop the feasible and optimal solutions using Dynamic programming

Experiments:

Write a C/ Java/ Python program to implement the following

1. Knapsack problem using greedy method.
2. Prim‟s minimum cost spanning tree using Greedy Method
3. Kruskal‟s minimum cost spanning tree using Greedy Method
4. Job sequencing with deadlines using Greedy Method
5. Single source shortest path problem using Greedy Method
6. All pairs Shortest path using Dynamic Programming
7. Optimal Binary Search Tree using Dynamic Programming
8. 0/1 Knapsack problem using Dynamic Programming
9. n-Queen‟s problem using backtracking method.
10. Sum of subsets using backtracking method.
11. Graph Coloring using backtracking method.
12. Travelling sales person using branch and bound,

Dynamic programming

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, SatrajSahni and Rajasekharan, University Press.

REFERENCE:

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.
2. Introduction to Algorithms, second edition,T.H.Cormen, C.E.Leiserson, R.L.Rivest, and C.Stein, PHI Pvt. Ltd./ Pearson Education.
3. Algorithm Design: Foundations, Analysis and Internet Examples, M.T. Goodrich and R. Tamassia, John Wiley and sons

2250581: CRYPTOGRAPHY AND NETWORK SECURITY LAB

B.Tech. III Year I Sem.

L	T	P	C
0	0	2	1

Prerequisites: Computer Networks Lab, Programming for Problem solving Lab, Java Programming Lab

Course Outcomes: The students will be able to:

- Demonstrate the knowledge of cryptography and network security concepts and applications.
- Understand and apply the concepts of symmetric encryption.
- Identify and investigate of Cryptographic Hash Functions.
- Understand the concepts of email security and PGP.
- Understand and apply web security mechanisms.

List of Experiments:

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms a. Ceaser cipher b. Substitution cipher c. Hill Cipher
4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement RSA algorithm.
9. Implement the Diffie-Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA-1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA.

TEXT BOOKS:

1. Cryptography and Network Security by AtulKahathe MC Graw Hill, 2ndedition.
2. Cryptography and Network Security by William Stallings 6th Edition, Pearson Education.

REFERENCES:

1. Cryptography and Network Security by Behrouz A. Forouzan.
2. Applied Cryptography" by Bruce Schneier.

2250587: WEB TECHNOLOGIES LAB

B.Tech. III Year I Sem. **L T P C**
0 0 2 1

Prerequisites: JAVA Programming Lab, Data Base Management Systems Lab

Course Outcomes: The students will be able to:

- Do client side scripting validation of forms and AJAX programming
- Understand server side scripting with PHP language
- Understand XML and how to parse and use XML data with java.
- Do server side programming with Java Servlets.
- Do server side programming with JSP.

List of Experiments

1. Write a PHP script to print prime numbers between 1-50.
2. PHP script to
   a. Find the length of a string.
   b. Count no of words in a string.
   c. Reverse a string.
   d. Search for a specific string.
3. Write a PHP script to merge two arrays and sort them as numbers, in descending order.
4. Write a PHP script that reads data from one file and write into another file.
5. 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
6. Validate the Registration, user login, user profile and payment by credit card pages using JavaScript.
7. 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.
8. 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.
9. 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 MVCarchitecture while doing the website.

TEXT BOOKS:

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

REFERENCES:

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

2250024: INTELLECTUAL PROPERTY RIGHTS

B.Tech. III Year I Sem. **L T P C**
3 0 0 0

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 ownership issues, copy right registration, notice of copy right, international copy right law.
Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets: Trade secrete 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 & REFERENCE BOOKS:

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, TataMcGraw Hill Publishing company ltd.

III - II

2260558: CLOUD COMPUTING

B.Tech. III Year. II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Data Base Management Systems, Computer Networks

Course Outcomes: Students should be able to:

- Learn about different Computing Paradigms
- Know fundamentals of cloud computing and its characteristics
- Understand various service delivery models of a cloud computing architecture.
- Understand the ways in which the cloud can be programmed and deployed.
- Know about different cloud service providers.

UNIT - I

Computing Paradigms: High-Performance Computing, Parallel Computing, Distributed Computing, Cluster Computing, Grid Computing, Cloud Computing, Bio computing, Mobile Computing, Quantum Computing, Optical Computing, Nano computing.

UNIT - II

Cloud Computing Fundamentals: Motivation for Cloud Computing, The Need for Cloud Computing, Defining Cloud Computing, Definition of Cloud computing, Cloud Computing Is a Service, Cloud Computing Is a Platform, Principles of Cloud computing, Five Essential Characteristics, Four Cloud Deployment Models

UNIT - III

Cloud Computing Architecture and Management: Cloud architecture, Layer, Anatomy of the Cloud, Network Connectivity in Cloud Computing, Applications, on the Cloud, Managing the Cloud, Managing the Cloud Infrastructure Managing the Cloud application, Migrating Application to Cloud, Phases of Cloud Migration Approaches for Cloud Migration.

UNIT - IV

Cloud Service Models: Infrastructure as a Service, Characteristics of IaaS. Suitability of IaaS, Pros and Cons of IaaS, Summary of IaaS Providers, Platform as a Service, Characteristics of PaaS, Suitability of PaaS, Pros and Cons of PaaS, Summary of PaaS Providers, Software as a Service, Characteristics of SaaS, Suitability of SaaS, Pros and Cons of SaaS, Summary of SaaS Providers, Other Cloud Service Models.

UNIT V

Cloud Service Providers: EMC, EMC IT, Captiva Cloud Toolkit, Google, Cloud Platform, Cloud Storage, Google Cloud Connect, Google Cloud Print, Google App Engine, Amazon Web Services, Amazon Elastic Compute Cloud, Amazon Simple Storage Service, Amazon Simple Queue ,service, Microsoft, Windows Azure, Microsoft Assessment and Planning Toolkit, SharePoint, IBM, Cloud Models, IBM Smart Cloud, SAP Labs, SAP HANA Cloud Platform, Virtualization Services Provided by SAP, Sales force, Sales Cloud, Service Cloud: Knowledge as a Service, Rack space, VMware, Manjra soft, Aneka Platform

TEXT BOOK:

1. Essentials of cloud Computing: K. Chandrasekhran, CRC press, 2014

REFERENCE BOOKS:

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing, Kai Hwang, Geoffery C. Fox, Jack J. Dongarra, Elsevier, 2012.
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp 2011.

2266202: DATA BASE SECURITY

B.Tech. III Year IISem.

L	T	P	C
3	0	0	3

Prerequisites: Data Base Management Systems, Operating Systems

Course Outcomes: The students will be able to:

- Understand the concepts of Security Architecture and its Components
- Create and manage Users
- Handle Passwords using SQL.
- Understand the Database Security Models.
- Implement Virtual Private Databases

UNIT-I

Security Architecture: Introduction, Security, Information Systems, Database Management Systems, Information Security,. Information Security Architecture, Database Security, Asset Types and their values, Security Methods.

Operating System Security Fundamentals: Operating System (OS) Overview, Operating System Security Environment, Components of an OS Security Environment, Authentication Methods, User Administration, Password Policies, Vulnerabilities of OS, E-Mail Security.

UNIT-II

Administration of Users: Introduction, Documentation of User Administration, OS Authentication, Creating users, Creating a SQL Server Users, Removing Users, Modifying Users, Default Users, Remote Users, Database Links, Linked Servers, Remote Servers, Practices for Administrators and Managers. Best Practices.

UNIT–III

Profiles, Password Policies, Privileges and Roles: Introduction, Defining and Using Profiles, Designing and Implementing Password Policies, Granting and Revoking User Privileges, Creating Assigning and Revoking User Roles. Best Practices.

UNIT–IV

Database Application Security Models– Introduction, Types of Users, Security Models- Types of users, access matrix model, access modes model, commonly used application types. Classes of access control: Discretionary access control (DAC), Mandatory access control (MAC) and Role based Access control (RBAC); Application Types, Application Security Models, Data Encryption, Pharmacy Application.

UNIT-V

Virtual Private Databases- Introduction, Overview of Virtual Private Databases (VPD), Implementing a VPD Using Views, Implementing a VPD Using Application Context in Oracle, Implementing Oracle VPD, Viewing VPD Policies and Application Contexts, Using Policy Manager, Implementing Row and Column level Security with SQL Server.

TEXT BOOKS:

1. Database Security and Auditing: Protecting Data Integrity and Accessibility — Hassan A. Afyouni - Cengage Learning.

REFERENCES:

1. Silvano Castano, Fugini, Martella, Samarati, Database Security, Addison Wesley, 1994.
2. M. Gertz, S. Jajodia, Handbook of Database Security, Springer, 2008

2260515: FORMAL LANGUAGES AND AUTOMATA THEORY

B.Tech. III Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Discrete Mathematics, Data structures

Course Outcomes: The students will be able to:

- Understand the concept of abstract machines and their power to recognize the languages.
- Employ finite state machines for modeling and solving computing problems.
- Design context free grammars for formal languages.
- Learn Normal Forms
- Design Turing Machines

UNIT-I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems. Non deterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions. Deterministic Finite Automata: Definition of DFA, How A DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA.

UNIT–II

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions. Pumping Lemma for Regular Languages, Statement of the pumping lemma, Applications of the Pumping Lemma. Closure Properties of Regular Languages: Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT–III

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Tress, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages. Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata. Conversion of CFG to PDA.

UNIT–IV

Normal Forms for Context- Free Grammars: Eliminating useless symbols, Eliminating €-Productions. Chomsky Normal form Griebech Normal form. Pumping Lemma for Context-Free Languages: Statement of pumping lemma, Applications Closure Properties of Context-Free Languages: Closure properties of CFL’s, Decision Properties of CFL's Turing Machines:

UNIT–V

Introduction to Turing Machine, Formal Description, Instantaneous description, The language of a Turing machine Types of Turing machine: Turing machines and halting

Undecidability: Undecidability, A Language that is Not Recursively Enumerable, An Undecidable Problem That is RE, Undecidable Problems about Turing Machines, Recursive languages, Properties of recursive languages, Post's Correspondence Problem, Modified Post Correspondence problem, Other Undecidable Problems, Counter machines.

TEXT BOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Theory of Computer Science – Automata languages and computation, Mishra and
3. Chandra shekaran, 2nd edition, PHI.

REFERENCES:

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press

2250585: Skill Development Course (UI DESIGN-FLUTTER)

Course Outcomes: The Student will be able to

- Implements Flutter Widgets and Layouts
- Create Responsive UI Design and with Navigation in Flutter
- Create custom widgets for specific UI elements and also Apply styling using themes and custom
  styles.
- Design a form with various input fields, along with validation and error handling
- Fetch data and write code for unit Test for UI components and also animation

List of Experiments:

1. a) Install Flutter and Dart SDK.
   b) Write a simple Dart program to understand the language basics.
2. a) Explore various Flutter widgets (Text, Image, Container, etc.).
   b) Implement different layout structures using Row, Column, and Stack widgets.
3. a) Design a responsive UI that adapts to different screen sizes.
   b) Implement media queries and breakpoints for responsiveness.
4. a) Set up navigation between different screens using Navigator.
   b) Implement navigation with named routes.
5. a) Learn about stateful and stateless widgets.
   b) Implement state management using set State and Provider.
6. a) Create custom widgets for specific UI elements.
   b) Apply styling using themes and custom styles.
7. a) Design a form with various input fields.
   b) Implement form validation and error handling.
8. a) Add animations to UI elements using Flutter's animation framework.
   b) Experiment with different types of animations (fade, slide, etc.).
9. a) Fetch data from a REST API.
   b) Display the fetched data in a meaningful way in the UI.
10. a) Write unit tests for UI components.
    b) Use Flutter's debugging tools to identify and fix issues.

TEXT BOOK:

1. Marco L. Napoli, Beginning Flutter: A Hands-on Guide to App Development.

2266273: DATABASE SECURITY LAB

B.Tech. III Year II Sem. L T P C
0 0 2 1

Prerequisites:

- A course on "Data Base Management Systems".
- A course on "Operating Systems".

Course Objectives:

- To explain Security Fundaments and Security Architecture.
- To Understand Creating and Managing Users, Creating and Managing Passwords.
- To study the Database Security Models and Virtual Private Databases.

Course Outcomes: The students will be able to:

- Understand the concepts of Security Architecture and its Components
- Ability to create and manage Users and Passwords using SQL.
- Understand the Database Security Models.

List of experiments:

1. Creation and manipulation of database using SQL scripts and graphical interfaces.
2. Creating and managing users in My-SQL using Database Authentication
3. Creating and managing users in My-SQL using External Authentication
4. Creating and managing users in My-SQL using Global Authentication.
5. Design and Implement password policies in MY-SQL
6. Grant and revoke permissions in MY-SQL
7. Implementing DAC: Implementation of database security policies using DAC in My-Sql
8. Implementing of MAC to ensure confidentiality using either My-SQL or SQL server.
9. Implementing of MAC to control information flow using either My-SQL or SQL server
10. Implementation of Virtual Private Database using View using My-SQL or SQL server
11. Implementing Row and Column Level security with MY-SQL

TEXT BOOKS:

1. Database Security and Auditing: Protecting Data Integrity and Accessibility – Hassan A. Afyouni - Cengage Learning.

REFERENCES:

1. Silvano Castano, Fugini, Martella, Samarati, Database Security, Addison Wesley, 1994.
2. M. Gertz, S. Jajodia, Handbook of Database Security, Springer, 2008

22X0074: ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY

III Year B. Tech.

L	T	P	C
0	0	2	1

1. 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 globalized 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.

2. 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.

3. SYLLABUS: The following course content to conduct the activities is prescribed for the Advanced English Communication Skills (AECS) Lab:

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.

Activities on Reading Comprehension – General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading& effective googling.

Activities on Writing Skills – Structure and presentation of different types of writing – letter writing/Resume writing / e-correspondence/Technical report writing/ – planning for writing – improving one's writing.

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.

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.

4. MINIMUM REQUIREMENT:

The Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural 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

5. SUGGESTED SOFTWARE:

The software consisting of the prescribed topics elaborated above should be procured and used. Oxford Advanced Learner's Compass, 7th Edition
DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice. Lingua TOEFL CBT Insider, by Dream tech
TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

TEXT BOOKS:

1. Effective Technical Communication by M Asharaf Rizvi. McGraw Hill Education (India) Pvt. Ltd. 2nd Edition
2. Academic Writing: A Handbook for International Students by Stephen Bailey, Routledge, 5th Edition.

REFERENCE BOOKS:

1. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
2. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
3. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. English Vocabulary in Use series, Cambridge University Press 2008.
6. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
7. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
8. Job Hunting by Colm Downes, Cambridge University Press 2008.
9. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.

2260025: ENVIRONMENTAL SCIENCE

B.Tech. III Year. II Sem.

L	T	P	C
3	0	0	0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development.

UNIT - I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemicalcycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In- Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil.

Noise Pollution: Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental**

Issues and Global Efforts: Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water,R22 B.Tech. ECE Syllabus JNTU HYDERABAD biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP).

Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications

2230510: OOPS Through JAVA
(Open Elective - I)

B.Tech. III Year I Sem **L T P C**
3 0 0 3

Prerequisites: A course on Programming on problem solving

Course Outcomes: The students should be able to

1. Solve real world problems using OOP techniques.
2. Understand the use of abstract classes.
3. Solve problems using java collection framework and I/o classes.
4. Develop multithreaded applications with synchronization.
5. Develop applets for web applications.
6. Design GUI based applications

UNIT - I

Object oriented thinking: A way of viewing world – Agents, responsibility, messages, methods, Classes and instances, class hierarchies – inheritance, method binding, overriding and exceptions summary of oop concepts. History of Java, Java buzzwords, data types, variables, scope and life time of variables, Type conversion and casting, arrays, operators, Operator Precedence, control statements.

Classes: Class fundamentals, Declaring Objects, methods, Constructors, this keyword, garbage collection, Overloading methods and constructors, Recursion.

UNIT - II

Inheritance, Packages and Interfaces – Inheritance basics, Using super, Creating a multilevel hierarchy, method overriding, Dynamic method dispatch, abstract classes, Using final with inheritance, Defining a package, Finding package and class path, Access protection, importing packages, Defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-III

Exception handling and Multithreading- Exception types, uncaught exceptions, using try and catch, Multiple catch classes, nested try statements, throw, throws and finally. Java's built-in exceptions, chained exceptions, creating own exception sub classes. Java thread model, thread priorities, synchronization, messaging, thread class and runnable interface, creating thread, creating multiple threads, thread priorities, synchronizing threads, inter thread communication, thread life cycle.

UNIT-IV

Event Handling : Events, Event sources, Event Listeners, Event classes, Event listener interface, Handling mouse and keyboard events, Adapter classes, The AWT class hierarchy, AWT controls- labels, buttons, scrollbars, text field, check box, check box groups, choices, handling lists, dialogs, Menubar, layout manager – layout manager types – border, grid, flow, card and grid bag.

UNIT – V

Applets – Types, Applet basics, Applet architecture, applet skleton, simple applet display methods, passing parameters to applets. Swing – Introduction, MVC connection, 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, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.(UNIT-I first part)

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. Object Oriented Programming through Java, P. Radha Krishna, University Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
5. Java Programming and Object-oriented Application Development, R. A. Johnson, Cengage Learning.

22X0542: NETWORK PROGRAMMING
(Open Elective - I)

B.Tech. III Year II Sem

L T P C
3 0 0 3

Prerequisites: Computer Networks

Course Outcomes: The Students should be able to

- Understand basics of Network Programming and Sockets
- Write socket API based programs
- Design and implement client-server applications using TCP and UDP sockets
- Analyze network programs
- Apply Multicasting

UNIT-I

Introduction to Network Programming: OSI model, Unix standards, TCP and UDP & TCP connection establishment and Format, Buffer sizes and limitation, standard internet services, Protocol usage by common internet application.

Socket**s:** Address structures, value – result arguments, Byte ordering and manipulation function and related functions Elementary TCP sockets – Socket, connect, bind, listen, accept, fork and exec function, concurrent servers. Close function and related function.

UNIT-II

TCP client server: Introduction, TCP Echo server functions, Normal startup, terminate and signal handling server process termination, Crashing and Rebooting of server host shutdown of server host. Elementary UDP sockets: Introduction UDP Echo server function, lost datagram, summary of UDP example, Lack of flow control with UDP, determining outgoing interface with UDP.

I/O Multiplexing: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server

UNIT-III

Socket options: getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

Advanced I/O Functions: Introduction, Socket Timeouts, recv and send Functions,readv and writev Functions, recvmsg and sendmsg Functions, Ancillary Data, How Much Data Is Queued?, Sockets and Standard I/O, T/TCP: TCP for Transactions.

UNIT-IV

Elementary name and Address conversions: DNS, gethost by Name function, Resolver option, Function and IPV6 support, uname function, other networking information.

Broadcasting: Introduction, Broadcast Addresses, Unicast versus Broadcast, dg_cli Function Using Broadcasting, Race Conditions

UNIT-V

Multicasting: Introduction, Multicast Addresses, Multicasting versus Broadcasting on A LAN, Multicasting on a WAN, Multicast Socket Options, mcast_join and Related Functions, dg_cli Function Using Multicasting, Receiving MBone Session Announcements, Sending and Receiving, SNTP: Simple Network Time Protocol

TEXT BOOKS:

1. UNIX Network Programming, by W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, Pearson Education
2. UNIX Network Programming, 1st Edition, - W. Richard Stevens. PHI.

REFERENCES:

1. UNIX Systems Programming using C++ T CHAN, PHI.
2. UNIX for Programmers and Users, 3rd Edition Graham GLASS, King abls, Pearson Education
3. Advanced UNIX Programming 2nd Edition M. J. ROCHKIND, Pearson Education

22X0519-CRYPTOGRAPHY AND NETWORK SECURITY
(Open Elective-2)

B.Tech. III Year II Sem

L	T	P	C
3	0	0	3

Prerequisites: Computer Networks

Course Out comes: The students will be able to:

- Demonstrate the knowledge of cryptography and network security concept sand applications.
- Understand and apply the concepts of symmetric encryption.
- Identify and investigate of Cryptographic Hash Functions.
- Understand the concept of mail security and PGP.
- Understand and apply web security mechanisms.

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 Internet work security, Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT-II

Symmetric key Ciphers : Block Cipher principles, DES, AES, Blowfish, RC4, RC5, Block cipher operation, Stream ciphers, Asymmetric key Ciphers : Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie – Hellman Key Exchange, Knapsack Algorithm.

UNIT–III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA512), Message authentication codes : Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme. Key Management and Distribution : Symmetric Key Distribution Using Symmetric & Asymmetric Encryption , Distribution of Public Keys ,Kerberos,
X. 509 Authentication Service, Public–Key Infrastructure

UNIT–IV

E mail privacy : Pretty Good Privacy (PGP) and S/MIME .IP Security : Over view, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Association sand 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.

TEXTBOOKS:

1. Cryptography and Net work Security by Atul Kahathe MC Graw Hill, 2nd edition.
2. Cryptography and Network Security by Will I am Stallings 6th Edition, Pearson Education.

REFERENCES:

1. Cryptography and Network Security by Behrouz A.Forouzan.
2. Applied Cryptography" by Bruce Schneier.

22X6202: DATA BASE SECURITY
(Open Elective-2)

B.Tech. III Year II Sem **L T P C**

3 0 0 3

Prerequisites: Data Base Management Systems, Operating Systems

Course Outcomes: The students will be able to:

- Understand the concepts of Security Architecture and its Components
- Create and manage Users
- Handle Passwords using SQL.
- Understand the Database Security Models.
- Implement Virtual Private Databases

UNIT-I

Security Architecture: Introduction, Security, Information Systems, Database Management Systems, Information Security,. Information Security Architecture, Database Security, Asset Types and their values, Security Methods.

Operating System Security Fundamentals: Operating System (OS) Overview, Operating System Security Environment, Components of an OS Security Environment, Authentication Methods, User Administration, Password Policies, Vulnerabilities of OS, E-Mail Security.

UNIT-II

Administration of Users: Introduction, Documentation of User Administration, OS Authentication, Creating users, Creating a SQL Server Users, Removing Users, Modifying Users, Default Users, Remote Users, Database Links, Linked Servers, Remote Servers, Practices for Administrators and Managers. Best Practices.

UNIT–III

Profiles, Password Policies, Privileges and Roles: Introduction, Defining and Using Profiles, Designing and Implementing Password Policies, Granting and Revoking User Privileges, Creating Assigning and Revoking User Roles. Best Practices.

UNIT–IV

Database Application Security Models– Introduction, Types of Users, Security Models- Types of users, access matrix model, access modes model, commonly used application types. Classes of access control: Discretionary access control (DAC), Mandatory access control (MAC) and Role based Access control (RBAC); Application Types, Application Security Models, Data Encryption, Pharmacy Application.

UNIT-V

Virtual Private Databases- Introduction, Overview of Virtual Private Databases (VPD), Implementing a VPD Using Views, Implementing a VPD Using Application Context in Oracle, Implementing Oracle VPD, Viewing VPD Policies and Application Contexts, Using Policy Manager, Implementing Row and Column level Security with SQL Server.

TEXT BOOKS:

1. Database Security and Auditing: Protecting Data Integrity and Accessibility — Hassan A. Afyouni - Cengage Learning.

REFERENCES:

1. Silvano Castano, Fugini, Martella, Samarati, Database Security, Addison Wesley, 1994.
2. M. Gertz, S. Jajodia, Handbook of Database Security, Springer, 2008

2260516: ARTIFICIAL INTELLIGENCE
(Professional Elective – I)

B.Tech. III Year. I Sem **L T P C**

3 0 0 3

Prerequisites: Data Structures, Discrete Mathematics

Course Outcomes: The students will be able to:

- Frame an efficient problem space for a problem expressed in natural language.
- Finalize a search algorithm for a problem and estimate its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique for a given problem.
- Develop Logical Reasoning Systems
- Apply AI techniques to solve problems of game playing, and machine learning.

UNIT-I

Artificial Intelligence: What is AI, Foundations and History of AI.

Intelligent Agents: Introduction, how Agents Should Act, Structure of Intelligent Agents, Agent programs, Simple reflex agents, Goal based agents, Utility based agents, Environments and Environment programs.

Problem Solving by Search: Problem-Solving Agents, Formulating Problems, Example Problems, Searching for Solutions, Search Strategies (Breadth-first search, Uniform cost search, Depth-First Search, Iterative deepening Depth-First search, Bidirectional search).

UNIT-II

Informed Search Methods: Best-First Search, Heuristic Functions, Memory Bounded Search, Iterative Improvement Algorithms.

Game Playing: Introduction, Games as Search Problems, Perfect Decisions in Two-Person Games, Imperfect Decisions, Alpha-Beta Pruning, Games That Include an Element of Chance, State-of-the-Art Game Programs.

UNIT–III

Knowledge and Reasoning: A Knowledge-Based Agent, The Wumpus World Environment, Representation, Reasoning, and Logic, Prepositional Logic, An Agent for the Wumpus World. First-Order Logic: Syntax and Semantics, Extensions and Notational Variations, Using First-Order Logic, Logical Agents for the Wumpus World, A Simple Reflex Agent, Representing Change in the World Building a Knowledge Base: Properties of Good and Bad Knowledge Bases, Knowledge Engineering, The Electronic Circuits Domain, General Ontology, Application:

UNIT–IV

Inference in First-Order Logic: Inference Rules Involving Quantifiers, An Example Proof, Generalized Modus Ponens, Forward and Backward Chaining, Resolution: A Complete Inference Procedure, Completeness of resolution.

Logical Reasoning Systems: Introduction, Indexing, Retrieval, and Unification, Logic Programming Systems, Theorem Provers, Forward-Chaining Production Systems, Frame Systems and Semantic Networks, Description Logics, Managing Retractions, Assumptions, and Explanations.

UNIT-V

Planning: A Simple Planning Agent, From Problem Solving to Planning, Planning in Situation Calculus, Basic Representations for Planning, A Partial-Order Planning Example, A Partial-Order Planning Algorithm, Knowledge Engineering for Planning. Practical Planning: Practical Planners, Hierarchical Decomposition, Analysis of Hierarchical
Decomposition, Resource Constraints.

CASE STUDY; CHAT GPT

TEXTBOOKS:

1. Artificial Intelligence A Modern Approach, Stuart Russell and Peter Norvig, 3rd Edition, Pearson Education.

REFERENCEBOOKS:

1. Artificial Intelligence, E.Rich and K.Knight, , 3rd Edition, TMH
2. Artificial Intelligence, Patrick Henny Winston, 3rd Edition, Pearson Education.
3. Artificial Intelligence, ShivaniGoel, Pearson Education

22X0565: MOBILE COMPUTING
(Professional Elective – I)

B.Tech. III Year I Sem **L T P C**

3 0 0 3

Prerequisites: Computer Networks

Course Outcomes: The students will be able to:

- Understand Multiplexing and MAC Protocols
- Learn basics of mobile telecommunication systems.
- Understand functionality of MAC, network layer and identify a routing protocol for a given Ad hoc network.
- Learn the functionality of Transport and Application layers.
- Develop a mobile application using android/blackberry/ios/Windows SDK

UNIT-I

INTRODUCTION

Introduction to Mobile Computing – Applications of Mobile Computing- Generations of Mobile Communication Technologies- Multiplexing – Spread spectrum -MAC Protocols – SDMA- TDMA- FDMA- CDMA.

UNIT-II

MOBILE TELECOMMUNICATION SYSTEM

Introduction to Cellular Systems – GSM – Services - Architecture - Protocols – Security – Satellite Systems – History – Applications – GEO – LEO - MEO – GPRS- Services – Architecture - UMTS – Network Architecture.

UNIT–III

MOBILE NETWORK LAYER

MANET, Mobile IP, Classification of Multicast Routing Protocols, Multicast Routing Protocols: DSDV, DSR, AODV ,ZRP, DHCP, Security issues in MANETs, Introduction to Vehicular AdHoc networks (VANET) – MANET Vs VANET.

UNIT–IV

MOBILE TRANSPORT AND APPLICATION LAYER

Classical TCP Improvements – Inderect TCP - Mobile TCP – Transaction Oriented TCP – Wireless Application Protocols – Architecture – WDP – WTLS – WTP –WSP – WAE – WML – WML Script.

UNIT-V

MOBILE PLATFORMS AND APPLICATIONS

Operating Systems for Mobile Computing – Special Constraints & Requirements – Commercial Mobile Operating Systems – Windows Mobile, iOS, Android, BlackBerry – Mobile Commerce – Applications – Structure.

TEXT BOOKS:

1. Jochen Schiller, ―Mobile Communications, PHI, Second Edition, 2003.
2. Prasant Kumar Pattnaik, Rajib Mall ―Fundamentals of Mobile Computing, PHI Learning Pvt.Ltd, New Delhi – 2012 .

REFERENCES:

1. Dharma Prakash Agarval, Qing and An Zeng, “Introduction to Wireless and Mobile systems”, Thomson Asia Pvt Ltd, 2005.
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, ―Principles of Mobile Computing, Springer, 2003.
3. William.C.Y.Lee,―Mobile Cellular Telecommunications-Analog and Digital Systems‖, Second Edition, Tata McGraw Hill Edition ,2006.
4. C.K. Toh, ―Ad Hoc Mobile Wireless Networks‖, First Edition, Pearson Education, 2002.

22X1201: LINUX PROGRAMMING
(Professional Elective – II)

B.Tech. III Year II Sem **L T P C**

3 0 0 3

Prerequisites: Programming For Problem Solving

Course Outcomes: The students should be able to

- Use Linux utilities and Shell scripting language (bash) to solve Problems.
- Implement in C some standard Linux utilities such as ls, mv, cp etc. using system calls.
- Develop skills necessary for systems programming including file system programming, process and signal management, and inter process communication.
- Develop the basic skills required to write network programs using Sockets.
- Work with shell script to automate different tasks as Linux administration.

UNIT- I

Linux Utilities - File handling utilities, Security by file permissions, Process utilities, Disk utilities, Net working commands, Filters, Text processing utilities and Backup utilities. Sed - Scripts, Operation, Addresses, Commands, Applications, awk - Execution, Fields and Records, Scripts, Operation, Patterns, Actions, Associative Arrays, String and Mathematical functions, System commands in awk, Applications. Shell programming with Bourne again shell (bash) - Introduction, shell responsibilities, pipes and Redirection, here documents, running a shell script, the shell as a programming language, shell meta characters, file name substitution, shell variables, command substitution, shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts.

UNIT- II

kernel support for files, system calls for file I/O operations- open, creat, read, write, close, lseek, dup2, file status information-stat family, file and record locking- fcntl function, file permissions - Files and Directories - File Concept, File types, File System Structure, file metadata-Inodes, chmod, fchmod, file ownership-chown, lchown, fchown, links-soft links and hard links – symlink, link, unlink. Directories - Creating, removing and changing Directories-mkdir, rmdir, chdir, obtaining current working directory-get cwd, Directory contents, Scanning Directories - opendir, readdir, closedir, rewinddir functions.

UNIT- III

Process – Process concept, Layout of a C program image in main memory, Process environment-environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process control - process creation, replacing a process image, waiting for a process, process termination, zombie process, orphan process, system call interface for process management-fork, vfork, exit, wait, waitpid, exec family, Process Groups, Sessions and Controlling Terminal, Differences between threads and processes. Signals – Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise, alarm, pause, abort, sleep functions.

UNIT- IV

Inter process Communication - Introduction to IPC, IPC between processes on a single computer system, IPC between processes on different systems, pipes-creation, IPC between related processes using unnamed pipes, FIFOs-creation, IPC between unrelated processes using FIFOs (Named pipes), differences between unnamed and named pipes, popen and pclose library functions. Message Queues - Kernel support for messages, APIs for message queues, client/server example. Semaphores - Kernel support for semaphores, APIs for semaphores, file locking with semaphores.

UNIT- V

Shared Memory - Kernel support for shared memory, APIs for shared memory, shared memory example. Sockets - Introduction to Berkeley Sockets, IPC over a network, Client Server model, Socket address structures (Unix domain and Internet domain),Socket system calls for connection oriented protocol and connectionless protocol, example – client / server programs-Single Server-Client connection, Multiple simultaneous clients, Socket options set sock opt and fcntl system calls, Comparison of IPC mechanisms.

TEXT BOOKS :

1. Unix System Programming using C++, T. Chan, PHI.
2. Unix Concepts and Applications, 4th Edition, Sumitabha Das, TMH.
3. Unix Network Programming, W. R. Stevens, PHI.

REFERENCE BOOKS:

1. Beginning Linux Programming, 4th Edition, N. Matthew, R. Stones, Wrox, Wiley India Edition.
2. Unix for programmers and users, 3rd Edition, Graham Glass, King Ables, Pearson.
3. System Programming with C and Unix, A. Hoover, Pearson.

22X0554: DATA ANALYTICS
(Professional Elective – II)

B.Tech. III Year II Sem **L T P C**

3 0 0 3

Prerequisites: Data Base Management Systems

Course Outcomes: The students will be able to:

- Understand the impact of data analytics for business decisions and strategy
- Carryout data analysis/statistical analysis
- To carry out standard data visualization and formal inference procedures
- Design Data Architecture
- Understand various Data Sources

UNIT-I

Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality (noise, outliers, missing values ,duplicate data)and Data Processing & Processing.

UNIT-II

Data Analytics :Introduction to Analytics, Introduction to Tools and Environment ,Application of Modeling in Business, Databases & Types of Data and variables, Data Modeling Techniques, Missing Imputationsetc. Need for Business Modeling.

UNIT–III

Regression – Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc. Logistic Regression : Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT–IV

Object Segmentation : Regression Vs Segmentation–Supervised and Unsupervised Learning ,Tree Building – Regression, Classification, Over fitting, Pruning and Complexity ,Multiple Decision Trees etc. Time Series Methods : Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated modelas Height ,Average Energy etc and Analyze for prediction

UNIT-V

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques , Hierarchical Visualization Techniques,
Visualizing Complex Data and Relations.

TEXTBOOKS:

1. Student's Hand book for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han ,Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCES:

1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006. 2. Data Mining Analysis and Concepts, M.Zakiand W.Meira
2. Mining of Massive Datasets, Jure Leskovec Stan ford Univ. Anand Rajaraman Milliway Labs Jeffrey DUllman Stan ford Univ

22X0573: AD-HOC WIRELESS NETWORKS
(Professional Elective – II)

B.Tech. III Year II Sem **L T P C**

3 0 0 3

Prerequisites: Computer Networks, Mobile Computing

Course Outcomes: Student should be able to

- Know the basis of Ad-hoc wireless networks.
- understand design, operation and the performance of MAC layer protocols of Ad Hoc wireless networks.
- Learn design, operation and the performance of routing protocol of Ad Hoc wireless network.
- Study design, operation and the performance of transport layer protocol of Ad Hoc wireless networks.
- understand sensor network Architecture and will be able to distinguish between protocols used in Adhoc wireless networks and wireless sensor networks.

UNIT - I

Wireless LANs and PANs: Introduction, Fundamentals of WLANS, IEEE 802.11 Standards, HIPERLAN Standard, Bluetooth, Home RF. Ad-Hoc Wireless Networks: Introduction, Issues in Ad Hoc Wireless Networks.

UNIT - II

MAC Protocols: Introduction, Issues in Designing a MAC protocol for Ad Hoc Wireless Networks, Design goals of a MAC Protocol for Ad Hoc Wireless Networks, Classifications of MAC Protocols, Contention - Based Protocols, Contention - Based Protocols with reservation Mechanisms, Contention – Based MAC Protocols with Scheduling Mechanisms, MAC Protocols that use Directional Antennas, Other MAC Protocols.

UNIT - III

Routing Protocols: Introduction, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classification of Routing Protocols, Table –Driven Routing Protocols, On – Demand Routing Protocols, Hybrid Routing Protocols, Routing Protocols with Efficient Flooding Mechanisms, Hierarchical Routing Protocols, Power – Aware Routing Protocols.

UNIT - IV

Transport Layer Protocols: Introduction, Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks, Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks, Classification of Transport Layer Solutions, TCP Over Ad Hoc Wireless Networks, Other Transport Layer Protocol for Ad Hoc Wireless Networks.

UNIT - V

Wireless Sensor Networks: Introduction, Sensor Network Architecture, Data Dissemination, Data Gathering, MAC Protocols for Sensor Networks, Location Discovery, Quality of a Sensor Network, Evolving Standards, Other Issues.

TEXT BOOKS:

1. Ad Hoc Wireless Networks: Architectures and Protocols - C. Siva Ram Murthy and B.S.Manoj, 2004, PHI.
2. Wireless Ad- hoc and Sensor Networks: Protocols, Performance and Control - Jagannathan Sarangapani, CRC Press.

REFERENCE BOOKS:

1. Ad- Hoc Mobile Wireless Networks: Protocols & Systems, C.K. Toh, 1st Ed. Pearson Education.
2. Wireless Sensor Networks - C. S. Raghavendra, Krishna M. Sivalingam, 2004, Springer.

IV – I

2270017: Fundamentals of Management

B.Tech. IV Year I Sem. **L T P C**
3 0 0 3

Course Objective:

- To understand the Management Concepts, applications of Concepts in Practical aspects of business and development of Managerial Skills for Engineers.

Course Outcome:

- The students understand the significance of Management in their Profession. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area.

UNIT- I:

Introduction to Management: Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills, Challenges of Management; Evolution of Management- Classical Approach- Scientific and Administrative Management; The Behavioral approach; The Quantitative approach; The Systems Approach; Contingency Approach, IT Approach.

UNIT – II:

Planning and Decision Making: General Framework for Planning - Planning Process, Types of Plans, Management by Objectives; Production Planning and Control. Decision making and Problem Solving - Programmed and Non Programmed Decisions, Steps in Problem Solving and Decision Making; Bounded Rationality and Influences on Decision Making; Group Problem Solving and Decision Making, Creativity and Innovation in Managerial Work.

UNIT- III:

Organization and HRM: Principles of Organization: Organizational Design & Organizational Structures; Departmentalization, Delegation; Empowerment, Centralization, Decentralization, Recentralization; Organizational Culture; Organizational Climate and Organizational Change.
Human Resource Management & Business Strategy: Job Satisfaction, Job Enrichment, Job Enlargement, Talent Management, Strategic Human Resource Planning; Recruitment and Selection; Training and Development; Performance Appraisal.

UNIT- IV:

Leading and Motivation: Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills, Leader as Mentor and Coach, Leadership during adversity and Crisis; Handling Employee and Customer Complaints, Team Leadership.
Motivation - Types of Motivation; Relationship between Motivation, Performance and Engagement, Content Motivational Theories - Needs Hierarchy Theory, Two Factor Theory, Theory X and Theory Y.

UNIT- V:

Controlling: Control, Types and Strategies for Control, Steps in Control Process, Budgetary and Non-Budgetary Controls. Characteristics of Effective Controls, Establishing control systems, Control frequency and Methods.

TEXT BOOKS:

1. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.
2. Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.

REFERENCE BOOKS:

1. Essentials of Management, Koontz Kleihrich, Tata Mc - Graw Hill.
2. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
3. Industrial Engineering and Management: Including Production Management, T.R. Banga, S.C. Sharma, Khanna Publishers

2276203: Blockchain and Crypto Currency

B.Tech. IV Year I Sem. **L T P C**
3 0 0 3

Prerequisites: Computer Networks

Course outcomes

- Understand and explore the working of Blockchain technology
- Analyze the working of Smart Contracts
- Understand and analyze the working of Hyperledger
- Apply the learning of solidity and de-centralized apps on Ethereum
- Do Solidity Programming

UNIT-1: Introduction

Definition of Blockchain, Blockchain Technology Mechanisms & Networks, Blockchain Origins, Objective of Blockchain, Blockchain Challenges, Transactions And Blocks, P2P Systems, Keys As Identity, Digital Signatures, Hashing, and public key cryptosystems, private vs. public Blockchain.

UNIT-2: Bit Coin and Cryptocurrency

Bit Coin and Cryptocurrency: What is Bitcoin, The Bitcoin Network, The Bitcoin Mining Process, Mining Developments, Bitcoin Wallets, Decentralization and Hard Forks, Ethereum Virtual Machine (EVM), Merkle Tree, Double-Spend Problem, Blockchain and Digital Currency, Transactional Blocks, Impact Of Blockchain Technology On Cryptocurrency. BITCOIN PROS and CONS

UNIT-3: Ethereum & Hyperledger

Introduction to Ethereum: What is Ethereum, Introduction to Ethereum, Consensus Mechanisms, How Smart Contracts Work, Metamask Setup, Ethereum Accounts, Receiving Ether's What's a Transaction?, Smart Contracts.

Introduction to Hyperledger: Definition of Hyperledger, Distributed Ledger Technology & its Challenges, Hyperledger & Distributed Ledger Technology, Hyperledger Fabric, Hyperledger Composer.

UNIT-4: Solidity Programming

Solidity Programming: Solidity - Language of Smart Contracts, Installing Solidity & Ethereum Wallet, Basics of Solidity, Layout of a Solidity Source File & Structure of Smart Contracts, General Value Types (Int, Real, String, Bytes, Arrays, Mapping, Enum, address)

UNIT-5: Blockchain Applications

Blockchain Applications: Internet of Things, Medical Record Management System, Domain Name Service and Future of Blockchain, Alt Coins.

TEXT BOOKS

1. Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

REFERENCES

1. Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
2. Antonopoulos and G. Wood, Mastering Ethereum.
3. D. Drescher, Blockchain Basics. Apress, 2017.
4. Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts
5. Arun Kumar Arigela and RaziyaBegum ,Blockchain Technology in advanced applications, IIP Publications,2022.

2270545: Ethical Hacking

B.Tech. IV Year I Sem. **L T P C**
3 0 0 3

Prerequisites: Operating Systems, Computer Networks

Course Outcomes: The students will be able to

- Gain the knowledge of the use and availability of tools to support an ethical hack
- Gain the knowledge of interpreting the results of a controlled attack
- Understand the role of politics, inherent and imposed limitations and metrics for planning of a test
- Comprehend the dangers associated with penetration testing

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 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.

2270517: Compiler Design (Professional Elective – III)

B.Tech. IV Year I Sem. **L T P C**
3 0 0 3

Prerequisites:

Formal Languages and Automata Theory, Computer Organization

Course Outcomes: The students will be able to:

- Design a compiler given a set of language features.
- Acquire skills in using lex tool & yacc tool for developing a scanner and parser.
- Design and implement LL and LR parsers
- Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
- Design algorithms to generate machine code.

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

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 BOOKS:

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

REFERENCES:

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

2270514: Machine Learning (Professional Elective – III)

B.Tech. IV Year I Sem.

L	T	P	C
3	0	0	3

Pre-requisites: Data Structures, Probability and Statistics, Python Programming

Course Outcomes: The students should be able to

- Understand the concepts of computational intelligence like machine learning
- Understand the Neural Networks and its usage in machine learning application
- Use Baysian Approach to solve problems
- Understand Genetic Algorithms and its Usage
- Apply machine learning techniques to address the real time problems in different areas

UNIT-I

Introduction - Well-Posed Learning Problems, Designing a Learning System, Perspectives and Issues in Machine Learning, Supervised versus Unsupervised Learning. Concept Learning and the general to specific ordering – Introduction to Concept Learning task, Concept Learning as Search, FIND-S: finding a Maximally Specific Hypothesis, Version Spaces and Candidate Elimination algorithm, Remarks on Version Spaces and Candidate Elimination, Inductive Bias.

Decision Tree Learning – Introduction, Decision Tree representation, the Basic Decision Tree Learning algorithm, Hypothesis space search in Decision Tree learning, Inductive bias in Decision Tree learning, Issues in Decision Tree learning.

UNIT–II

Artificial Neural Networks– Introduction, Neural Network Representation, Appropriate problems for Neural Network Learning, Perceptions, Multilayer networks and the Back-Propagation Algorithm, Remarks on the Back-Propagation Algorithm, An illustrative Example: Face recognition, Advanced topics in Artificial Neural Networks.

Evaluation Hypotheses – Motivation, Estimation Hypothesis Accuracy, Basics of Sampling Theory, A General Approach for Deriving Confidence Intervals, Difference in Error of Two Hypotheses, Comparing Learning Algorithms.

UNIT–III

Bayesian learning – Introduction, Bayes theorem, Bayes theorem and concept learning, Maximum Likelihood and Least Squared Error Hypotheses, Maximum Likelihood Hypotheses for Predicting Probabilities, Minimum Description Length Principle, Bayes Optimal Classifier, Gibbs Algorithm, Naïve Bayes Classifier, Learning to Classify Text Example, Bayesian Belief Networks.

Instance-Based Learning- Introduction, k-Nearest Neighbour (KNN) algorithm, Locally Weighted Regression, Radial Basis Functions, remarks on lazy and eager learning**.**

UNIT–IV

Genetic Algorithms – Motivation, Genetic algorithms, an Illustrative Example, Hypothesis Space Search, Genetic Programming.

Learning Sets of Rules – Introduction, Sequential Covering Algorithms, Learning Rule sets: Learning First-Order rules, Learning Sets of First-Order rules: FOIL, Induction as Inverted Deduction, Inverting Resolution.

Reinforcement Learning – Introduction, the Learning Task, Q–learning.

UNIT - V

Analytical Learning- Introduction, Learning with Perfect Domain Theories: PROLOG-EBG, Remarks on Explanation-Based Learning, Explanation-Based Learning of Search Control Knowledge.

Combining Inductive and Analytical Learning – Motivation, Inductive-Analytical Approaches to Learning, Using Prior Knowledge to Initialize the Hypothesis, Using Prior Knowledge to alter the Search Objective, using Prior Knowledge to Augment Search Operators**.**

TEXTBOOKS:

1. Machine Learning – Tom M. Mitchell, - MGH,

REFERENCEBOOKS:

1. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis

2276244: Security Assessment & Risk Analysis
(Professional Elective – III)

B.Tech. IV Year I Sem.

L	T	P	C
3	0	0	3

Prerequisites: Cryptography and Network Security, Data Base Management Systems

Course Outcomes: The students will be able to:

- Understand the Web SECURITY and its risk analysis.
- Know Privacy-Protecting Techniques
- Implement database security
- Understand how common mistakes can be bypassed and exploit the application.
- Identify common application vulnerabilities.

UNIT-I

The Web Security, The Web Security Problem, Risk Analysis and Best Practices. Cryptography and the Web: Cryptography and Web Security, Working Cryptographic Systems and Protocols, Legal Restrictions on Cryptography, Digital Identification.

UNIT-II

The Web's War on Your Privacy, Privacy-Protecting Techniques, Backups and Anti-Theft, Web Server Security, Physical Security for Servers, Host Security for Servers, Securing Web Applications.

UNIT-III

Database Security: Recent Advances in Access Control, Access Control Models for XML, Database Issues in Trust Management and Trust Negotiation, Security in Data Warehouses and OLAP Systems.

UNIT-IV

Security Re-engineering for Databases: Concepts and Techniques, Database Watermarking for Copyright Protection, Trustworthy Records Retention, Damage Quarantine and Recovery in Data Processing Systems, Hippocratic Databases: Current Capabilities.

UNIT-V

Future Trends Privacy in Database Publishing: A Bayesian Perspective, Privacy-enhanced Location Based Access Control, Efficiently Enforcing the Security and Privacy Policies in a Mobile Environment.

TEXT BOOKS:

1. Web Security, Privacy and Commerce Simson G Arfinkel, Gene Spafford, O'Reilly.
2. Handbook on Database security applications and trends Michael Gertz, Sushil Jajodia.

2270547: Natural Language Processing
(Professional Elective – III)

B.Tech. IV Year I Sem. **L T P C**
3 0 0 3

Prerequisites: Data structures, Finite Languages and Automata Theory

Course Outcomes: The Students will be able to

- Show sensitivity to linguistic phenomena and an ability to model them with formal grammars.
- Understand and carry out proper experimental methodology for training and evaluating empirical NLP systems
- Manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods.
- Design, implement, and analyze NLP algorithms
- Design different language modeling Techniques.

UNIT - I
Finding the Structure of Words: Words and Their Components, Issues and Challenges, Morphological Models Finding the Structure of Documents: Introduction, Methods, Complexity of the Approaches, Performances of the Approaches

UNIT - II
Syntax Analysis: Parsing Natural Language, Treebanks: A Data-Driven Approach to Syntax, Representation of Syntactic Structure, Parsing Algorithms, Models for Ambiguity Resolution in Parsing, Multilingual Issues

UNIT - III
Semantic Parsing: Introduction, Semantic Interpretation, System Paradigms, Word Sense Systems, Software.

UNIT - IV
Predicate-Argument Structure, Meaning Representation Systems, Software.

UNIT - V
Discourse Processing: Cohension, Reference Resolution, Discourse Cohension and Structure Language Modeling: Introduction, N-Gram Models, Language Model Evaluation, Parameter Estimation, Language Model Adaptation, Types of Language Models, Language-Specific Modeling Problems, Multilingual and Crosslingual Language Modeling

TEXT BOOKS:

1. Multilingual natural Language Processing Applications: From Theory to Practice – Daniel M. Bikel and Imed Zitouni, Pearson Publication
2. Natural Language Processing and Information Retrieval: Tanvier Siddiqui, U.S. Tiwary

REFERENCE:

1. Speech and Natural Language Processing - Daniel Jurafsky & James H Martin, Pearson Publications

2276274: BLOCKCHAIN &CRYPTO CURRENCY LAB

IV Year B.Tech. CS I – Sem.

L	T	P	C
0	0	2	1

List of Experiments

1. Create a Simple Blockchain in any suitable programming language?
2. Use Geth to Implement Private Ethereum Block Chain?
3. Build Hyperledger Fabric Client Application?
4. Build Hyperledger Fabric with Smart Contract?
5. Create Case study of Block Chain being used in illegal activities in real world?
6. Develop Block Chain Application using python?
7. Build Hyperledger Composer?
8. Create a smart contract to take a string as input and give an 8 digit hash as an output?
9. ConstructERC-20 Token
10. Prepare a case study on Crypto currency Cyber-attack. (Ex: Grim Finance)

IV – II

22X0550: DISTRIBUTED SYSTEMS (Professional Elective – IV)					
B.Tech. IV Year II - Sem.	**L**	**T**	**P**	**C**	
	3	0	0	3	

Prerequisites : Operating Systems, Computer Network

Course Objectives:

- To understand theoretical concepts, namely, virtual time, agreement and consensus protocols.
- To understand lPC, Group Communication & RPC Concepts.
- To understand the DFS and DSM Concepts.
- To understand the concepts of transaction in distributed environment and associated concepts, namely, concurrency control, deadlocks and error recovery.

Course Outcomes: At the end of this course, students will be able to

CO 1	:	Identify the challenges in the design, development and maintenance of run-time environments for distributed systems
CO 2	:	Evaluate various time synchronization protocols and their trade-offs in maintaining consistent time across distributed systems.
CO 3	:	Demonstrate inter-process communication mechanisms, remote procedure calls, message passing, and distributed object systems.
CO 4	:	Apply distributed shared memory and data management techniques for replication strategies.
CO 5	:	Solve issues like deadlocks, race conditions and conflicts in a distributed environment.

UNIT - I :

Characterization of Distributed Systems: lntroduction, Examples of Distributed Systems Resource Sharing and the Web, Challenges. System Models: lntroduction, Architectural Models, Fundamental Models.

UNIT - II :

Time and Global States: lntroduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging. Coordination and Agreement: lntroduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

UNIT - III :

lnter Process Communication: lntroduction, The API for the lnternet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX. Distributed Objects and Remote lnvocation: lntroduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

UNIT - IV :

Distributed File Systems: lntroduction, File Service Architecture, Case Study 1: Sun Network File System, Case Study 2: The Andrew File System. Name Services: lntroduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.
Distributed Shared Memory: lntroduction, Design and lmplementation lssues, Sequential Consistency and lW case study, Release Consistency, Munin Case Study, Other Consistency LT 30), fr Models.

UNIT - V :

Transactions and Concurrency Gontrol: lntroduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control. Distributed Transactions: lntroduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

Text Books:

1. Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4th Edition, 2009.

References:

1. Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2nd Edition, PHl.
2. Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman & Hall/CRC, Taylor &Fransis Group, 2007

2280543: Soft Computing
(Professional Elective – IV)

B.Tech. IV Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Machine Learning, Probability an Statics

Course Outcomes: The students will be able to:

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Apply Neural networks to solve problems
- Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem.

UNIT - I

Introduction: Neural networks, Fuzzy logic, Genetic algorithm, Hybrid systems, Soft computing

Artificial Neural network: Fundamental concept, Evolution of Neural Networks, Basic models of Artificial Neural Networks, Important Terminologies of ANNs, McCulloch-Pitts Neuron, Linear Separability, Hebb Network.

Supervised Learning Network: Introduction, Perceptron Networks, Adaptive Linear Neuron, Multiple Adaptive Linear Neuron, Back-propagation Network, Radial Basis Function Network, Time Delay Neural Network, Functional Link Networks, Tree Neural Networks, Wavelet Neural Networks

UNIT - II

Associative Memory Networks: Introduction, Training Algorithms for Pattern Association, Auto associative Memory Network, Hetero associative Memory Network, Bidirectional Associative Memory, Hop fields, Interactive Auto associative Memory Networks.

Unsupervised Learning Networks: Fixed Weight Competitive nets, Kohonen Self-Organizing Future maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Network

UNIT – III

Third-Generation Neural Networks: Spiking Neural Networks, Convolutional Neural Networks, Deep learning Neural Networks

Introduction to Fuzzy logic, Classical sets, Fuzzy sets.

Classical Relations and Fuzzy Relations: Cartesian product of Relation, Classical Relations, Fuzzy Relations, Tolerance and Equivalence Relations.

UNIT – IV

Fuzzification: Features, Methods of Membership Value assignments, Defuzzification, Fuzzy Arithmetic, Extension Principle, Fuzzy Measures, Fuzzy Integrals.

Fuzzy Rule Base and Approximation Reasoning: Truth values and Tables in Fuzzy Logic, Fuzzy Propositions, Fuzzy Reasoning, Fuzzy Inference systems, Fuzzy Decision Making, Fuzzy Logic control systems, Fuzzy Cognitive maps.

UNIT-V

Genetic Algorithms: Introduction, Biological Background, Traditional Optimization and Search Techniques, Genetic Algorithm and search space, Basic Terminology, Simple GA, Operators in Genetic Algorithm, Stopping Condition for Generic Algorithm Flow, Classification of Genetic Algorithms, Genetic Programming

TEXTBOOKS:

1. Principles of Soft Computing By S.N. Sivanandam, S.N.Deepa Wiley 3rd Edition

REFERENCE BOOKS:

1. George J. Klir and Bo Yuan, Fuzzy Sets and Fuzzy Logic - Theory and Applications, Prentice Hall, 1995.
2. Ross J.T., Fuzzy Logic with Engineering Applications John Wiley & Sons, 2009
3. Rajasekaran, S. Vijayalakshmi Pai, G.A. Neural Networks, Fuzzy Logic and Genetic Algorithms PHI Learning, 2003.
4. Priddy L.K., Keller E.P., Artificial Neural Networks: An Introduction, SPIE Press, 2005. 7. Gen, M. Cheng R., Genetic Algorithms and Engineering Optimization John Wiley & Sons. 2000.

2286245: Mobile & Wireless Security
(Professional Elective – IV)

B.Tech. IV Year II Sem. **L T P C**
3 0 0 3

Course Outcomes: The student will be able to

- Know about security issues in mobile communication
- Understanding the modern concept and foundation of Mobile security.
- Understand and classify various next generation networks
- Identity various sources of vulnerabilities from Mobile
- Analyze network security attacks and its countermeasures.

UNIT-1

Security Issues in Mobile Communication: Mobile Communication History, Security – Wired Vs Wireless, Security Issues in Wireless and Mobile Communications, Security Requirements in Wireless and Mobile Communications, Security for Mobile Applications, Advantages and Disadvantages of Application – level Security.

UNIT-2

Mobile Security: Security risks in Mobile ,Android Architecture, and Security Model for Android, Fundamentals of Android Development, Android Rooting, Intercepting Android Traffic, Attacks on Android, and Security Model for iOS.

UNIT-3

Mobile and Wireless Networks: Mobile Cellular Networks–(Generation Networks),802.11Standards– 02.11.802.15, 802.16, 802.20, 802.21, Mobile Internet networks, Attacks and defence strategies on Cellular networks.802.11 dedicated architectures Introduction, Adhoc networks(hotspot), Wireless Intrusion Detection System(WIDS),Honeypots,

UNIT-4

Wireless Security: Wireless networks Attacks – Active, passive attacks, DoS attacks, TCP, Trojan and Dictionary Attacks, Security risks in IEEE 802.11 standards, Security in 802.1x, 802.11i.

UNIT-5

Wi MAX and LTE Security: Introduction, WiMAX architecture and OFDM, Security risks involved in802.16-2004, Security risks involved in 802.16e Security in GSM, UMTS, GPRS, VoIP security, LTE security.

TEXT BOOK:

1. M. Au, R. Chooand G.Kessler,Mobile security and privacy.Cambridge,MA:Syngress,2017.

REFERENCES:

1. Pallapa Venkataram, Satish Babu: “Wireless and Mobile Network Security”, 1st Edition, Tata McGraw Hill,2010.
2. J.Joshi, Network Security. New York: Elsevier,2009.
3. S.AHMADI,MOBILEWIMAX.[Placeofpublicationnotidentified]:ELSEVIERACADEMICPress, 2016.
4. J.Harrington, Network security. SanFrancisco, CA: Morgan Kaufmann Publishers,2005.

2281202: Software Project Management (Professional Elective – V)

B.Tech. IV Year II Sem. **L T P C**
3 0 0 3

Prerequisites: Software Engineering

Course Objectives:

- To acquire knowledge on software process management.
- To acquire managerial skills for software project development.
- To understand software economics. Course Outcomes:
- Understand the software process change, assessment, project plans and Quality Standards.
- Examine the life cycle phases, artifacts, workflows and checkpoints of a process.
- Design and develop software products using conventional and modern principles of software project
- management.
- Identify the new project management process and practices.

UNIT – I

Software Process Maturity Software maturity Framework, Principles of Software Process Change, Software Process Assessment, The Initial Process, The Repeatable Process, The Defined Process, The Managed Process, The Optimizing Process, Process Reference Models Capability Maturity Model (CMM), CMMI, PCMM, PSP, TSP).

UNIT - II Software Project Management Renaissance Conventional Software Management, Evolution of Software Economics, Improving Software Economics, Life-Cycle Phases and Process artifacts Engineering and Production stages, inception phase, elaboration phase, construction phase, transition phase, artifact sets, management artifacts, engineering artifacts and pragmatic artifacts, model-based software architectures.

UNIT – III

Workflows and Checkpoints of process Software process workflows, Iteration workflows, Major milestones, minor milestones, periodic status assessments, Process Planning Work breakdown structures, Planning guidelines, cost and schedule estimating process, iteration planning process, Pragmatic planning.

UNIT - IV

Project Organizations Line-of- business organizations, project organizations, evolution of organizations, process automation. Project Control and process instrumentation, The seven-core metrics, management indicators, quality indicators, life-cycle expectations, Pragmatic software metrics, metrics automation.

UNIT - V

CCPDS-R Case Study and Future Software Project Management Practices, Modern Project Profiles, Next-Generation software Economics, Modern Process Transitions.

TEXT BOOKS: 1. Managing the Software Process, Watts S. Humphrey, Pearson Education 2. Software Project Management, Walker Royce, Pearson Education.

REFERENCE BOOKS:

1. An Introduction to the Team Software Process, Watts S. Humphrey, Pearson Education, 2000
2. Process Improvement essentials, James R. Persse, O'Reilly, 2006
3. Software Project Management, Bob Hughes & Mike Cotterell, fourth edition, TMH, 2006
4. Applied Software Project Management, Andrew Stellman & Jennifer Greene, O'Reilly, 2006.
5. Software Engineering Project Management, Richard H. Thayer & Edward Yourdon, 2nd edition, Wiley India, 2004.
6. Agile Project Management, Jim Highsmith, Pearson education, 2004.

2280551: Deep Learning
(Professional Elective – V)

B.Tech. IV Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Machine Learning Probability and Statistics

Course Outcomes: The students will be able to:

- Understand the concepts of Neural Networks
- Select the Learning Networks in modeling real world systems
- Use an efficient algorithm for Deep Models
- Apply optimization strategies for large scale applications
- Train Deep Learning Models

UNIT-I

Artificial Neural Networks Introduction, Basic models of ANN, important terminologies, Supervised Learning Network, Perceptron Networks, Adaptive Linear Neuron, Back-propagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT-II

Unsupervised Learning Network-Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks.

UNIT–III

Introduction to Deep Learning, Historical Trends in Deep learning, Deep Feed – forward networks, Gradient-Based learning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation Algorithms. Convolutional Neural Networks, Deep learning Neural Networks

UNIT – IV

Regularization for Deep Learning: Parameter norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problems, Dataset Augmentation, Noise Robustness, Semi-Supervised learning, Multi-task learning Early Stopping, Parameter Typing and Parameter Sharing, Sparse Representations, Bagging and other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, tangent Prop and Manifold, Tangent Classifier.

UNIT –V

Optimization for Train Deep Models: Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second Order Methods, Optimization Strategies and Meta-Algorithms

Applications: large Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing.

TEXT BOOKS:

1. Deep Learning: An MIT Press Book By Ian Goodfellow and Yoshua Bengio and Aaron Courville
2. Neural Networks and Learning Machines, Simon Haykin, 3rd Edition, Pearson Prentice Hall.

REFERENCES:

1. Bishop. C.M., Pattern Recognition and Machine Learning, Springer, 2006,
2. Yegnanarayana, B., Artificial Neural Networks PHI Learning Pvt. Ltd, 2009
3. Golub, G.H., and Van Loan, C.F., Matrix Computations, JHU Press, 2013.
4. Satish Kumar, Neural Networks: A Classroom Approach, Tata McGraw Hill Education, 2004.

2286246: Enterprise Security
(Professional Elective – V)

B.Tech. IV Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Cryptography and Network Security

Course Outcome: The student will be able to

- Know about Enterprise Security and Risk analysis
- Understand Web service security ,
- Private Key security and Public key security
- Implement Multilevel Security
- Apply security and Privacy in cloud

UNIT-I

Introduction: Enterprise security and risk analysis. ***Identity management***: Passwords and two- factor authentication. Authentication protocols. Single sign-on: SAML and OpenID.

Access control: Access control matrix. ACLs. Capabilities and PKI. Attacks and sandboxing. Safety analysis. HRU and Take-grant. Federated access control: XACML

UNIT-II

Web service security*:* Enterprise web service security and SAML. REST security and OAuth, Enterprise security patterns.

Private key security: Stream ciphers. Birthday theorem. Block ciphers. Hash functions

Public key security: Diffie-Helman, El Gamal,RSA. Public key protocols. Advanced cryptosystems.

UNIT-III

Multilevel security: Bell-Lapadula, noninterference, non-deducibility. Role-based access control. ***Multilevel integrity***: Biba. Multilateral security: Compartmentation, Chinese Wall, Clark-Wilson, BMA. Secondary uses and privacy

UNIT-IV

Network security*:* Vulnerabilities. Firewalls. Intrusion detection. Denial of service.

Worms: Botnets. Cyber forensics. Security and privacy in the cloud

UNIT-V

Cryptography APIs*:* Java Cryptography Extension (JCE). Bouncy Castle. PKI and certificatemanagement.

TEXT BOOKS:

1. Ross Anderson, [A] Security Engineering, 2nd ed., Wiley, 2008. ISBN 0470068523
2. David Hook, [H] Beginning Cryptography, Wiley, 2005. ISBN 9780764596339

2280544: Internet Of Things (Professional Elective – V)

B.Tech. IV Year II Sem.

L	T	P	C
3	0	0	3

Prerequisites: Computer Networks, Python Programming

Course Outcomes: The students will be able to:

- Understand the characteristics, protocols and communication models required for logical design of IoT.
- Realize the hardware platforms for implementing and interfacing the IoT based board with different peripheral devices and serial communication devices.
- Develop stacks for IoT and M2M networks and configurations.
- Integrate devices and develop an application that can communicate through IoT Cloud.
- Do case studies

UNIT-I

Introduction to Internet of Things –Definition and Characteristics of IoT. Physical Design of IoT – IoT Protocols. Logical Design of IoT -IoT Communication Models, IoT Communication APIs.
IoT Enabling Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems. IoT Levels and Deployment Templates.

UNIT-II

Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib, RPi.GPIO.
IoT Physical Devices and Endpoints - Introduction to Raspberry PI, Interfaces (serial, SPI, I2C). Programming Raspberry PI with Python - Controlling LED, interfacing an LED and Switch, Interfacing a Light Sensor with Raspberry Pi.

UNIT–III

Domain Specific IoTs – Home, City, Environment, Energy Systems, Retail, Logistics, Agriculture, Industry, Health and Lifestyle.
IoT and M2M – Software Defined Networks, Network Function Virtualization, Difference between SDN and NFV for IoT. IoT System Management with NETCONF-YANG: SNMP, NETCONF, YANG, NETOPEER.

UNIT–IV

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs, WAMP- Auto Bahn for IoT, Cloud for IoT, Python Web Application Framework, Designing a RESTful Web API.

UNIT-V

Case Studies Illustrating IoT Design: Home Automation, Agriculture.

TEXTBOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press,2015.
2. Learning Internet of Things by Peter Waher, Packt publisher, 2015.

REFERENCES:

1. Getting started with sensors: Measure the world with Electronics, Arduino, and Raspberry, Kimmokarvinen and teroKarvenien, First Edition, Shroff/O'Reilly, 2014.
2. Getting started with Raspberry Pi, Richardson Matt, Shroff Publishers & Distributers Private Limited.2015
3. Practical Internet of Things Security by Brian Russell, Drew Van Duren, Packt publisher, 2016.

2280559: Computer Vision and Robotics
(Professional Elective - V)

B.Tech. IV Year II Sem. **L T P C**
3 0 0 3

UNIT - I
CAMERAS: Pinhole Cameras Radiometry – Measuring Light: Light in Space, Light Surfaces, Important Special Cases Sources, Shadows, And Shading: Qualitative Radiometry, Sources and Their Effects, Local Shading Models, Application: Photometric Stereo, Interreflections: Global Shading Models Color: The Physics of Color, Human Color Perception, Representing Color, A Model for Image Color, Surface Color from Image Color.

UNIT - II
Linear Filters: Linear Filters and Convolution, Shift Invariant Linear Systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing, Filters as Templates Edge Detection: Noise, Estimating Derivatives, Detecting Edges Texture: Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesis by Sampling Local Models, Shape from Texture.

UNIT - III
The Geometry of Multiple Views: Two Views Stereopsis: Reconstruction, Human Stereposis, Binocular Fusion, Using More Cameras Segmentation by Clustering: Segmentation, Human Vision: Grouping and Getstalt, Applications: Shot Boundary Detection and Background Subtraction, Image Segmentation by Clustering Pixels, Segmentation by Graph-Theoretic Clustering,

UNIT – IV
Segmentation by Fitting a Model: The Hough Transform, Fitting Lines, Fitting Curves, Fitting as a Probabilistic Inference Problem, Robustness Geometric Camera Models: Elements of Analytical Euclidean Geometry, Camera Parameters and the Perspective Projection, Affine Cameras and Affine Projection Equations Geometric Camera Calibration: Least-Squares Parameter Estimation, A Linear Approach to Camera Calibration, Taking Radial Distortion into Account, Analytical Photogrammetry, An Application: Mobile Robot Localization

UNIT – V
Introduction to Robotics: Social Implications of Robotics, Brief history of Robotics, Attributes of hierarchical paradigm, Closed world assumption and frame problem, Representative Architectures, Attributes of Reactive Paradigm, Subsumption Architecture, Potential fields and Perception
Common sensing techniques for Reactive Robots: Logical sensors, Behavioural Sensor Fusion, Pro- prioceptive sensors, Proximity Sensors, Topological Planning and Metric Path Planning

TEXT BOOKS:

1. David A. Forsyth and Jean Ponce: Computer Vision – A Modern Approach, PHI Learning (Indian Edition), 2009.
2. Robin Murphy, Introduction to AI Robotics, MIT Press

REFERENCE BOOKS:

1. E. R. Davies: Computer and Machine Vision – Theory, Algorithms and Practicalities, Elsevier (Academic Press), 4th edition, 2013.
2. The Robotics premier, Maja J Matari, MIT Press
3. Richard Szeliski “Computer Vision: Algorithms and Applications” Springer-Verlag London Limited 2011.

2286247: High Performance Computing
(Professional Elective - V)

B.Tech. IV Year II Sem. **L T P C**
3 0 0 3

Prerequisites: Java Programming, Operating Systems

Course Outcomes*:* The students will be able to
- Understanding the concepts in grid computing
- Set up cluster and run parallel applications
- Implement cluster projects and cluster OS
- Understand the concepts of pervasive computing, quantum computing.
- Implement Device Connectivity

UNIT-I
Grid Computing: Data & Computational Grids, Grid Architectures And Its Relations To Various Distributed Technologies. Autonomic Computing, Examples Of The Grid Computing Efforts (Ibm).

UNIT-II
Cluster Setup & Its Advantages, Performance Models & Simulations; Networking Protocols & I/O,
Messaging Systems. Process Scheduling, Load Sharing And Balancing; Distributed Shared Memory, Parallel I/O.

UNIT–III
Example Cluster System – Beowlf; Cluster Operating Systems: Compas And Nanos Pervasive Computing Concepts & Scenarios; Hardware & Software; Human – Machine Interface.

UNIT–IV
Device Connectivity; Java for Pervasive Devices; Application Examples.

UNIT–V
Classical Vs Quantum Logic Gates; One, Two & Three Qubit Quantum Gates; Fredkin& Toffoli Gates; Quantum Circuits; Quantum Algorithms.

TEXTBOOKS:

1. “Selected Topics In Advanced Computing” Edited By Dr. P. Padmanabham And Dr. M.B. Srinivas, 2005 Pearson Education.

REFERENCES:

1. J. Joseph & C. Fellenstien: „Grid Computing „, Pearson Education
2. J. Burkhardt et.al: „pervasive computing“ Pearson Education
3. Marivesar:“ Approaching quantum computing“, Pearson Education.
4. Raj kumar Buyya:“High performance cluster computing“, Pearson Education.
5. Neilsen & Chung L:“ Quantum computing and Quantum Information“, Cambridge University Press.

2280563: Cognitive Computing (Professional Elective – VI)

B.Tech. IV Year II Sem. **L T P C**
3 0 0 3

UNIT - I
Introduction to Cognitive Science: Understanding Cognition, IBM's Watson, Design for Human Cognition, Augmented Intelligence, Cognition Modeling Paradigms: Declarative/ logic-based computational cognitive modeling, connectionist models of cognition, Bayesian models of cognition, a dynamical systems approach to cognition.

UNIT - II
Cognitive Models of memory and language, computational models of episodic and semantic memory, modeling psycholinguistics.

UNIT - III
Cognitive Modeling: modeling the interaction of language, memory and learning, Modeling select aspects of cognition classical models of rationality, symbolic reasoning and decision making.

UNIT - IV
Formal models of inductive generalization, causality, categorization and similarity, the role of analogy in problem solving, Cognitive Development Child concept acquisition. Cognition and Artificial cognitive architectures such as ACT-R, SOAR, OpenCog, CopyCat, Memory Networks.

UNIT – V
DeepQA Architecture, Unstructured Information Management Architecture (UIMA), Structured Knowledge, Business Implications, Building Cognitive Applications, Application of Cognitive Computing and Systems.

TEXT BOOK:
1. The Cambridge Handbook of Computational Psychology by Ron Sun (ed.), Cambridge University Press.

REFERENCE BOOKS:
1. Judith S. Hurwitz, Marcia Kaufman, Adrian Bowles Cognitive Computing and Big Data Analytics, Wiley
2. Vijay V Raghavan, Venkat N. Gudivada, Venu Govindaraju, Cognitive Computing: Theory and Applications: Volume 35 (Handbook of Statistics), North Hollan.

2280562: Business Intelligence

L	T	P	C
3	0	0	3

Prerequisites: Data Base Management Systems

Course Outcomes: The students will be able to**:**

- Explain the fundamentals of business intelligence.
- Link data mining with business intelligence.
- Apply various modeling techniques.
- Explain the data analysis and knowledge delivery stages.
- Apply business intelligence methods to various situations. □ .

UNIT I: Business Intelligence:

Business intelligence: Effective and timely decisions, Data, information and knowledge, The role of mathematical models, Business intelligence architectures, Ethics and business intelligence Decision support systems: Definition of system, Representation of the decision-making process, Evolution of information systems, Definition of decision support system, Development of a decision support system

UNIT II: Mathematical models for decision making:

Structure of mathematical models, development of a model, Classes of models Data mining: Definition of data mining, Representation of input data, Data mining process, Analysis methodologies, Data preparation: Data validation, Data transformation, Data reduction.

UNIT III: Business intelligence applications

Marketing models: Relational marketing, Sales force management, Logistic and production models: Supply chain optimization, Optimization models for logistics planning, Revenue management systems. Data envelopment analysis: Efficiency measures, Efficient frontier, The CCR model, Identification of good operating practices.

UNIT-IV: Knowledge Management:

Introduction to Knowledge Management ,Organizational Learning and Transformation, Knowledge Management Activities, Approaches to Knowledge Management, Information Technology (IT) In Knowledge Management, Knowledge Management Systems Implementation, Roles of People in Knowledge Management Artificial Intelligence and Expert Systems: Concepts and Definitions of Artificial Intelligence, Artificial Intelligence Versus Natural Intelligence, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, Knowledge Engineering, Development of Expert Systems

UNIT-V: Future of Business Intelligence

Emerging Technologies, Machine Learning, Predicting the Future with the help of Data Analysis, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

TEXT BOOK:

1. Business Intelligence: Data Mining and Optimization for Decision Making by Carlo Vercellis, Wiley India Publications.
2. Efraim Turban, Ramesh Sharda, Dursun Delen, “Decision upport and Business Intelligence Systems”, 9th Edition, Pearson 2013.

REFERENCES:

1. P. N. Tan, M. Steinbach, Vipin Kumar, “Introduction to Data Mining”, Pearson Education
2. Michael Berry and Gordon Linoff “Data Mining Techniques”, 2nd Edition Wiley Publications.
3. Michael Berry and Gordon Linoff “Mastering Data Mining- Art & science of CRM”, Wiley Student Edition Vikram Pudi & Radha Krishna, “Data Mining”, Oxford Higher Education.