REGULATIONS (R-20), SYLLABI

for

B.Tech. Degree Program

COMPUTER SCIENCE & INFORMATION TECHNOLOGY

CHALAPATHI INSTITUTE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

Accredited by NAAC with 'A' Grade
Approved by AICTE :: Affiliated to Acharya Nagarjuna University
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I YEAR I Semester   COURSE STRUCTURE

S.NO	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of Examination			Category code
			L	T	P	INT	EXT	CREDITS	
1	CSIT 111	Mathematics-I	5	1	0	30	70	3	BSC
2	CSIT 112	Engineering Physics	5	0	0	30	70	3	BSC
3	CSIT 113	Engineering Graphics	2	0	4	30	70	3	ESC
4	CSIT 114	Problem Solving using C	5	0	0	30	70	3	ESC
5	CSIT 115	Basic Electrical Engineering	5	0	0	30	70	3	ESC
6	CSIT 151	Engineering Physics Lab	0	0	3	30	70	1.5	BSC
7	CSIT 152	Problem Solving using C Lab	0	0	3	30	70	1.5	ESC
8	CSIT 153	Introduction to Computing Lab	0	0	3	30	70	1.5	ESC
		Total	22	1	13	240	560	19.5	

I YEAR II Semester   COURSE STRUCTURE

S.NO	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of Examination			Category code
			L	T	P	INT	EXT	CREDITS	
1	CSIT 121	Mathematics-II	4	1	0	30	70	3	BSC
2	CSIT 122	Engineering Chemistry	4	0	0	30	70	3	BSC
3	CSIT 123	Professional Communication	4	0	0	30	70	3	HSC
4	CSIT 124	Python programming	4	1	0	30	70	3	ESC
5	CSIT 125	Digital Logic Design	4	1	0	30	70	3	ESC
6	CSIT 161	Engineering Chemistry Lab	0	0	3	30	70	1.5	BSC
7	CSIT 162	Professional Communication Skills Lab	0	0	3	30	70	1.5	HSC
8	CSIT 163	Python programming Lab	0	0	3	30	70	1.5	ESC
9	CSIT 126	Environmental Science	4	0	0	30	70	0	MC
		Total	24	3	9	270	630	19	

II YEAR I Semester   COURSE STRUCTURE

S.No.	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of Examination			Category Code
			L	T	P	INT	EXT	CREDITS	
1	CSIT 211	Probability & Statistics	4	1	0	30	70	3	BSC
2	CSIT 212	Data Structures	4	0	0	30	70	3	PCC
3	CSIT 213	Micro Processors & Micro Controllers	4	0	0	30	70	3	ESC
4	CSIT 214	Principles of Programming Languages	3	0	0	30	70	3	PCC
5	CSIT 215	Operating Systems	3	1	0	30	70	3	PCC
6	CSIT 251	Operating Systems Lab	0	0	3	30	70	1.5	PCC
7	CSIT 252	Data Structures Lab	0	0	3	30	70	1.5	PCC
8	CSIT 253	Micro Processors & Micro controllers Lab	0	0	3	30	70	1.5	ESC
		Skill Oriented Course*	1	0	2			2	SC
9	CSIT 216	Design Thinking	4	0	0	30	70	0	MC
		Total	23	2	11	270	630	21.5	

II YEAR II Semester   COURSE STRUCTURE

S.No.	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of Examination			Category Code
			L	T	P	INT	EXT	CREDITS	
1	CSIT 221	Mathematics-IV	4	1	0	30	70	3	BSC
2	CSIT 222	Database Management Systems	4	1	0	30	70	3	PCC
3	CSIT 223	Java Programming	4	1	0	30	70	3	PCC
4	CSIT 224	Design & Analysis of Algorithms	4	1	0	30	70	3	PCC
5	CSIT 225	Professional Ethics and Human Values	4	0	0	30	70	3	HSC
6	CSIT 261	Database Management systems Lab	0	0	3	30	70	1.5	PCC
7	CSIT 262	Java Programming Lab	0	0	3	30	70	1.5	PCC
8	CSIT 263	Algorithms Lab	0	0	3	30	70	1.5	PCC
		Skill Oriented Course*	1	0	2			2	
9	CSIT 226	Life Sciences	2	0	0	30	70	0	MC
		Total	23	2	11	240	560	21.5	

III YEAR I Semester COURSE STRUCTURE

S.No.	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of examination			Category Code
			L	T	P	INT	EXT	CREDITS	
1	CIT 311	Computer Networks	3	0	0	30	70	3	PCC
2	CIT 312	Internet Programming	3	0	0	30	70	3	PCC
3	CIT 313	Automata & Compiler Design	2	1	0	30	70	3	PCC
4	CIT 314	Professional Elective-1 (MOOCS)	3	0	0	30	70	3	PEC
5	CIT 315	Open Elective-1	3	0	0	30	70	3	OEC
6	CIT 351	Computer Networks Lab	0	0	3	30	70	1.5	PCC
7	CIT 352	Internet Programming Lab	0	0	3	30	70	1.5	PCC
8	CIT 353	Summer Internship	0	0	0	30	70	1.5	PROJ
		Honors/Minor courses	4	0	0			4	
	CIT 354	Skill Advanced Course/Soft skill Course *	1	0	2			2	SC
9	CIT 316	Constitution of India	2	0	0	30	70	0	MC
		Total	17	1	8	270	630	21.5	

III YEAR II Semester COURSE STRUCTURE

S.No.	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of examination			Category Code
			L	T	P	INT	EXT	CREDITS	
1	CIT 321	Artificial Intelligence	3	0	0	30	70	3	PCC
2	CIT 322	Data Warehousing & Data Mining	2	1	0	30	70	3	PCC
3	CIT 323	Open Elective-II (MOOCS)	3	0	0	30	70	3	OEC
4	CIT 324	Professional Elective-II	3	0	0	30	70	3	PEC
5	CIT 325	Internet of Things	3	0	0	30	70	3	PCC
6	CIT 361	Artificial Intelligence Lab	0	0	3	30	70	1.5	PCC
7	CIT 362	Data Mining Lab with R/Python/OCTAVE	0	0	3	30	70	1.5	PCC
8	CIT 363	Internet of Things Lab	0	0	3	30	70	1.5	PCC
		Honors/Minor courses	4	0	0			4	
	CIT 364	Skill Advanced Course/Soft skill Course *	1	0	2			2	SC
9	CIT 326	Soft Skills	2	0	0	30	70	0	MC
		Total	15	1	11	270	630	21.5	

IV YEAR I Semester   COURSE STRUCTURE

S.No.	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of examination			Category Code
			L	T	P	INT	EXT	CREDITS	
1	CIT 411	Professional Elective-III	3	0	-	30	70	3	PEC
2	CIT 412	Professional Elective-IV	3	0	-	30	70	3	PEC
3	CIT 413	OPEN ELECTIVE-III(MOOCS)	3	0	-	30	70	3	OEC
4	CIT 414	OPEN ELECTIVE-IV	3	0	-	30	70	3	OEC
5	CIT 415	Professional Elective-V	3	0	-	30	70	3	PEC
6	CIT 416	Humanities And Social Elective	3	-	-	30	70	3	HSC
7	CIT 417	Summer Internship	0	0	0	30	70	1.5	PROJ
		Honors/Minor courses	4	0	0			4	
		SKILL Advanced Courses*	2			30	70	2	SC
	Total		20	0		240	560	21.5	

IV YEAR II Semester   COURSE STRUCTURE

S.No.	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of examination			Category Code
			L	T	P	INT	EXT	CREDITS	
1	CIT 421	MAJOR PROJECT (Project WORK, Seminar And Internship In Industry)	0	0	0			14	PROJ
	Total		0	0	0			14	

Professional Elective Courses:

PE-1: MOOCS
1. Cloud Computing
2. Advanced Distributed Architecture
3. Web Based Technologies and Multimedia Applications
4. Data Structure and Algorithms using Java

PE-2:
1. Unix Programming
2. Networking Programming
3. Computer Organization
4. Computer Graphics

PE-3:
1. Big Data & Hadoop
2. Principles of Software Engineering
3. Cyber Security
4. Information Retrieval Systems

PE-4:
1. Software Testing Methodologies
2. Machine Learning
3. Block Chain Technology
4. Computer Forensics

PE-5:
1. Deep Learning
2. Software Architecture and Design Pattern
3. Social Media Analytics
4. Data Analytics through R

Open Elective Courses:

OE-1: Artificial IntelligenceOE-
OE-2: DBMS
OE-3: Machine Learning
OE-4: Data Analytics through R

Humanities and Social Sciences Electives:

1. Managerial Economics and Financial Analysis
2. Introduction to Industrial Management
3. Human Resources Behavior and Organization Behavior
4. Project Management and Entrepreneurship

CIT 111   **MATHEMATICS-I**   **L T P C**
                                                                   5 1 0 3

Course Objectives:
- To introduce theory of matrices and solving system of linear equations
- To explain the role of Eigen values and Eigen vectors for orthogonal transformations.
- To impart knowledge of mean value theorems and series expansions.
- To explain the importance of partial differentiation and improper integrals.

UNIT-I
Matrices:
Matrices: Types of Matrices, Rank – Echelon form – Normal form -Inverse of a matrix by Gauss-Jordan method - Solution of Homogeneous linear systems – Solution of Non-homogeneous linear systems – Gauss Elimination – Gauss Seidel methods.

UNIT-II
Eigen values – Eigen vectors:
Eigen values – Eigen vectors – Properties – Cayley Hamilton theorem (without proof) – Inverse, Power of Matrix by Cayley Hamilton theorem –– Reduction of quadratic form to Canonical form (Orthogonal transformation) – Rank, Index, and Signature of a Quadratic form.

UNIT-III
Sequences-Series & Mean Value Theorems:
Sequences and Series: Convergence and divergence-Oscillatory sequences and series – Ratio test – Comparison test-D-Alembert's ratio test – Integral test – Cauchy's root test – Alternate series – Leibnitz's rule.
Rolle's theorem - Lagrange's mean value theorem - Geometrical interpretation - Cauchy's mean value theorem - Geometrical interpretation - Taylor's theorem - Maclaurin's series.

UNIT-IV
Special Functions & Calculus:
Definitions of improper integrals: Beta & Gamma functions and their applications
Partial Differentiation – Homogeneous function – Euler's theorem – Total derivative – Chain rule –Taylor's and Maclaurin's series – Expansion of two variable functions – functional dependence – Jacobean – Maxima and Minima of functions of two variables without constraints and Lagrange's method of multipliers.

UNIT-V
Multivariable Calculus:
Double Integrals:
Double integrals, change of order of integration, double integration in polar coordinates, area enclosed by plane curves.
Triple Integrals:
Evaluation of triple integrals, change of variables between Cartesian and cylindrical Coordinates.

Text books:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna Publishers, 2017.

References:
1. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.
2. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Pub-

CIT 112   **ENGINEERING PHYSICS**   **L T P C**
                                                                    5 0 0 3

Course Objectives:
- Introduce the fundamental concepts of wave optics, conducting materials and optoelectronic devices
- Familiarize the students with topics of Electromagnetic waves and Fiber optics
- Understand the concepts of Quantum mechanics and Semiconductors.
- Gain knowledge about the concepts of Lasers and learning advanced concepts like Superconductivity.

UNIT- I

Wave Optics

Principle of Superposition–Interference of light–Young's double slit Experiment–Interference in thin films by reflected light-Newton's Rings–Determination of Wavelength-Michelson Interferometer –Engineering applications

Diffraction–Fresnel Diffraction–Fraunhofer Diffraction –Single slit Diffraction–Diffraction Grating–Grating Spectrum –Determination of Wavelength–engineering applications

UNIT- II

Laser and Fiber Optics

Characteristics of Laser–Spontaneous and Stimulated emissions–Principle of lasing action–Population inversion– Pumping–Einstein's Coefficients–Components of laser system–Working principle of Ruby laser, He-Ne laser–Applications of lasers.

Introduction to Optical Fibers–Principle of optical fiber–Critical angle, Acceptance angle–Numerical Aperture–Classification of fibers based on Refractive index profile, Modes–Fiber optic Communication system–Applications of Optical fiber.

UNIT-III

Quantum Mechanics

Introduction–Matter waves–de-Broglie's Hypothesis of matter waves–Properties of matter waves– Heisenberg's uncertainty principle–Schrodinger's time independent and time dependent wave equation –Physical significance of the wave function–Particle in one dimensional potential box.

UNIT- IV

Semiconductors

Origin of energy band formation in solids–Classification of materials into conductors, semi-conductors & insulators – Semiconductors–Intrinsic semiconductors–dependence of Fermi level on carrier concentration and temperature(Qualitative)–Electrical conductivity–Extrinsic semiconductors–P-type & N-type, Dependence of Fermi level on carrier concentration and temperature (Qualitative)–Drift & Diffusion Currents–Einstein's equation–Hall effect–Direct

and Indirect band gap semiconductors– LED, Photo conductor and Solar cell–Applications of Semiconductors.

UNIT- V

Electromagnetic Theory and Superconductivity

Gauss theorem, Strokes theorem– Fundamental laws of electromagnetism–Equation of continuity–Displacement Current– Maxwell's electromagnetic wave equations–Propagation of electromagnetic waves in dielectric and conducting media.

Introduction to superconductivity–Properties-critical parameters (T_c, H_c, I_c)–Meissner effect–Types of superconductors–London Equations–BCS Theory (Qualitative)–Josephson effect–High T_C Superconductors–Applications of superconductors.

Text Books:
1. A Text book of Engineering Physics - M.N. Avadhanulu and P.G. Kshirsagar - S.Chand Publications,2017
2. A Text book of Engineering Physics - Dr. D. Thirupathi Naidu and M Veeranjaneyulu -V.G.S. Book Links,2019

Reference Books:
1. Engineering Physics - R.K. Gaur and S.L. Gupta, Dhanpat Rai Publications (P) LTD, 2008
2. Optical Fiber Communications- 4/e, Gerd Keiser,   Tata Mc GrawHill, 2008
3. Introduction to Solid State Physics- Charles Kittel, Wiley Publications, 2011
4. Semiconductor devices-Physics and Technology- S.M. Sze,Wiley, 2008

CIT 113　　　　　**ENGINEERING GRAPHICS**　　　　**L　T　P　C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　2　0　4　3

Course Objectives:
- Bring awareness that Engineering Drawing is the Language of Engineers.
- Familiarize how industry communicates technical information.
- Teach the practices for accuracy and clarity in presenting the technical information.
- Instruct the utility of drafting & modeling packages in orthographic and isometric drawings.

UNIT- I
Introduction to Engineering graphics: Principles of Engineering Graphics and their significance-Conventions in drawing-lettering - BIS conventions. Dimensioning principles and conventional representations. a) Conic sections including the rectangular hyperbola-general method only, b) Cycloid, epicycloids and hypo cycloidc) Involutes.

UNIT- II
Projection of points, lines and planes: Projection of points in any quadrant, lines inclined to one or both planes, finding true lengths, angle made by line. Projections of regular plane surfaces.

UNIT- III
Projections of solids: Projections of regular solids inclined to one or both planes by rotational.
Sections of solids: Section planes and sectional view of right regular solids- prism, cylinder, pyramid and cone. True shapes of the sections.

UNIT- IV
Orthographic Projections: Systems of projections, orthographic projections (Simple Figures).

UNIT- V
Isometric Projections: Principles of isometric projection- Isometric scale; Isometric views: lines, planes, figures, simple and compound solids.

Text Books:
1. K.L.Narayana& P.Kannaiah, Engineering Drawing, 3/e, Scitech Publishers, Chennai, 2012.
2. N.D.Bhatt, Engineering Drawing, 53/e, Charotar Publishers, 2016
3. Engineering Graphics & Design, Jain, Maheshwary, Gautam, Khanna Publishing House
4. Engineering Drawing, ND Bhat, Charotar Publishing House

Reference Books:
1. Dhanajay A Jolhe, Engineering Drawing, Tata McGraw-Hill, Copy Right, 2009
2. Shah and Rana, Engineering Drawing, 2/e, Pearson Education, 2009
3. Venugopal, Engineering Drawing and Graphics, 3/e, New Age Publishers, 2000
4. K.C.John, Engineering Graphics, 2/e, PHI, 2013
5. Basant Agarwal & C.M.Agarwal, Engineering Drawing, Tata McGraw-Hill, 2008.

CIT 114   **PROBLEM SOLVING USING C**   L   T   P C
                                                         5   0   0 3

Course Objectives:
- Students will able to implement the algorithms & draw flowcharts for solving problems.
- Student will able to understand computer programming language concepts and code with branching & iterations.
- Design modular programming & recursive solution formulation using the concept of functions and arrays.
- Ability to design well-structured programs with the concept of structures and pointers.

UNIT- I
Flowchart design through Raptor: Flow chart symbols, Input/ Output, Assignment, operators, conditional if, repetition, function and sub charts. Example problems(section 1) – Finding maximum of 3 numbers, Unit converters, Interest calculators, multiplication tables, GCD of 2 numbers Example problems(section 2) - Fibonacci generation, prime number generation. Minimum, Maximum and average of n numbers.

UNIT- II
C Basics: C-Basics: C-character set, Data types, Constants, Expressions, Structure of C program, Operators and their precedence & associatively, Simple programs in C using all the operators, Type casting ,type coercion.

UNIT- III
Control Structures and Functions: Control Structures, Basic input and output statements, Preprocessor directives. Functions: Concept of a function, passing the parameters, automatic variables, scope and extent of variables, storage classes, recursion, iteration vs recursion, types of recursion, Simple recursive and non recursive programs, Towers of Hanoi problem.

UNIT- IV
Arrays and Pointers: Arrays: Single and multidimensional Arrays, Character array as a string, string functions, Programs using arrays and string manipulation. Pointers: Pointers declarations, Pointer expressions, Pointer parameters to functions. Pointers, Pointers and array, Pointer arithmetic.

UNIT- V
Structures and Files: Structures: Declaring and using structures, operations on structures, structures and arrays, user defined data types, pointers to structures. Command line arguments. Files: Introduction, file structure, file handling functions, file types, file error handling, Programs using file functions.

Text Books:

1. Programming in ANSI in C, E Balaguruswamy, Tata McGraw Hill
2. C Programming – AnithaGoel/Ajay Mittal/E.Sreenivasa Reddy-Pearson India
3. Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing

Reference Books:

1. https://raptor.martincarlisle.com/
2. Problem Solving with C- Somasekharan-PHI.
3. C Programming- Behrouz A forouzan – CENGAGE Learning
4. Let us C, Yashavant P. Kanetkar, BBP Publications, Delhi

CIT 115   **BASIC ELECTRICAL ENGINEERING**   **L T P C**
                                                                              5 1 0 3

Course Objectives:

- To learn the basics of the D.C. circuit analysis.
- To have an idea about single-phase and three-phase A.C. electrical circuits.
- To gain knowledge about basic magnetic circuits and transformers.
- To learn the construction and operation of D.C. and A.C. machines.

UNIT - I
DC 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 and Norton Theorems.

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

UNIT- III
DC Machines & Transformers: Construction and working of DC machine - EMF equation DC Generator- OCC characteristics of DC generator, Classifications of DC motor and their applications
Transformer - Ideal and practical transformers, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer.

UNIT- IV
AC Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic, starting and speed control of induction motor. Single-phase induction motor. Construction and working of synchronous generators.

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.

Text Books:
1. William H. Hayt, Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 6[th]Edition, TMH, 2002.
2. A Sudhakar and Shyam Mohan SP, Circuits and Networks: Analysis and Synthesis, 4th Edition, TMH, 2010
3. Electric Machines by I.J. Nagrath& D.P. Kothari, Tata Mc Graw – Hill Publishers

Reference Books:

1. Fundamentals of Electric Circuits / Charles K. Alexander, Matthew N. O. Sadiku. — 5th ed.
2. Mahmood Nahvi and Joseph Edminister, Electric Circuits, 4th Edition, Schaum's outline series, TMH, 2004.
3. Electric Machinary-A.E. Fritzgerald, C. Kingsley &S. Umans, Mc Graw-Hill Companies, 6[th]editon 2003.

CIT 151   **ENGINEERING PHYSICS LAB**   **L T P C**
                                                          0 0 3 1.5

LIST OF EXPERIMENTS

1. Determination of radius of curvature of plano convex lens by Newton's rings method
2. Determination of wavelength by using plane diffraction grating.
3. Determination of dispersive power of a Prism
4. Determination of wavelength of given Laser source
5. Determination of numerical aperture of a given optical fiber and hence to find its acceptance angle
6. Photo cell – I-V Characteristic curves and determination of stopping potential
7. Hall effect –Determination of Hall Coefficient
8. Photo voltaic cell - Determination of fill-factor
9. Determination of energy gap of a semiconductor
10. Measurement of resistance with varying temperature
11. Carey- Foster's bridge: Determination of specific resistance/Temperature coefficient of resistance.
12. Magnetic field along the axis of a circular coil carrying current.
13. Series LCR resonance circuit - Determination of "Q" factor
14. Determination of frequency of A.C supply using Sonometer
15. Determination of acceleration due to gravity by using compound Pendulum

CIT 152   **INTRODUCTION TO COMPUTING LAB**   **L T P C**
                                                            0 0 3 1.5

LIST OF EXPERIMENTS

Exercise No: 1
a. Identify various kinds Computing devices and their components.
b. Identify the different peripherals, ports and connecting cables in a PC.
c. Assemble and disassemble components of a PC

Exercise No: 2
Title : Document creation, Text manipulation with Scientific Notations
a. Starting Word
b. Creating Documents
c. Opening a Word document
d. Cutting, Copying and Pasting Text
e. Modifying Font
f. Aligning Text
g. Indenting Paragraphs and modifying line spacing
h. Setting and Modifying Tabs
i. Inserting Numbers and bullets in the word document
j. Inserting Bullets

Exercise No: 3
Title : Table creation, Table formatting and Conversion
a. Open a new document and insert a table with the following data: First Name Last Name Phone Address
b. Save the document with address.doc
c. Select the first Row and Bold the Text.
d. Align the text in the first row to "Center" and align the text in the remaining rows to "Left".
e. Insert a New Column to the beginning of the table with the data given.
f. Add a New Row to the End of the Table.
g. Insert a New Row between 3 and 4
h. Insert a New Column between 4th and 5th Column.
i. Change the size of the second column's width.
j. Sort the data according to alphabetical order of "First Name".
k. Delete the third row and third Column from the table.
l. Create a new row at the top of your table, merge the cells, and add a title to the table.
m. Split the above table into two tables
n. Apply Borders, Shading and Color to the table.
o. Spell check your document and correct all the grammatical as well as spelling mistakes
p. Save the above document as table.doc.

Exercise No: 4
Title :CHARTS – Line, XY, Bar and Pie
SPREAD SHEET
To analyze the marks of I year students

	A	B	C	D	E	F	G	H
1				Mark Analysis – I year				
2	Roll No.	Name	Mark I	Mark II	Mark III	Total	Average	
3	1	Meena	67	98	56			
4	2	Vishal	56	67	65			
5	3	Elisa	98	97	90			
6	4	Richa	78	87	89			
7	5	Swetha	45	56	54			
8	6	Dravid	78	56	87			
9	7	Sourav	34	45	53			

a. Enter the above data in a worksheet and save the workbook as student.xls ii) Calculate total and average for each student.

b. Save the workbook again.

c. Draw a pie chart to denote the names Vs total marks.

d. Try out various charts.

Exercise No: 5
Title :Power Point Presentation
Prepare a power point presentation on the topic given with minimum 10 slides and present it.

Exercise No: 6
Title :Mail Merge
Open a new document and type the following letter.
Enclosure: Resume.
a. Save the document as "Letter.doc."
b. Send the document to 10 recipients using Mail merge. (Use 10 different addresses)
c. Close the document.

Exercise No: 7
Title :Website Design
Design a sample website with minimum 6 pages.

Exercise No: 8
Title :Git Hub
Open an account in GitHub and upload the designed website to GitHub.

Exercise No: 9
Title :Cloud Services
Design Cloud Service with Web Role to demonstrate Windows Azure Blob Storage.

Exercise No: 10
Title :Cloud Services
Design Cloud Service with WebRole to demonstrate Windows Azure Table Storage.

CIT 153   **PROBLEM SOLVING USING C LAB**   L T P C
                                                         0 0 3 1.5

LIST OF EXPERIMENTS

Program- 1:
1. Construct flowcharts to
a. calculate the maximum, minimum and average of N numbers
b. develop a calculator to convert time, distance, area, volume and temperature from one unit to another.
c. calculate simple and compound interest for various parameters specified by the user
d. generate first N numbers in the Fibonacci series

Program- 2:
Write a program
a) Which determines the largest and the smallest number that can be stored in different data types of like short, int., long, float and double.
b) To find greatest of three numbers using conditional operator.
c) To swap two numbers with and without temporary variable.
d) Multiple unary increment and decrement operators in arithmetic expressions.

Program- 3:
Write a program
a) To find greatest of three numbers.
b) To find arithmetic operations using switch.
c) To count the digits of a number.
d) To check whether a number is perfect or not.

Program- 4:
Write a program
a) To check whether a number is strong or not.
b) To check whether a number is armstrong or not.
c) To check whether a number is palindrome or not.
d) To find the Fibonacci series upto the given number.

Program- 5:
Write a program
a) To swap two variables using functions.
b) To perform menu driven arithmetic operations using functions.
c) To find the factorial of a number using recursive and non- recursive functions.
d) To find the Fibonacci series using recursive functions.
e) To find the solution for towers of Hanoi using recursive function.
f) Pass parameters to a functions using call by value and call by reference.

Program- 6:
Write a program on Arrays
a) To read n numbers and sort them.
b) To find the minimum and maximum numbers.
c) To read two matrices and find their sum, difference and product of them.

Program- 7:
Write a program on strings
a) To demonstrate the use of string manipulation functions.
b) To sort the names in Alphabetical order.

Program- 8:
Write a program on pointers
a) To read dynamic array and sort the elements.
b) To perform pointer arithmetic.

Program- 9:
Write a program
a) To create student structure and read marks of three subjects and find the sum and total of
   the student.
b) for 60 students record using the above student structure.
c) To implement complex structure. Perform addition, subtraction and multiplication of two
   complex numbers.

Program- 10:
Write a program on Files
a) To append content of a file.
b) To display the content of a file.
c) To copy content of one file to other file.
d) To count the no of characters in a file.
e) To compare the contents of two files.

FIRST YEAR SECOND SEMESTER

CIT 121 **MATHEMATICS-II** **L T P C**
4 1 0 3

Course Objectives:
- To introduce important features of differential equations and related methods
- To familiarize the techniques of solving partial differential equations arising in engineering
- To introduce the subject of vector calculus to the students.
- To make the students aware of the importance between mathematics and engineering.

UNIT-I
Linear Differential Equations of first:
Introduction-Exact – Reducible to exact differential equations, Linear and Bernoulli's equations –Applications: Orthogonal trajectories – Newton's law of cooling – Law of exponential growth and decay.

UNIT- II
Linear Differential Equations of Higher Order:
Non homogeneous equations of higher order with constant coefficients with Right hand side terms of the type: e^{ax}, sin ax, cos ax, x^k, $e^{ax} V(x)$ and $x^m V(x)$.
Applications: Method of variation of parameters, Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy- Euler equation.

UNIT- III
Partial Differential Equations and Applications:
Introduction, Formation of PDE, Solution of PDE, Linear equations of first order, Non-linear equations of first order.
Applications: Method of separation of Variables, One dimensional Wave, Heat equations and Laplacian equation.

UNIT- IV
Vector Calculus: Vector differentiation:
Scalar and vector point functions, Del applied to scalar point functions. Gradient – Divergence – Curl – Vector identities.

UNIT- V
Vector Integration:
Line integral – work done – Potential function – area – surface and volume integrals – Vector integral theorems (without proof) viz. Greens, stokes and Gauss divergence and related problems.

Textbooks:
1. Erwin Kreyszig, Advanced Engineering Mathematics, 10/e, John Wiley & Sons, 2011.
2. B. S. Grewal, Higher Engineering Mathematics, 44/e, Khanna publishers, 2017.

References Books:
1. Dennis G. Zill and Warren S. Wright, Advanced Engineering Mathematics, Jones and Bartlett, 2011.

2. Michael Greenberg, Advanced Engineering Mathematics, 2/e, Pearson, 2018
3. George B. Thomas, Maurice D. Weir and Joel Hass, Thomas Calculus, 13/e, Pearson Publishers, 2013.
4. R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 3/e, Alpha Science International Ltd., 2002.

CIT 122   **ENGINEERING CHEMISTRY**   L T P C
                                                                4 0 0 3

Course Objectives:

- To familiarize engineering chemistry and its applications

- To impart the concept of soft and hard waters, softening methods of hard water

- To train the students on the principles and applications of electrochemistry, polymers, surface chemistry, and cement.

- compare the materials of construction for battery and electrochemical sensors (L2)

- explain the preparation, properties, and applications of thermoplastics & thermo settings, elastomers & conducting polymers. (L2)

- explain the principles of spectroscopy, GC and HPLC in separation of gaseous and liquid mixtures (L2)

UNIT- I

Water Technology: Various impurities of Water, WHO guidelines, Hardness unit sand determination by EDTA method, water treatment for drinking purpose-sedimentation, coagulation, filtration (slow sand filter), various methods of chlorination, breakpoint chlorination.
Water treatment for industrial purpose: Boiler troubles, scales, sludges, caustic embrittlement, boiler corrosion, priming and foaming- causes and prevention, Internal conditioning - Phosphate, Calgon and Carbonate treatment, External conditioning-Lime Soda process (simple problems), softening by ion-exchange process, Desalination of Brackish water by Electro dialysis and Reverse osmosis.

UNIT- II

Polymer Chemistry
Introduction to polymers, Functionality of monomers, chain growth and step growth polymerization, Co-polymerization (Stereo specific polymerization) with specific examples and mechanisms of polymer formation.
Plastics: Thermoplastics and Thermosetting, preparation, properties and applications of Bakelite, Elastomers, Preparation, properties and applications of BUNA-S and BUNA-N Rubbers.
Conducting Polymers- Introduction, examples, general applications and mechanism of Conduction on Poly acetylene.
Chemistry of Nano materials: Introduction to nano chemistry, preparation of nano materials - carbon nano tubes and fullerenes and their engineering applications.

UNIT- III

Electro Chemistry and Applications
Electrodes-concepts, types of cells, electro chemical series, Nernst equation.
Batteries: Primary cell (Dry cell), Secondary cell (Lead-acid), Lithium batteries and their advantages, Fuel cell (H_2-O_2 cell).
Corrosion: Types of corrosions- chemical corrosion, dry corrosion, electro chemical corrosion and wet corrosion, galvanic series, pitting and differential aeration of corrosion, factors affecting corrosion.
Corrosion control: Cathodic protection, Corrosion Inhibitors, Electro plating (Au) & (Ni).

UNIT- IV

Instrumental Methods

Electromagnetic spectrum-Absorption of Radiation: Beer-Lambert's law-Principle and applications of Ultra-Violet, Infra-Red and Nuclear Magnetic Resonance Spectroscopy. Principle and applications of Gas Chromatography and HPLC Techniques.

UNIT- V

Cement and Concrete chemistry

Introduction to Building Materials, Portland Cement, Constituents, Manufacturing Process, Setting and Hardening Cement.

Organic Reactions and Synthesis of a Drug Molecule:

Introduction to reactions involving Substitution (SN_1 and SN_2), Elimination reactions (E_1 and E_2), Synthesis of commonly used drug molecule – Aspirin and Paracetmol.

Text Books:

1. Engineering Chemistry, P.C. Jain and M. Jain - Dhanapathi Rai & Sons, Delhi
2. A text book of Engineering Chemistry, S.S. Dara - S. Chand & Co. New Delhi
3. Engineering Chemistry, B.K. Sharma - Krishna Prakashan, Meerut
4. Instrumental methods of analysis, 7th edition, Gurudeep raj & Chatwal Anand, CBS Publications,1986.
5. Text book of Nano Science and Nano technology, B.S. Murthy and P. Shankar, University press.

References Books:

1. Quantitative analysis - Day & Underwood.
2. A Text book of Instrumental methods - Skoog and West.
3. Instrumental methods of analysis, 7th edition, H.W. Wilard and Demerit, CBS publications, 1986.
4. Text book of Nano Science and Nano technology, B.S. Murthy and P. Shankar, University press.

CIT 123   **PROFESSIONAL COMMUNICATION**   **L T P C**
                                                                   4 0 0 3

Course Objectives:
- To inculcate a sense of professionalism among the students while emphasizing on vocabulary building.
- To adopt activity based teaching-learning methods to ensure that learners would be engaged in use of language.
- To provide pertinent reading strategies for comprehension.
- To impart effective strategies for sensible writing and demonstrate the same in briefing.

1. Vocabulary Building
1.1 The concept of Word Formation
1.2 Root words from foreign languages and their use in English
1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives.
1.4 Synonyms, antonyms, and standard abbreviations.
1.5 One word substitutes and Idioms

2. Basic Writing Skills
2.1 Sentence Structures
2.2 Use of phrases and clauses in sentences
2.3 Importance of proper punctuation
2.4 Organizing principles of paragraphs in documents

3. Identifying Common Errors in Writing
3.1 Subject-verb agreement
3.2 Noun-pronoun agreement
3.3 Misplaced modifiers
3.4 Articles
3.5 Prepositions

4. Nature and Style of Sensible Writing
4.1 Positive, Negative and Interrogative Sentences
4.2 Making Polite requests
4.3 Letter Writing: Format of a formal and Informal letters: writing formal letters and informal letters
4.4 Describing

5. Writing Practices
5.1 Reading Comprehension
5.2 Précis Writing
5.3 Essay Writing

Reference Books:
1. *Academic writing: A handbook for International Students* Bailey, Stephen. Routledge, 2014.
2. *Pathways: Listening, Speaking and Critical Thinking* Chase, Becky Tarver. Heinley ELT; 2nd Edition, 2018.

3. Skillful Level 2 Reading & Writing Student's Book Pack (B10), Macmillan Educational.
4. Practical English Usage, Michael Swan. OUP. 1995.
5. Remedial English Grammar F.T. Wood., Macmillan.2007
6. Study Writing- Liz Hamp-Lyons and Ben Heasly., Cambridge University Press. 2006.
7. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad.
8. Technical Writing Sharon J.Gerson, Steven M.Gerson, , New Delhi: Pearson education, 2007.
9. Communication Skills Sanjay Kumar and Pushp Lata, , Noida: Oxford University Press, 2012.
10. Word Power Made Handy Dr. Shalini Verma, , S.Chand & Co Ltd., 2009.
11. Objective English for Compititive Examinations Hari mohan Prasad, Uma rani sinha, , New Delhi, Tata McGrraw-Hill P.Ltd, 2007.
12. Communication Skills- Meenakshi Raman, Sangeetha Sharma, , Oxford University Press, 2011

CIT 124   **PYTHON PROGRAMMING**   **L T P C**
                                                                   4 1 0 3

Course Objectives:
- To understand programming skills on python
- To understand the concepts of functions
- To learn how to use data types in python
- To acquire object oriented skills in python

UNIT- I
Context of software development: Software, Development tools, Learning programming with Python, Writing a python program.
Values and Variables: Variables and assignments, identifier, Control codes within Strings, User Input, The eval function, the print function.
Expressions and Arithmetic: Expressions, Operator precedence and Associatively, Comments, Errors, More arithmetic operators.

UNIT-II
Conditional Execution: Boolean Expressions, Simple if and if else, nested conditionals, multi-way decision statements, conditional expressions, errors in conditional statements.
Iteration: While statements, for statement, definite loops and indefinite loops, nested loops, abnormal loop termination, infinite loops.
Data Structures: Lists - Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions

UNIT- III
Functions: Introduction, standard mathematical functions, time functions, Random numbers, main function, parameter passing, Function examples: Better organized prime number.
More on Functions: Global variables, Default Parameters, recursion, Making functions reusable, documenting functions and modules, functions as data.
Modules: Creating modules, import statement, from. Import statement, name spacing,
Python packages: Introduction to PIP, Installing Packages via PIP, Using Python Packages

UNIT- IV
Lists processing: Sorting, flexible sorting, search.
Object Oriented Programming OOP in Python: Classes, 'self variable', Abstract classes and Interfaces, Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding,
Error and Exceptions: Difference between an error and Exception, Handling Exception, try except block, Raising Exceptions, User Defined Exceptions

UNIT- V
PYTHON:-OS and SYS, multithreading , date and time, Graphical user interface.
File Handling:-open(), read(), create(), and delete ()
Text books:
1. Taming Python by Programming, Jeeva Jose, Khanna Publishing House
2. Learning To Program With Python Richard L. Halterman
3. Core Python Programming by Dr. R.Nageswara Rao, dream tech, second edition

Reference Books:
1. Introduction to Computing and Problem Solving with Python, J. Jose, Khanna Publications
2. Python Programming, Seema Thareja, Pearson

CIT 125   **DIGITAL LOGIC DESIGN**   **L T P C**
                                                                4 1 0 3

Course Objectives:
- To impart the essential knowledge on the fundamentals and applications of digital circuits and digital computing principles.
- To provide an overview on the design principles of digital computing systems.
- To provide technical knowledge about various digital hardware components.
- To identify basic requirements for a design application and propose cost effective solution.

UNIT- I

Number Systems and Boolean Algebra: Number Systems and their Conversions, ASCII code, Excess -3 codes, Gray code. Binary codes, Error detection and correction codes, fixed point and floating-point arithmetic, Boolean algebra, Simplification of Boolean functions using K maps and Tabulation method.

UNIT- II

Combinational Logic Circuits: Design and applications of binary adders and subtractors, Carry Look Ahead Adder, Comparators, Encoders, Decoders, Multiplexers and Demultiplexers, Design of BCD to 7 Segment Decoder, Parity Generator and Checker, BCD Adder/Subtractor.

UNIT- III

Sequential Logic Circuits: Latches and flip-flops, Excitation Tables, State tables and State Diagrams of flip-flops, Flip-flop conversions. Shift registers, Analysis and Synthesis of Sequential Circuits and Counters.

UNIT- IV

Finite State Machines: Basic Design Steps, Sate Assignment Problem, Mealy State Model, Serial Adder, State Minimization, Design of a Counter using the Sequential Circuit Approach.

UNIT- V

Algorithmic State Machine: Digital System Design Using ASM Charts, Introduction to Programmable Logic Devices.

Text Books:
1. M Morris Mano and Micael D. Ciletti, Digital Design, Pearson Education, 2008
2. Donald E Givone, "digital principles and design", TMT.
3. R. P. Jain, "Modern Digital Electronics", 4th edition, McGraw Hill Education (India Private Limited), 2012.

Reference Books:
1. Thomas L. Floyd, Digital Fundamentals 7th Edition, Pearson
2. Charles H. Roth jr., Fundamentals of logic Design, Jaico publications, 1992
3. Z. Kohavi and N. K. Jha, "Switching and Finite Automata Theory", 3rd Edition, Tata McGraw Hill, 2010.

CIT 126   **ENVIRONMENTAL SCIENCE**   L T P C
                             (Mandatory)   4 0 0 0

Course Objectives:
- To make the students to get awareness on environment.
- To understand the importance of protecting natural resources, ecosystems for future generations.
- To identify the causes for pollution due to the day to day activities of human life to save earth from the inventions by the engineers.
- To make the students aware of Solid Waste Management.
- To Familiarize the Environmental Acts.

UNIT- I

Multidisciplinary Nature of Environmental Studies
Definition, Scope and Importance – Need for Public Awareness.
Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT- II

Ecosystems, Biodiversity and its Conservation
Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:
     a. Forest ecosystem.
     b. Grassland ecosystem
     c. Desert ecosystem
     d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and its Conservation : Definition: genetic, species and ecosystem diversity – Bio- geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega- diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, Man - wild life conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT- III

Environmental Pollution and Solid Waste

Management Environmental Pollution: Definition, Cause, effects and control measures of :

   a. Air Pollution.
   b. Water pollution
   c. Soil pollution
   d. Marine pollution
   e. Noise pollution
   f. Thermal pollution
   g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT- IV

Social Issues and the Environment

From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT- V

Human Population and the Environment

Population growth, variation among nations. Population explosion – Family Welfare Programmed. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/ Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

Text Books:

1. Text book of Environmental Studies for Undergraduate Courses - Erach Bharucha for University Grants Commission, Universities Press.
2. Environmental Studies - Palaniswamy – Pearson education
3. Environmental Studies - Dr.S.Azeem Unnisa, Academic Publishing Company

Reference Books:

1. Textbook of Environmental Science - Deeksha Dave and E.Saibaba Reddy, Cengage Publications.
2. Text book of Environmental Science and Technology - M.Anji Reddy, BS Publication.
3. Comprehensive Environmental studies - J.P.Sharma, Laxmi publications.
4. Environmental sciences and engineering – J. Glynn Henry and Gary W. Heinke – PHI
5. A Text Book of Environmental Studies - G.R.Chatwal, Himalaya Publishing House
6. Introduction to Environmental engineering and science - Gilbert M. Masters and Wendell P. Ela - PHI.

CIT 161 **ENGINEERING CHEMISTRY LAB** **L T P C**
                                                           0 0 3 1.5

LIST OF EXPERIMENTS

1. Determination of hardness of water by EDTA method
2. Estimation of Mohr's salt by Permanganometry
3. Estimation of Mohr's salt by Dichrometry
4. Determination of alkalinity of water
5. Percentage of purity of washing soda
6. Determination of available chlorine in bleaching powder
7. Preparation of Urea-Formaldehyde resin
8. Determination on strength of NaOH using HCl conductometry
9. Acid-Base titration by P^H meter
10. Acid-Base titration by Potentiometer
11. Determination of viscosity of lubricating oil
12. Determination of Surface tension

CIT 162   PROFESSIONAL COMMUNICATION SKILLS LAB   L T P C
0 0 3 1.5

LIST OF MODULES

Module-1: **Phonetics**
   a) Introduction to Phonetics
   b) Vowels and Consonants
   c) Accent, Intonation and Rhythm

Module-2: **Listening Comprehension**
   a) Comprehending Spoken material in British English
   b) Comprehending Spoken material in American English
   c) Intelligent listening in situations

Module-3: **Every Day Situations: Conversation and Dialogues**
   a) Introducing oneself & others
   b) Asking for & giving permissions
   c) Asking for and responding to give directions
   d) Seeking request
   e) Inviting and responding invitations
   f) Apologizing

Module-4: **Interview Skills**
   a) Introduction and Definition
   b) Process of Interviews
   c) Stress Interview
   d) Technical Interview

Module-5: **Presentation Skills**
   a) Extempore (JAM) Sessions
   b) Group discussion
   c) Identification of Source Material
   d) Arrangement of Collected Data Elocution
   e) Paper Presentation

CIT 163　　　　　**PYTHON PROGRAMMING LAB**　　　**L T P C**

(Common to all the Branches)　　　　　**0 0 3 1.5**

LIST OF EXPERIMENTS

1. Design a Python script to convert a Binary number to Decimal number and verify if it is a Perfect number.
2. Design a Python script to determine if a given string is a Palindrome using recursion
3. Design a Python script to sort numbers specified in a text file using lists.
4. Design a Python Script to determine the Square Root of a given number without using inbuilt functions in Python.
5. Design a Python Script to convert a given number to words
6. Design a Python Script to convert a given number to roman number.
7. Design a Python script to generate statistical reports (Minimum, Maximum, Count, Average, Sum etc) on public datasets.
8. Design a Python script using the Turtle graphics library to construct a turtle bar chart representing the grades obtained by N students read from a file categorizing them into distinction, first class, second class, third class and failed.
9. Design a Python script to search an element in the given list.
10. Design a Python script on str methods and list methods.

SECOND YEAR FIRST SEMESTER

CIT 211   **Mathematics-III: Probability and Statistics**   L T P C
                                                                          4 1 0 3

Course Objectives:
- To teach the learners the foundations of probability theory.
- To impart the concepts of statistical methods to solve engineering applications
- To apprise the students with the concept of Testing of hypothesis.
- To provide the learners solving application problems of their disciplines.
- To make the students aware of the importance between statistical techniques and engineering.

UNIT- I

Probability

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

UNIT- II

Distributions

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties.

UNIT- III

Descriptive statistics and methods for data science

Measures of Central tendency: Arithmetic Mean – Median – Mode - Geometric Mean- Harmonic Mean Measures of Dispersion: Range – Quartile Deviation – Variance, Standard Deviation –Skewness- Kurtosis. Curve Fitting and Principles of Least Squares.   Correlation- correlation coefficient - rank correlation - Regression coefficients -Regression lines.

UNIT- IV

Estimation and Testing of hypothesis: Large sample tests

Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test.

Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems.

UNIT-V

Testing of hypothesis: Small sample tests

Small Sample Tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes.

TEXT BOOKS:

1. Miller and Freund, Probability and Statistics for Engineers, 7th Edition, Pearson, 2008.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11th Edition, Sultan Chand & Sons Publications, 2012.
3. B. S. Grewal, Higher Engineering Mathematics, 44th Edition, Khanna Publishers, 2017.

REFERENCES:

1. S. Ross, a First Course in Probability,8th Edition, Pearson Education India, 2002.
2. W. Feller, an Introduction to Probability Theory and its Applications, 1st Edition, Wiley, 1968.

CIT 212 **DATA STRUCTURES** **L T P C**
4 0 0 3

Course Objectives:
- To understand the importance of algorithm
- To design and implement arrays, stacks, queues, and linked lists
- To understand the complex data structures such as trees and graphs
- To understand the various techniques of sorting and searching

UNIT- I
Development of Algorithms -Notations and analysis -Storage structures for arrays -Sparse matrices -Stacks and Queues: Representations and applications.

UNIT- II
Linked Lists -Linked stacks and queues -Operations on polynomials -Doubly linked lists - Circularly linked lists -Dynamic storage management -Garbage collection and compaction.

UNIT- III
Trees: Binary Trees -Binary search trees -Tree traversal -Expression manipulation -Symbol table construction-Height balanced trees (AVL trees) -Red-black trees.

UNIT- IV
Graphs -Representation of graphs -Traversal Methods (BFS, DFS)- Applications of DFS-Connected and Bi-Connected Components -Topological sort.

UNIT- V
Searching Methods - Linear search -Binary search –Hash table Methods.
Sorting Techniques - Selection, Shell, Bubble, Insertion, Merge, Quick, Heap and Radix sort.

Text Books:
1.J. P. Tremblay and P. G. Sorenson, "An Introduction to Data Structures with applications", Second Edition, Tata McGraw Hill, 1981
2.M. Tanenbaum and Augestien, "Data Structures using C", Third Edition, Pearson Education 2007.
3. Fundamentals of Data Structures, Sartaj Sahni, University Press
4. Data Structures, RS Salaria, Khanna Publishing House

Reference Books:
1. Data Structures through C, Yashwant Kanetkar, BPB Publications
2. Expert Data Structures with C++, RB Patel, Khanna Publications

CIT 213   MICROPROCESSORS AND MICROCONTROLLERS   L T P C
                                                      4 0 0 3

Course Objectives:

- Assess and solve math operation using micro processor
- Apply knowledge and demonstrate programming proficiency
- Analyze assembly language preprogram and select appropriate assembler utility.
- Design interface gravity to the micro processor in order to interface processor to external devices.

UNIT- I

8086/8088 Processor: Features, Pin Diagram and Description, Architecture, Addressing Modes, Instruction Set and Assembly language Programming.

UNIT- II

Programming Peripheral Interface and I/O Devices: Interfacing Programming peripheral interface PPI 8255, interfacing memory and I/O Devices. LED and Switch interfacing to 8086 using 8255. Universal Synchronous Asynchronous Receiver Transmitter – Interfacing of 8251

UNIT- III

Direct Memory Access and Interrupt system: DMA, Need of DMA, Memory management, Interfacing 8257, DMA controller, Interrupts, Programmable interrupt controller PIC-8259.

UNIT- IV

Introduction to micro-controllers: Overview of 8051 micro-controller, Architecture, I/O ports, Memory organization, addressing modes and instruction set of 8051, Simple programs.

UNIT- V

8051 Real Time Control: Programming Timer interrupts, programming external hardware interrupts, Programming the serial communication interrupts, Programming 8051 timers and counters.

Text Books:
1. Microprocessor and interfacing by Douglas V.Hall, McGraw Hill International Edition, 1992.
2. 2.Kenneth.J.Ayala. The 8051 microcontroller, 3rd edition, Cengage learning,2010

Reference Books:

1. The Intel microprocessor 8086/8088, 80186, 80286, 80386, and 80486 by Barry B. Brey PHI, 1998.
2. Advanced microprocessors and peripherals-A.K ray and K.M.Bhurchandani, TMH, 2nd edition 2006.
3. 8086/8088 Microprocessors by Walter A. Tribel and Avtar Singh, PHI, 1991.

CIT 214   PRINCIPLES OF PROGRAMMING LANGUAGES   L T P C
                                                         3 0 0 3

Course Objectives:
- To understand the evolution of programming languages.
- To introduce the notations to describe the syntax and semantics of programming languages.
- To introduce the principles and techniques involved in design and implementation of modern programming languages.
- To introduce the concepts of concurrency control and exception handling.

UNIT- I

Preliminary concepts: Reasons for studying, concepts of programming languages, Language Evaluation Criteria, influences on Language design, Language categories. Programming Language Implementation – Compilation, Hybrid Implementation, Pure Interpretation and Virtual Machines. methods of describing syntax - BNF, EBNF for common programming languages features, parse trees, ambiguous grammars, attribute.

Syntax and semantics: General Problem of describing Syntax and Semantics, formal grammars.

UNIT- II

Data types: Introduction, primitive, character, user defined, array, associative, record, union, pointer and reference types, design and implementation uses related to these types. Names, Variable, concept of binding, type checking, strong typing, type compatibility, named constants, variable initialization.

Expressions and statements: Arithmetic relational and Boolean expressions, Short circuit evaluation mixed mode assignment, Assignment Statements, Control Structures – Statement Level, Compound Statements, Selection, Iteration, Unconditional Statements.

UNIT- III

Subprograms and blocks: Fundamentals of sub-programs, Scope and lifetime of variable, static and dynamic scope, Design issues of subprograms and operations, local referencing environments, parameter passing methods, overloaded sub-programs, generic sub-programs, parameters that are sub-program names, design issues for functions user defined overloaded operators, co routines.

Abstract data types: Abstractions and encapsulation, introductions to data abstraction, design issues, language examples, C++ parameterized ADT, object oriented programming in small talk, C++, Java, C#, Ada 95.

UNIT- IV

Concurrency: Subprogram level concurrency, semaphores, monitors, massage passing, Java threads, C# threads.

Exception handling: Exceptions, exception Propagation, Exception handler in Ada, C++ and Java.

UNIT- V

Functional programming languages: Introduction, fundamentals of FPL, LISP, ML, Haskell, application of Functional Programming Languages and comparison of functional and imperative Languages.

Logic programming language: Introduction and overview of logic programming, basic elements of prolog, application of logic programming.

Text Books:

1. Robert .W. Sebesta, Concepts of Programming Languages, 6th Edition, Pearson Education, 2002. (1 to 5 units)
2. Lowlen, Programming Languages, 3rd Edition, 2012.

Reference Books:
1. Ghezzi, "Programming languages", 3rd Edition, John Wiley, 2008.
2. Pratt and Zelkowitz, "Programming Languages Design and Implementation", 4th Edition PHI/Pearson Education, 2008.
3. Watt, "Programming languages",1st Edition, Wiley Dreamtech, 2004.
4. Patric Henry Winston and Paul Horn, LISP, 3rd Edition, Wiley Dreamtech, 2005.
5. Clocksin, "Programming in PROLOG", 5th Edition, Springer, 2004.

CIT 215   **OPERATING SYSTEMS**   **L T P C**
                                                                  3 1 0 3

Course Objectives:
- To know the basics such as process and CPU scheduling algorithms.
- To understand the critical regions and dead lock problem.
- To understand virtual memory concept, thrashing problem and page replacement algorithms.
- To understand the file tables, access algorithms, and spoofing.

UNIT- I
Introduction to Operating Systems- What operating systems do, Operating System operations, Process management, Memory management, Storage management, Protection and security. **System Structures-** Operating System Services, System calls, Operating System design and implementation, Operating System structure, Virtual machines.

UNIT- II
Process Management - Process concept, Process scheduling, Operations on processes, Inter-process communication. **Process Scheduling**- Basic concepts, Scheduling criteria, Scheduling algorithms, Multiple-Processor scheduling. **Process Synchronization**- Background, The Critical section problem, Synchronization hardware, Semaphores, Classical problems of synchronization.

UNIT- III
Deadlocks- System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection and recovery from deadlock. **Memory Management Strategies**- Background, Swapping, Contiguous memory allocation, Paging, Structure of page table, Segmentation. **Virtual Memory Management**- Background, Demand paging, Page replacement, Thrashing.

UNIT- IV
File System- File concept, Access methods, Directory structure, Protection. **Implementing File System-** File system structure, File system implementation, Directory implementation, Allocation methods, Free space management. **Secondary Storage Structures**-Mass storage structures, Disk structure, Disk scheduling

UNIT- V
Dockers-Docker Basics and Architecture, What is containerization, how are containers different from physical machines and VMs, Docker evolution and architecture, Developments in Docker world, Docker tooling, Basic Docker commands. **Docker Networking**-Introduction, Types of Docker networks, Using Networks, Identifying container networks, **Docker Volumes**-Managing data in Docker containers with volumes, Volume file systems And basic Docker image file systems, Creating and managing volumes.

Text Books:
1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne: Operating System Principles, 9th edition, Wiley-India, 2012.
Reference Books:
1. William Stallings: Operating systems Internals and Design Principles | Ninth Edition, Pearson Education, 2018
2. Remzi H. Arpaci-Dusseau and Andrea C. Arpaci- Dusseau, Operating systems: Three easy pieces, URL : http://pages.cs.wisc.edu/~remzi/OSTEP/
3. James Turnbull: The Docker Book: Containerization is the new virtualization Kindle Edition, Kindle Edition,2014.

CIT 216   DESIGN THINKING AND PRODUCT INNOVATION   L T P C
                                                          4 0 0 0

Course Objectives:
- To bring awareness on innovative design and new product development.
- To explain the basics of design thinking.
- To familiarize the role of reverse engineering in product development.
- To train how to identify the needs of society and convert into demand.
- To introduce product planning and product development process.

UNIT-I

Science to Engineering: Job of engineers, engineering units and measurement, elements of engineering analysis, forces and motion, energy, kinematics and motion, conversion of linear motion to rotary and vice versa, motion transmission. Physics to Engineering: Application of Newton laws, Pascal's law, Bouncy, Bernoulli's theorem, Ohm's law, electrical induction in engineering products.

UNIT-II

Historical Development: Invention wheel, early mechanics in design, mechanical advantages, industrial revolution, steam and petrol for mobility. Innovations in Electrical and Electronics: Electrical energy generation, electrical bulb, electrical equipment, electronics and automation, computing for early days to present, innovations in communications.

UNIT-III

Systematic approach to product development: Design Thinking, Innovation, Empathize Design Thinking as a systematic approach to Innovation, brainstorming, visual thinking, design challenges, innovation, art of Innovation, strategies for idea generation, creativity, teams for innovation. Solution finding methods: Conventional, intuitive, discursive, methods for combining solution, decision making for new design.

UNIT-IV

Reverse engineering in product development: Reversing engineering methods, identifying the bad features in a product, reduction in size and weight, usage of new materials, 3D printing, study of introducing electrical and electronic controls to the old products, importance of ergonomics in product development, environmental considerations in design, safety considerations in design.

UNIT-V

Study of Product Development- Agriculture, development of machines for separation of corn seeds, peeling of groundnut shells, husk removing from paddy. Electrical: Design of burglar alarm, speedometer, water level indicator, smart gates, smart lights. Design of electrical vehicles, unmanned vehicles, design principles in drones.

Text Books:
1. Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, "Exploring Engineering: An Introduction to Engineering and Design", 4th edition, Elsevier, 2016.
2. David Ralzman, "History of Modern Design", 2nd edition, Laurence King Publishing Ltd., 2010
3. An AVA Book, "Design Thinking", AVA Publishing, 2010.

Reference Books:

1. G. Pahl, W.Beitz, J. Feldhusen, KH Grote, "Engineering Design: A Systematic Approach", 3rd edition, Springer, 2007.
2. Tom Kelley, Jonathan Littman, "Ten Faces in Innovation", Currency Books, 2006.

CIT 251   **OPERATING SYSTEMS LAB**   **L T P** C
                                                                    0 0 3 1.5

LIST OF EXPERIMENTS

1. Simulate the following CPU scheduling algorithms.

   a) Round Robin b) SJF c) FCFS d) Priority

2. Simulate all file allocation strategies

   a) Sequential b) Indexed c) Linked

3. Simulate MVT and MFT

4. Simulate all File Organization Techniques

   a) Single level directory b) Two level c) Hierarchical d) DAG

5. Simulate all page replacement algorithms

   a) FIFO b) LRU c) LFU

6. Working with different Unix commands, Pipes, I/O redirection.

7. Write Shell Programs for the following

   a) Display all the words which are entered as command line arguments.
   b) Changes Permissions of files in PWD as rwx for users.
   c) To print the list of all sub directories in the current directory.
   d) Program which receives any year from the keyboard and determine whether
      the year is leap year or not. If no argument is supplied the current year
      should be assumed.
   e) Program which takes two file names as arguments, if their contents are same
      then delete the second file.

8. Write shell scripts for the following
   a) To print the given number in the reversed order.
   b) To print first 25 Fibonacci numbers.
   c) To print the Prime numbers between the specified range.
   d) To print the first 50 Prime numbers.

9. Write shell scripts for the following
   a) To print gcd of a given number.
   b) To print the reverse of rows and columns of a matrix.
   c) To print the scalar product of two vectors.

10. Write shell scripts for the following
    a) To delete all lines containing the word 'unix' in the files supplied as
       arguments.
    b) Menu driven program which has the following options.
             i) contents of/etc/password
             ii) list of users who have currently logged in.
             iii) present working directory.
             iv) exit.
    c) For sorting, searching and insertion, deletion of elements in the list

CIT 252   **DATA STRUCTURES LAB**   **L T P C**

                                                              0 0 3 1.5

LIST OF EXPERIMENTS

1. Code the following list ADT operations using array.

      (a) voidis_emptyList(List 1)   (b) List makeNullList(size n)

      (c) Position firstPost(List 1)   (d) Position endPost(List 1)

      (e) Position nextPost(List 1, Position p)   (f) Position prevPos(List 1, position p)

      (g) Position find)List 1, Element x)   (h) Position findKth(List 1, int k)

      (i) void insert(List 1, Position p)   (j) void delete(List 1, Position p)

      (k) void append(List 1, Element x)   (l) intcmp(List 1,Position p1,Position p2)

      (m) int cmp2(List11, List, Position p1, Position p2)

      (n) void swap(List 1, Position p1, Position p2)

      (o) Element retrieveElement(List 1, Position p)

      (p) void print element(List 1, Position p)

2. Code the following list ADT operations using single linked list.

      (a) voidis_emptyList(List 1)   (b) List makeNullList(size n)

      (c) Position firstPost(List 1)   (d) Position endPost(List 1)

      (e) Position nextPost(List 1, Position p)   (f) Position prevPos(List 1, position p)

      (g) Position find)List 1, Element x)   (h) Position findKth(List 1, int k)

      (i) void insert(List 1, Position p)   (j) void delete(List 1, Position p)

      (k) void append(List 1, Element x)   (l) intcmp(List 1,Position p1,Position p2)

      (m) int cmp2(List11, List, Position p1, Position p2)

      (n) void swap(List 1, Position p1, Position p2)

      (o) Element retrieveElement(List 1, Position p)

      (p) void print element(List 1, Position p)

3. Code the following list ADT operations using double linked list.

    (a) voidis_emptyList(List 1)   (b) List makeNullList(size n)

    (c) Position firstPost(List 1)   (d) Position endPost(List 1)

    (e) Position nextPost(List 1, Position p)   (f) Position prevPos(List 1, position p)

    (g) Position find)List 1, Element x)   (h) Position findKth(List 1, int k)

    (i) void insert(List 1, Position p)   (j) void delete(List 1, Position p)

    (k) void append(List 1, Element x)   (l) intcmp(List 1,Position p1,Position p2)

    (m) int cmp2(List11, List, Position p1, Position p2)

    (n) void swap(List 1, Position p1, Position p2)

    (o) Element retrieveElement(List 1, Position p)

    (p) void print element(List 1, Position p)

4. Write a program that reads two lists of elements, prints them, reverses them, prints the reverse list, sort the lists, print the sorted lists, merges the list, prints merge list.

5. Implement a polynomial ADT and write a program to read two polynomials and print them, adds the polynomials, prints the sum, multiply the polynomials and print the product.

6. Implement stack ADT and write a program that reads an infix arithmetic expression of variables, constants, operators (+, -, *, /) and converts it into the corresponding postfix form. Extend the program to handle parenthesized expression also.

7. Implement Queue ADT and write a program that performs Radix sort on a given set of elements.

8. Implement the following sorting operations:

   (a) Shell Sort (b) Heap Sort (c) Merge Sort (d) Quick Sort

9. Implement Binary search Tree ADT and write a program that interactively allows

   (a) Insertion (b) Deletion (c) Find_min (d) Find_max (e) Find operations

10. Implement AVL Tree ADT and Write a program that interactively allows
   (a) Insertion (b) Deletion (c) Find_min (d) Find_max

CIT 253   MICROPROCESSORS & MICROCONTROLLERS LAB   L T P C
                                                        0 0 3 1.5

LIST OF EXPERIMENTS

1. Write an ALP to Add and Subtract two numbers
2. Write an ALP to multiply and divide two numbers
3. Write an ALP to find out Largest, smallest no, and even or odd from the given sequence of numbers.
4. Write an ALP to sort the given numbers in ascending and descending order.
5. Write an ALP to verify the given number is Armstrong and strong number.
6. Write an ALP to print n Fibonacci numbers.
7. Write an ALP to find out no of 1s and 0s in a given data
8. Write an ALP to string Manipulations like String Transfer, String Reversing, and Search for a String.
9. Write an ALP to verify the given string is palindrome or not
10. Write an ALP to interface 8255
11. Write an ALP to interface 8257
12. Write an ALP to interface 8259

CIT 221	**Mathematics - IV**	**L T P C**
		4 1 0 3

Course Objectives:
- To study the concepts of curvature, envelopes and curve tracing.
- To introduce Laplacian transformation techniques for solving ordinary differential equations.
- To educate the students about Z-transforms and its applications in engineering.
- To learn different numerical methods to solve nonlinear algebraic equations
- To provide the learners with basic concepts and techniques of numerical computing to deal with real world application.

UNIT- I
Radius of Curvature and Curve Tracing:
Curvature: Radius of curvature - Cartesian curves - parametric equations - at origin - Newton's formula - polar curves - pedal curves - centre of curvature - circle of curvature- Evaluates - Envelopes. Increasing and decreasing functions - Maxima and Minima - practical problems - Asymptotes - Curve tracing- Cartesian- parametric and polar curves.

UNIT- II
Laplace Transforms:
Laplace transforms of standard functions – shifting theorems – transforms of derivative's and integrals – Unit step function – Dirac's delta function. Inverse Laplace transforms - convolution theorem (without proof) – solving ordinary differential equations (Initial value problems) using Laplace transforms.

UNIT- III
Z-Transforms:
Definition of Z-transform, elementary properties, linearity property, damping rule, shifting to the right and left, multiplication by n, initial value theorem, final value theorem, inverse Z-transform, convolution theorem, solution of difference equations using Z-transforms.

UNIT- IV
Numerical Solutions of Equations:
Introduction - Solution of Algebraic and Transcendental Equations - Bisection method- Newton- Raphson Method - iterative Methods.
Finite Differences and Interpolation:
Finite Differences – Differences of a polynomial – factorial notation – relations between operators – Newton's Interpolation formulae – central difference interpolation formulae - Gauss interpolation formulae – stirlings formula - interpolation with unequal intervals – Lagrange's interpolation – inverse interpolation.

UNIT- V
Numerical Integration and Solution of Ordinary Differential Equations:
Numerical Integration: Trapezoidal rule - Simpson's one-third rule - Simpson's three-eighth.
Numerical Solution of Ordinary Differential Equations: Introduction – Picard's Method- Euler's Method Runge- Kutta Method of fourth order.

Textbooks:

1. B. S. Grewal, Higher Engineering Mathematics, 43 edition, Khanna Publishers
2. Erwin Kreyszig, Advanced Engineering Mathematics, 8th edition, New Age International (P) Ltd

References:

1. N. P. Bali, A text book of Engineering Mathematics, Lakshmi publications
2. S. S. Sastry, Introductory Methods of Numerical Analysis, 5th edition, PHI learning (P) Ltd
3. N. P. Bali, Satyanarayana Bhvanari and Indrani Keller, Lakshmi Publications, New Delhi.
4. Anthony C. Grove, An introduction to Laplace transform and the Z-transform, Prentice Hall, New York. (1991).

CIT 222   **DATABASE MANAGEMENT SYSTEMS**   **L T P C**
                                                              4 1 0 3

Course Objectives:
- Capability of maintaining huge amount of data.
- Design various database system and learn about different database models and their relationships.
- To reduce the redundancy of data using the normal forms.
- To learn about transaction management and Recovery mechanism.

UNIT-I
Introduction to Databases-Introduction, An Example, Characteristics of Database approach, Advantages of using DBMS approach, When not to use a DBMS Database System.

Concepts and Architecture: Data models, Schemas and instances, Three schema architecture and data independence Database languages and interfaces, The database system environment, Various components of a DBMS.

SQL-SQL Data Definition and Data Types specifying basic constraints in SQL, Basic retrieval queries in SQL, Insert, Delete and Update statements in SQL, nested queries - correlated and uncorrelated, notion of aggregation, aggregation functions group by and having clauses embedded SQL. Specifying Constraints as Assertions and Triggers, Views (Virtual Tables) in SQL, Schema Change Statement in SQL.

UNIT-II
NO SQL-Overview, History of NoSQL Databases, Definition of the Four Types of NoSQL Database, Different NOSQL Tools, SQL vs NOSQL.

E/R Model - Conceptual data modelling -Motivation, entities, entity types, various types of attributes, relationships, relationship types, E/R diagram notation, examples.

UNIT-III
Relational Data Model - Concept of relations, schema-instance distinction, keys, referential integrity and foreign keys.

Relational algebra operators: selection, projection, cross product, various types of joins, division, example queries, Tuple relation calculus, Domain relational calculus, converting the database specification in E/R notation to the relational schema.

UNIT-IV
Dependencies and Normal forms - Importance of a good schema design, problems encountered with bad schema designs, motivation for normal forms, dependency theory - functional dependencies, Armstrong's axioms for FD's, closure of a set of FD's, minimal covers, definitions of 1NF, 2NF, 3NF and BCNF, decompositions and desirable properties of them, algorithms for 3NF and BCNF normalization, multi-valued dependencies and 4NF, join dependencies and definition of 5NF.

UNIT-V
Transaction Processing, Concurrency Control, and Recovery-Transaction Processing, Concurrency Control, and Recovery: Introduction to Transaction Processing, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability, Two-Phase Locking Techniques for Concurrency Control, Recovery Concepts ,NO-UNDO/REDO Recovery

Techniques based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging, The ARIES Recovery Algorithm.

Text Books:
 1. Fundamentals of Database Systems, Ramez Elmasri and Navate Pearson Education, 6th edition.
 2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.

References:
1. Data base System Concepts, Silberschatz, Korth, McGraw hill, 6th edition.
2. An Introduction to Database Systems, C.J.Date, A.Kannan, S.Swamynathan, Pearson Education,8th edition.

CIT 223   **JAVA PROGRAMMING**   **L T P C**
                                                                 4 1 0 3

Course Objectives:
- The course provides fundamentals of object-oriented programming in Java and development of user interface
- Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc.
- Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms.
- Understand the principles of inheritance, packages and interfaces.

UNIT- I

Introduction: Introduction to java, The History and Evolution of Java, Java Buzzwords, java program structure, data types, dynamic initialization, scope and life time, operators, control statements, arrays, type conversion and casting, The primitive types, variables, Automatic Type Promotion in Expressions, finals & blank finals.

OOP Concepts : Oriented Languages-Classes, Objects, Abstraction, Encapsulation, Inheritance, Polymorphism, Procedural languages Vs. OOP.

Classes and Objects : Concepts, methods, constructors, usage of static, access control, this key word, garbage collection, overloading, parameter passing mechanisms, nested classes and inner classes.

UNIT- II

Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface and extending interfaces.

Packages: Creating a Package, setting CLASSPATH, Access control protection, importing packages.

Strings: Exploring the String class, String buffer class, Command-line arguments.
Library: Date class, Collection, Enumerations and Wrapper classes.

UNIT- III

Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes.

Multithreading : Concepts of Multithreading, differences between process and thread, thread life cycle, Thread class, Runnable interface, creating multiplethreads, Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks, thread groups.

I/O Streams: Streams, Byte streams, Character streams, File class, File streams.

UNIT- IV

Applets: Concepts of Applets, life cycle of an applet, creating applets, passing parameters to applets, accessing remote applet, Color class and Graphics

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events.

AWT: AWT Components, windows, canvas, panel, File Dialog boxes, Layout Managers, Event handling model of AWT, Adapter classes, Menu, Menubar.

UNIT- V

Swing-I – swings introduction, JApplet, JFrame and JComponent, Icons and Labels, text fields,buttons – The JButton class, Check boxes, Radio buttons.

Swing- II: Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

JDBC Conectivity : Jdbc connectivity , types of Jdbc Drivers, connecting to the database, Jdbc Statements, Jdbc Exceptions, Manipulations on the database, Metadata .

Text Books:

1. The Complete Reference Java J2SE 7th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons,Pearson Edu.
3. Object Oriented Programming with C++, Balaguruswamy, TMH
4. Mastering Object-Oriented Programming with C++, R.S. Salaria, Khanna Book Publishing, N.Delhi

Reference Books:

1. JAVA Programming, K. Rajkumar,1/e, Pearson,2013.
2. Core JAVA, Black Book, Nageswara Rao, Wiley, 1/e, Dream Tech, 2012.
3. Programming with Java, Balaguruswamy, TMH
4. Object Oriented Programming in C++ and Java, D.Samantha, PHI
5. Internet and Java Programming, Tanweer Alam, Khanna Publishing House

CIT 224   **DESIGN & ANALYSIS OF ALGORITHMS**   **L T P C**

4 1 0 3

Course Objectives:

- To analyze the asymptotic performance of algorithms
- Ability to choose appropriate algorithm design techniques for solving problems
- To design and implement various programming paradigms and its complexity
- To analyze the problems using shortest path algorithms.

UNIT- I

Introduction: Algorithm Design paradigms – motivation, concept of algorithmic efficiency, run time analysis of algorithms, Asymptotic Notations.

Divide and Conquer: Structure of divide and conquer, Binary Search, Merge sort, Quick sort, Strassen Matrix Multiplication; Analysis of divide and conquer run time recurrence relations.

UNIT- II

Greedy Method: Overview, Knapsack problem, Job sequencing with deadlines, Minimum Spanning Tree (Prim's and Kruskal's algorithms), Single source shortest path Algorithms (Dijkstra's Algorithm, Bellman-Ford algorithm).

UNIT- III

Dynamic Programming: Overview, difference between dynamic programming and DAC, difference between dynamic programming and Greedy Method. All-pair Shortest path, Matrix-chain multiplication, Traveling Salesman Problem, longest Common sequence.

UNIT- IV

Back tracking: Overview, N-queen problem, sum of subsets, Graph Coloring, Hamiltonian Cycle and Knapsack problem.

UNIT- V

Branch and Bound: 0/1 Knapsack problem using LIFO branch and bound, FIFO branch and bound, Travelling Salesman Problem.

Computational Complexity: Complexity measures, Polynomial Vs Non-polynomial time complexity; NP-hard and NP-complete classes, examples.

Text Books:

1.E. Horowitz, S. Sahni and S.Rajsekran, "Fundamentals of Computer Algorithms", Galgotia Publication.

2. Design & Analysis of Algorithms, S. Sridhar, Oxford

3. Design & Analysis of Algorithms, Sharma, Khanna Publishing House, N.Delhi

Reference Books:

1.T. H. Cormen, Leiserson, Rivest and Stein, "Introduction of Computer Algorithm", PHI.

2.Sara Basse, A.V. Gelder, "Computer Algorithms", Addison Wesley.

3. E.Sreenivasa Reddy,"Design and Analysis of Algorithms", Sci-Tech Publications.

CIT 225   PROFESSIONAL ETHICS AND HUMAN VALUES   L T P C
                                                     4 0 0 3

Course Objectives:
- To learn moral values.
- To learn Human values.
- To have an idea on Engineering Ethics .
- To study various types of negative and positive faces of Engineering Ethics.

UNIT- I
Human Values: Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty – Courage – Value time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT- II
Engineering Ethics: The History of Ethics-Purposes for Engineering Ethics-Engineering Ethics- Consensus and Controversy –Professional and Professionalism –Professional Roles to be played by an Engineer –Self Interest, Customs and Religion-Uses of Ethical Theories-Professional Ethics-Types of Inquiry – Engineering and Ethics-Kohlberg's Theory – Gilligan's Argument –Heinz's Dilemma.
Engineering as Social Experimentation: Comparison with Standard Experiments – Knowledge gained – Conscientiousness – Relevant Information – Learning from the Past – Engineers as Managers, Consultants, and Leaders – Accountability – Role of Codes – Codes and Experimental Nature of Engineering.

UNIT- III
Engineers' Responsibility for Safety and Risk Safety and Risk, Concept of Safety – Types of Risks – Voluntary v/s Involuntary Risk- Short term v/s Long term Consequences- Expected Probability- Reversible Effects- Threshold Levels for Risk- Delayed v/s Immediate Risk-Safety and the Engineer – Designing for Safety – Risk- Benefit Analysis-Accidents.

UNIT- IV
Engineers' Responsibilities and Rights Collegiality-Techniques for Achieving Collegiality – Two Senses of Loyalty- obligations of Loyalty-misguided Loyalty – professionalism and Loyalty- Professional Rights –Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems – Self- interest, Customs and Religion- Ethical egoism-Collective bargaining- Confidentiality-Acceptance of Bribes/Gifts-when is a Gift and a Bribe- examples of Gifts v/s Bribes-problem solving-interests in other companies- Occupational Crimes-industrial espionage-price fixing-endangering lives-Whistle Blowing-types of whistle blowing-when should it be attempted- preventing whistle blowing.
UNIT- V
Global Issues
Globalization- Cross-culture Issues-Environmental Ethics-Computer Ethics- computers as the instrument of Unethical behaviour-computers as the object of Unethical Acts-autonomous computers-computer codes of Ethics- Weapons Development-Ethics and Research-Analysing Ethical Problems in Research-Intellectual Property Rights.

Text Books:
1. "Engineering Ethics & Human Values" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
2. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill – 2003.
3. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.
4. Professional Ethics and Human Values, Premvir Kapoor, Khanna Book Publishing

Reference Books:
1. "Professional Ethics and Morals" by Prof.A.R.Aryasri, DharanikotaSuyodhana-Maruthi Publications.
2. "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M. Jayakumaran- Laxmi Publications
3. "Professional Ethics and Human Values" by Prof. D.R. Kiran.
4. "Indian Culture, Values and Professional Ethics" by PSR Murthy- BS Publication.
5. A Foundation Course in Human Values and Professional Ethics, R.R. Gaur, R. Sangal, G.P. Bagaria, Excel Books, Delhi

CIT 261　　　　**DATABASE MANAGEMENT SYSTEMS LAB**　　　**L T P C**
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LIST OF EXPERIMENTS

1. Introduction to Oracle, Creation of table, data types, Displaying table definition using DESCRIBE, inserting rows into table and SELECT command.

2. Projection, ORDER BY clause, Altering and dropping of tables (use constraints while creating tables) examples using SELECT command.

3. Queries using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.

4. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views. SUBQUERIES(Multiple Subqueries, Nested subqueries)

5. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date).

6. a) Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found).

　 b) Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

　 c) CONTROL STRUCTURES (IF statement, Loop…End Loop, Exit command, While Loop, For loop, Goto statement).

8. a) Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

　 b) Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

9. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.

10. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers.

CIT 262 **JAVA PROGRAMMING LAB** L T P C
0 0 3 1.5

LIST OF EXPERIMENTS

1. Write a java program to demonstrate static member, static method and static block.

2. Write a java program to demonstrate method overloading and method overriding.

3. Write a java program to demonstrate finals, blank finals, final methods and final classes.

4. Write a java program to implement inheritance.

5. Write a java program to create user defined exception class and test this class.

6. Write an applet program to demonstrate Graphics class.

7. Write GUI application which uses awt components like label, button, text field, text area, choice, checkbox, checkbox group.

8. Write a program to demonstrate Mouse Listener, Mouse Motion Listener, Keyboard Listener, Action Listener, Item Listener.

9. Develop swing application which uses JTree, Jtable, JComboBox.

10. Write a JDBC Application to implement DDL and DML commands.

CIT 263   **ALGORITHMS LAB**   **L T P C**
                                                                     0 0 3 1.5

LIST OF EXPERIMENTS

1. Write a program to implement strassen's matrix multiplication problem.

2. Write a program to obtain the topological ordering of vertices in a given Graph.

3. Compute the transitive closure of a given directed graph using Warshalls Algorithm.

4. You have a business with several offices; you want to lease Broadband to connect them up with each other; and the company charges different amounts of money to connect different pairs of cities. You want a set of lines that connects all your offices with a minimum total cost. It should be a spanning tree, since if a network isn't a tree you can always remove some edges and save money. Implement the above problem.

5. Write a program From a given vertex in a weighted connected graph, Find shortest paths to other vertices using Dijkstras Algorithm.

6. Write a program to implement the knapsack problem using Dynamic Programming.

7 Write a program to implement the sum of subsets problem using back tracking.

8. Write a program for Bellman-Ford algorithm for single source shortest path.

9. Implement N-Queen Problem using Backtracking.

10. Programs involving some advanced data structures.

CIT 311   **COMPUTER NETWORKS**   **L T P C**

                                                                3 0 0 3

Course Objectives:

- Build an understanding of the fundamental concepts of data communication and computer networking.
- Understand how errors detected and corrected that occur in transmission
- How collisions to be handled when many stations share a single channel
- Know about routing mechanisms and different routing protocols

UNIT I

Introduction: Uses of Computer Networks, Network Topology, Network Hardware, LANs, MANs, WANs, Network Software.

Reference Models: The OSI Reference Model, TCP/IP Reference Model, the comparison of OSI and TCP/IP reference models.

The Physical Layer: Guided transmission media: Magnetic Media, Twisted Pair, Coaxial Cable, and Fiber Optics.

UNIT II

The Data Link Layer: Data link layer design issues, Error detection and correction, Elementary data link protocols, and Sliding window protocols.

The Medium Access Control Sub layer: The channel allocation problem, multiple access protocols, ETHERNET and Wireless LANs.

UNIT III

The Network Layer: Network Layer Design Issues, Routing Algorithms: Shortest Path, Flooding, DVR, and Link State routing algorithm, Congestion Control Algorithms, and Quality of Service. IP protocol and IP address.

UNIT – IV

The Transport Layer: The Transport Service, Elements of Transport Protocols, and the Internet Transport Protocols: UDP- Remote Procedure Call, The Real-Time Transport Protocol, TCP- Introduction to TCP, The TCP Service model, The TCP Protocol, The TCP Segment Header, TCP Connection Establishment, TCP Connection Release, TCP Connection Management Modeling, TCP Transmission Policy, Congestion Control, TCP Timer Management.

UNIT - V

Application Layer: The Domain Name System (DNS) – Resource Records, Name Servers, E-Mail – Architecture and Services, POP3, IMAP, World Wide Web – Architectural Overview, Server side, Uniform Resource Locators, Statelessness and Cookies.

Text Book:
1. Andrew S Tanenbaum, Computer Networks.4 ed, Pearson Education / PHI.

Reference Books:
1. Behrouz A.Forouzan, Data Communications and Networking. 4 ed, TATA McGraw Hill
2. Kurose and Ross, Computer Networks – A Top-down Approach Featuring the Internet. Pearson Education.

Course Objectives:
- Understand best technologies for solving web client/server problems
- Analyze and design real time web applications
- Use Java script for dynamic effects and to validate form input entry
- Analyze to Use appropriate client-side or Server-side applications

UNIT – I

Introduction to HTML: HTML tags, Lists, Tables, Images, Forms, Frames, Java Script, Functions, Objects in java scripts, control structures, arrays, simple web applications.

UNIT – II

JAVA PROGRAMMING: I/O Streams – files - Socket programming – client/server programs – E-mail client – SMTP - POP3 programs – protocol handlers – content handlers - applets – - Remote Method Invocation.

UNIT – III

XML: Introduction to XML, Defining XML tags their attributes and values, Document Type Definition, XML Schema, Document Object Model, and XHTML.

Parsing XML Data: DOM and SAX Parsers in java.

JSON: Introduction, JSON vs XML, Data types, Objects.

UNIT-IV

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. binary files listing directories.

UNIT – V

Introduction to Servlets: Common Gateway Interface (CGI), The Servlet API, Life cycle of a Servlet, Deploying a Servlet, Reading Servlet parameters, Reading Initialization parameters, Handling HTTP Request &Responses, Using Cookies and Sessions.

Introduction to JDBC: JDBC Drivers, JDBC Process, Connecting to a Database using JDBC.

Text Books:
1. Programming the World Wide Web 7th Edition by Robert W. Sebesta
2. Web Technologies Uttam K Roy, Oxford University Press

Reference Books:
1. The Complete Reference PHP – Steven Holzner , Tata McGraw-Hill

2. Deitel, Deitel and Nieto, "Internet and World Wide Web – How to program", Pearson Education Publishers, 2000.

3. Herbert Schildt "The Complete Reference JAVA", McGrawHill Education, Seventh Edition.

4. N.P. Gopalan, J. Akilandeswari "Web Technology A Developer's Perspective", Eastern Economy Edition.

CIT 313   **AUTOMATA & COMPILER DESIGN**   **L T P C**

                                                                           2 1 0 3

Course Objectives:

     a. Introduce concepts in automata theory and theory of computation.

     b. Identify different formal language classes and their relationships.

     c. Design grammars and recognizers for different formal languages.

     d. Prove or disprove theorems in automata theory using its properties.

UNIT – I

Automata, Formal Languages & Grammar Hierarchy: Introduction to Automata, The central concepts of automata theory - Alphabets, Strings, Languages, Types of Automata, Types of Languages, Types of Grammars.

Finite Automata: Deterministic finite automata (DFA) - Definition of DFA, DFA processing strings, Notations for DFA, Acceptance of DFA, the language of DFA, Design of DFA for the string acceptance.

UNIT – II

Non deterministic finite automata (NFA) – Definition of NFA, NFA processing strings, Notations for NFA, Acceptance of NFA, Equivalence of DFA and NFA

Automata with € transitions: Use of € - transition, notation for an € - NFA, Epsilon closures, extended transitions and languages, Conversion of epsilon NFA to NFA and DFA.

Transducers: Design of a Moore Machine and Mealy Machine, Conversion of Moore to Mealy, Minimization of DFA: Minimization of automata.

UNIT – III

Introduction to Compiler: Structure of a compiler – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens – Recognition of Tokens – Lex – Finite Automata – Regular Expressions to Automata – Minimizing DFA..

UNIT – IV

Syntax Analysis: CFG, LMD, RMD, and ambiguity, parse tree, role of the parser, Classification of Parsing Techniques: Brute Force approach, left recursion, left factoring.

UNIT – V

Types of Bottom-Up Approaches: Introduction to bottom-up parser, Why LR Parsers?, shift-reduce parser, difference between LR and LL Parsers, Construction of SLR Table.

Syntax-directed Translation & Semantic analysis: SDT schemes, evaluation of semantic rules, three address codes - quadruples, triples, abstract syntax trees, types and declarations.

Textbooks:

1. Nasir S.F.B, P.K. Srimani, "A Text Book on Automata Theory", 1/e, Foundation Publications Cambridge University Press, 2014.

2. John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, "Introduction to Automata Theory, Languages and computation", 3/e, PEA, 2009.

References:

1. Cohen, 'Computer Theory', KLP Mishra & N.Chandrasekharan, 'Theory of Computation', PHI.

2. Alfred V.Aho, Ravi Sethi, JD Ullman, 'Compilers Principles, Techniques and Tools', Pearson Education, 2007.

3. Torben Egidius Mogensen 'Intruction to Compiler Design' Pearson Education, 2011.

CIT 314 (A) PE-1: CLOUD COMPUTING (MOOCS)

Week 1: Introduction to Cloud Computing

Week 2: Cloud Computing Architecture

Week 3: Service Management in Cloud Computing

Week 4: Data Management in Cloud Computing

Week 5: Resource Management in Cloud

Week 6: Cloud Security

Week 7: Open Source and Commercial Clouds, Cloud Simulator

Week 8: Research trend in Cloud Computing, Fog Computing

Week 9: VM Resource Allocation, Management and Monitoring

Week 10: Cloud-Fog-Edge enabled Analytics

Week 11: Serverless Computing and FaaS Model

Week 12: Case Studies and Recent Advancements

CIT 314 (B) PE-1 : ADVANCED DISTRIBUTED SYSTEMS (MOOCS)

Week 1 : Epidemic and gossip based algorithms

Week 2 : Napster and Gnutella

Week 3 : DHTs: Chord, Pastry and BitTorrent

Week 4 : Logical clocks, Mutual Exclusion Algorithms

Week 5 : Distributed Leader Election

Week 6 : Distributed minimum spanning tree, the FLP result

Week 7 : Consistency models and the CAP theorem

Week 8 : Paxos and Raft

Week 9 : Byzantine General's Problem, Virtual synchrony

Week 10 : Bitcoin and Blockchains

Week 11 : Amazon Dynamo, Facebook Cassandra, Google Percolator

Week 12 : Voldemort (LinkedIn), Condor, and Microsoft DryadLINQ

CIT 314 (C) PE-1: WEB-BASED TECHNOLOGIES AND MULTIMEDIA APPLICATIONS (MOOCS)

BLOCK-1 : INTERNET CONCEPTS

Week-1: Internet : An Overview

Week-2: Concepts of Web Browser

Week-3: Internet Search

Week-4: What can we do using Internet

BLOCK-2: WEB PAGE DESIGN

Week-5: Introduction to HTML, Tools for Web Page Designing

Week-6: Designing of Frames and Forms

BLOCK-3: INTRODUCTION TO MULTIMEDIA

Week-7: An Overview of Multimedia

Week-8: Multimedia Design, Production and Distribution

Week-9: Applications of Multimedia

Week-10: Distributed Environment

Week-11: Multimedia Authoring Tools (Part-1)

Week-12: Multimedia Authoring Tools (Part-2)

CIT 314 (D) PE-1: DATA STRUCTURE AND ALGORITHMS USING JAVA (MOOCS)

Week 1: 1D array, list and vector, 2D matrices and tables of objects

Week 2: Java implementation of 1D and 2D arrays and its operations

Week 3: Linked lists and its various operations, stack and queue

Week 4: Java implementation of linked lists, stack and queue

Week 5: Binary trees: Representation and operations. Variations of binary tree: Binary search tree, Height balanced search tree, Heap tree

Week 6: Java implementation of binary trees and its variations

Week 7: Graph : Structure, representation and operations

Week 8: Java implementations of graph data structures

Week 9: Algorithms (Part-I): Searching and sorting algorithms

Week 10: Java implementation of Part-I algorithms

Week 11: Algorithms (Part-II): Greedy algorithms, shortest path algorithms

Week 12: Java implementation of Part-II algorithms

CIT 316 **CONSTITUTION OF INDIA** **L T P C**

2 0 0 0

UNIT I

Introduction to Indian Constitution: Meaning of the term Constitution. Making of Indian Constitution: Constitutional history, Drafting Committee and Sources, Philosophy of Indian Constitution: Preamble and Features. Citizenship, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT II

Union Government and its Administration Structure : Organs of the Government : Legislative, Executive and Judiciary. The term Federalism and Centre-State relationship. President: Role, power and position. Prime Minister and Council of ministers, Cabinet, Central Secretariat, Lok Sabha, Rajya Sabha. The Supreme Court and High Court: Powers and Functions.

UNIT III

State Government and its Administration: Governor: Role and Position. Chief Minister and Council of ministers. State Secretariat: Organization, Structure and Functions.

UNIT IV

Local Administration: District's Administration: Head and his/her Role and Importance. Urban administration: Municipalities - Mayor and role of Elected Representative, CEO of Municipal Corporation. Rural administration : Pachayati Raj and its Functions. PRI: Zilla Panchayat, Elected officials and their roles, CEO of Zilla Panchayat. Block level Organizational Hierarchy (Different   departments), Village level administration : Role of Elected and Appointed officials. Importance of grass root democracy.

UNIT V

Election Commission: Role of Chief Election Commissioner and Election Commissionerate, State Election Commission, Functions of Commissions for the welfare of SC/ST/OBC and women.

TEXT BOOKS:

1. Introduction to the Constitution of India, Durga Das Basu PHI, New Delhi

2. Indian Constitution, Subash Kashyap, National Book Trust 3. Dynamics of Indian Government & Politics,J.A.Siwach.

REFERENCE BOOKS:

1. Constitutional Law of India, 4th edition in 3 volumes, H.M.Sreevai, Universal Law Publication

2. Indian Government and Politics, J.C. Johari

3. Indian Government and Politics, J. Raj

4. Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, M.V. Pylee, PHI, New Delhi

5. Challenges to Civil Rights Guarantees in India, A.G.Noorani, A.G.,Oxford University Press 2012 6. Indian Government and Politics,D.C. Gupta

CIT 351   **COMPUTER NETWORKS LAB**   **L T P C**

0 0 3 1.5

LIST OF EXPERIMENTS

1. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.

2. Study of Network Devices in Detail.

3. Study of Network IP.

4. Connect the computers in Local Area Network.

5. Write a Program on Bit stuffing is a process of inserting an extra bit as 0, once the frame sequence encountered 5 consecutive 1's.

6. Program to implement Character Stuffing

7. Study of basic network command and Network configuration commands.

8. Performing an Initial Switch Configuration

9. Performing an Initial Router Configuration

10. Connecting a Switch

11. Examining WAN Connections.

CIT 352   **INTERNET PROGRAMMING LAB**   **L T P C**

                                                 0   0 3 1.5

1. Create a Registration page using HTML.

2. Create a static HTML application with three frames as below: First frame at the top containing a header Second frame a navigation frame that contains hyperlinks to open 3 other pages Third frame that displays a page corresponding to the hyperlinks in the second frame

3. Design a static HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

4. Design a HTML page with required JavaScript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show "out of range" and if it is not a number, it should show "not a number" message in the result box.

5. To create a web page which includes a map and display the related information when a hot spot is clicked in the map.

6. Validate an XML document using DTD and XML schema.

7. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser

8. Create a PHP application that reads request parameters from the registration page created in the first experiment and stores in the database.

9. Installation and configuration of Tomcat and deploy a simple "Hello World" servlet.

10. Write a servlet that reads request parameters from the registration page created in the first experiment and stores in the database.

11. Write a servlet program for authenticating users for the above program.

12.   Implement the following session handling techniques using servlets:

                i) Cookies ii) Hidden form field iii) HttpSession iv) URL Rewriting

CIT 321   **ARTIFICIAL INTELLIGENCE**   **L T P C**
                                                                3 0 0 3

Course Objectives:
• To present fundamental concepts and problem solving methodologies of artificial intelligence.
• To learn logical representation of Knowledge.
• To understand the role of various planning techniques in solving problems.
• To describe how to measure uncertainty for given knowledge base.

UNIT-I

Introduction to AI: What is AI? , Foundations of AI, History of AI, State of the Art. **Intelligent Agents**: Agents and Environments, Good Behavior: Concept of Rationality, The Nature of Environments And The Structure of Agents.

Solving Problems by Searching: Problem Solving Agents, Searching for Solutions,

UNIT-II

Uninformed Search Strategies: Breadth First Search, Uniform Cost Search, Depth First Search, Iterative Deepening DFS and Bi-directional Search.

Informed (Heuristics) Search Strategies: Greedy BFS, A* Algorithm, Heuristics Functions.

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Local Search in CSPs, Structure of Problems.

UNIT-III

Logical Agents: Knowledge Based Agents, the Wumpus World.

First Order Logic: Representation, Revisited Syntax and Semantics of First Order Logic, Using First Order Logic, Knowledge Engineering in First Order Logic. Inferences in First Order Logic: Propositional vs. First Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT-IV

Knowledge Representation: Ontological Engineering, Categories and Objects, Events, Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

UNIT-V

Uncertain Knowledge & Reasoning Uncertainty: Acting under Uncertainty, Basic Probability Notation, and Inference Using Full Joint Distributions, Independence, Bayes' Rule and Its Use. Probabilistic Reasoning: Representing Knowledge in an uncertain Domain, The Semantics of Bayesian Networks, Exact Inference in Bayesian Networks, Approximate Inference in Bayesian Network, and Other Approaches to Uncertain Reasoning.

Text books:
1. Artificial Intelligence- A Modern Approach, Stuart Russell and Peter Norvig, 3rd Edition Pearson Education.
2. Artificial Intelligence, 3rd Edn., E. Rich and K. Knight (TMH).
3. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning.

References:
1. Artificial Intelligence, 3rd Edition, Patrick Henry Winston, Pearson Education.
2. Artificial Intelligence, Shivani Goel, Pearson Education.
3. Artificial Intelligence and Expert systems – Patterson, Pearson Education.

CIT 322   **DATA WAREHOUSING & DATA MINING**   **L T P C**

                                                                    2 1 0 3

Course Objectives:
- This course gives an introduction to methods and theory for development of data warehouses and data analysis using data mining.
- Data quality and methods and techniques for pre-processing of data.
- Understand and apply various algorithms for finding frequent item sets.
- Algorithms for classification, clustering and association rule analysis.

UNIT – I

Data Warehouse – Introduction, A Multi-dimensional data model, Data Warehouse Architecture, Data Warehouse Implementation.

Data Mining – Introduction, Data Mining, Kinds of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major issues in Data Mining.

UNIT – II

Data Pre-processing – Data cleaning, Data Integration & Transformation, Data Reduction, Discretization & Concept Hierarchy Generation, Data Mining Primitives.

Mining Frequent Patterns, Associations, and Correlations - Basic concepts, Frequent Itemset Mining methods (Apriori and FP-Growth algorithms).

UNIT – III

Cluster Analysis – Introduction, Types of data in Cluster analysis, A categorization of major clustering methods, partitioning methods, Hierarchical methods, Density-Based Methods: DBSCAN, Grid-based Method: STING; Model-based Clustering Method: Statistical approach, Outlier analysis.

UNIT – IV

Classification & Prediction – Introduction, Classification by Decision tree induction, Bayesian Classification, Classification by Back propagation, Other Classification Methods, Prediction, Classifier accuracy.

UNIT-V

Mining Complex Type of Data – Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Mining Spatial Databases, Mining Multimedia Databases, Mining Text Databases, Mining the World Wide Web.

Textbooks:

1. Data Mining Concepts & Techniques – Jiawei Han Micheline Kamber – Morgan Kaufmann Publishers.

2. Data Warehousing in the real world – A Practical guide for Building decision support systems – Sam Anahory, Dennis Murray – Pearson Education.

Reference Books:

1.   Data Warehouse Toolkit – Ralph Kinball – John Wiley Publishers.

2.   Data Mining (Introductory and Advanced Topics) – Margaret H.Dunham – Pearson Education.

3.   Introduction to Data Mining with case studies – G.K.Gupta, PHI Publications, 2006

CIT 324 (A)   **PE-2: UNIX PROGRAMMING**   **L T P C**

                                                            3 0 0 3

Course Objectives:

- Create an overall view of various types of translators, linkers, loaders, and phases of a compiler.
- Understand the Syntax Analysis, Various types of Parsers, like the Top-Down approach, and the Bottom- Up approach parsers.
- Gives a view of Intermediate Code Generation, Type Checking, Understand the role of Symbol Table and its organization.
- Describe Code Generation, Machine Independent Code Optimization and Instruction Scheduling.

UNIT – I

Introduction to unix-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-Command Substitution-Giving Multiple Commands.

UNIT – II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-I Nodes-The Directory Hierarchy, File Attributes and Permissions

The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT – III

Using the Shell-Command Line Structure-Met characters-Creating New Commands-Command Arguments and Parameters-Program Output as Arguments-Shell Variables- -More on I/O Redirection-Looping in Shell Programs.

UNIT – IV

Filters-The Grep Family-Other Filters-The Stream Editor Sed-The AWK Pattern Scanning and processing Language-Good Files and Good Filters.

The here Document (<The Sleep Command-Debugging Scripts-The Script Command-The Eval Command-The Exec Command

UNIT – V

Shell Programming-Shell Variables-The Export Command-The Profile File a Script Run During Starting-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures, The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs.

Text Books:

1. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.

2. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.

References:

1. Unix and shell programmingby B.M. Harwani, OXFORD university press.

CIT 324 (B)   **PE-2 : NETWORK PROGRAMMING**   **L T P C**

                                                                3 0 0 3

Course Objectives:
- To know about different networking protocols and sockets.
- To learn about TCP client server communication.
- To learn about UDP sockets and address conversion.
- To know about inter process communication.

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.

Sockets : 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.

I/O Multiplexing and socket options: I/O Models, select function, Batch input, shutdown function, poll function, TCP Echo server, getsockopt and setsockopt functions. Socket states, Generic socket option IPV6 socket option ICMPV6 socket option IPV6 socket option and TCP socket options.

UNIT-III

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.

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

UNIT-IV

IPC : Introduction, File and record locking, Pipes, FIFOs streams and messages, Name spaces, system IPC, Message queues, Semaphores.

UNIT-V

Remote Login: Terminal line disciplines, Pseudo-Terminals, Terminal modes, Control Terminals, rlogin Overview, RPC Transparency Issues.

Text Books:

1. W.Richard Stevens ,"UNIX Network Programming Vol. I, Sockets API", 2nd Edition. Pearson Edn. Asia.
2. W.Richard Stevens "UNIX Network Programming", 1st Edition, -. PHI.
3. Graham GLASS, King abls, "UNIX for Programmers and Users", 3rd Edition, Pearson Education.

Reference Books:

1. T CHAN "UNIX Systems Programming using C++", PHI.

2.M.J.ROCHKIND,"Advanced UNIX Programming",2nd Edition,Pearson Education.

CIT 324 (C) PE-2 : COMPUTER ORGANISATION

L T P C
3 0 0 3

Course Objectives

- To understand the structure, function and characteristics of computer systems.
- To understand the design of the various functional units and components of computers.
- To identify the elements of modern instructions sets and their impact on processor design.
- To identify and compare different methods for computer I/O.

UNIT - I

REGISTER TRANSFER AND MICRO-OPERATIONS: Register Transfer Language, Register Transfer, Bus and memory Transfers, Arithmetic Micro-operations, Logic Micro-operations, Shift Micro-operations, Arithmetic Logic Shift Unit.

BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Registers, Computer Instructions, Instruction cycle, Memory-Reference Instruction, Input-Output and Interrupt, Design of Basic Computer, Design of Accumulator Logic.

UNIT-II

CENTRAL PROCESSING UNIT: General registers Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

COMPUTER ARITHMETIC: Addition and Subtraction, Multiplication Algorithms, Division Algorithms Floating-point Arithmetic operations.

UNIT –III

MEMORY ORGANIZATION: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management hardware

UNIT-IV

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA),Input-Output Processor, Serial Communication.

UNIT-V

PIPELINING: Instruction Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Static Arithmetic pipeline, Multifunctional arithmetic pipelines.

Textbook:
1. Morris M. Mano, 'Computer Systems Architecture', 5th Edition-Pearson Education

Reference Books:
1. John P Hayes, 'Computer Architecture and Organization', 2nd edition.
2. V.Carl Hamacher et.al, 'Computer Organization' 2nd edition.
3. Tanenbaum: Structured Computer Organization, Pearson Education
4. William Stallings: Computer Organization and Architecture, PHI

CIT 324 (D) P E -2:   COMPUTER GRAPHICS

L T P C
3 0 0 3

Course Objectives:
- To appreciate the importance of technical ability and creativity within design practice.
- To gain knowledge about graphics hardware devices and software used.
- To understand the two-dimensional graphics and their transformations.
- To understand the three-dimensional graphics and their transformations.
- To appreciate illumination and color models

Unit-I

TWO DIMENSIONAL GEOMETRIC TRANSFORMATIONS – Matrix representations and homogeneous coordinates, composite transformations; - Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms

UNIT-II

THREE DIMENSIONAL GRAPHICS
Three dimensional concepts; Three dimensional object representations – Polygon surfaces-Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces
TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; Three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods..

UNIT-III

Public key cryptography and Authentication requirements: Principles of public key crypto systems - RSA algorithm - security of RSA - key management – Diffle-Hellman key exchange algorithm - introductory idea of Elliptic curve cryptography – Elgamel encryption.

UNIT-IV

ILLUMINATION AND COLOUR MODELS 7
Light sources – basic illumination models – halftone patterns and dithering techniques; Properties of light – Standard primaries and chromaticity diagram; Intuitive colour concepts – RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model.

UNIT-V

Curves and surfaces: Spline representations, Bezier curves and surfaces, B-spline curves and surfaces Visible surface detection methods: Back-face detection, depthbuffer, A-buffer, Z- buffer , scan-line

TEXT BOOKS :
1. 1. Donald Hearn and Pauline Baker M, ―Computer Graphics", Prentice Hall, New Delhi, 2007 [UNIT I – III]
2. 2. Andleigh, P. K and Kiran Thakrar, ―Multimedia Systems and Design‖, PHI, 2003. [UNIT IV,V]

REFERENCE BOOKS:

1. Judith Jeffcoate, ―Multimedia in practice: Technology and Applications‖, PHI, 1998.

2. Foley, Vandam, Feiner and Hughes, ―Computer Graphics: Principles and Practice‖, 2nd Edition,

Pearson Education, 2003.

3. Jeffrey McConnell, ―Computer Graphics: Theory into Practice‖, Jones and Bartlett Publishers,2006.

4. Hill F S Jr., "Computer Graphics", Maxwell Macmillan , 1990.

CIT 325   **INTERNET OF THINGS**   **L T P C**

                                                                    3 0 0 3

Course Objectives:
- To understand about the fundamentals of Internet of Things and its building blocks along with their characteristics.
- To understand the recent application domains of IoT in everyday life.
- To understand the protocols and standards designed for IoT and the current research on it.
- To understand the other associated technologies like cloud and fog computing in the domain of IoT.

UNIT-I
Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies, IoT Levels and Templates.

UNIT-II
Sensors and Actuators – Introduction and example, Introduction to Arduino, Arduino IDE, Digital Analog Input and Output, Arduino Library and Functions, Sensor interfacing with Arduino, Sensor and actuator interfacing with Arduino.

UNIT-III
Connecting microcontroller with mobile devices, communication through Bluetooth, Wi-Fi, Ethernet, RFID Architecture Reference Model- Introduction, architecture , Protocols- 6LoWPAN, RPL, CoAP, MQTT.

UNIT-IV
Intel IOTivitiy – Device discovery functionality Introduction to Cloud Storage, Cloud Storage models and communication APIs for IoT, WAMP-AutoBahn for IoT

UNIT-V
Example Amazon Web services for IOT EC2, AutoScaling, S3, RDS,SQS

Text Books:
1. ArsheepBahga, Vijay Madisetti," Internet of Things: A HandsOn Approach" ,1st Edition, Orient Blackswan Private Limited,2015.

2. Michael Margolis," Arduino Cookbook",2nd Edition, O'Reilly Media,2011.

3. Neil Cameron," Arduino Applied: Comprehensive Projects for Everyday Electronics",1st Edition, Apress Publisher,2019.

Reference Books:
1. Brian Evans," Beginning Arduino Programming", 1st Edition, Apress Publisher,2011.

CIT 326   **SOFT SKILLS**   **L T P C**
                                                                                                   2 0 0 0

UNIT I

Basics of Applied Grammar and usage Tenses: Part of Speech, Active & Passive Voice, Articles, Subject-verb agreement, Antonyms, Synonyms, Prefix and Suffix, Narration, Conditional sentences, Concord, Tag questions, punctuation marks.

UNIT II

Presentation and Interaction Skills Speech Delivery, Interjecting: Objectives& Methodology; Group Discussion: Objectives & Methods; Theme Presentation: Methods; Argumentative skills: Pattern and Ingredients; Debate & Discussion: Unity, Coherence & Emphasis. Public Speaking: Audience Analysis: Approach and Style. Interviews: Types; Focus & Objectives.

UNIT III

Interpersonal Communication Skills Features: Methods; Principles; Requisites; Team- work; Skills: Empathy, Emotional Intelligence, empathy and listening skills. Time Management; Attitude; Responsibility. Leadership qualities: Integrity; Values; Trust; SelfConfidence & Courage; Communication and Networking; Speed reading; Problem Solving & Trouble- Shooting

UNIT IV

Persuasion and Negotiation Skills Definition; Understanding Attitude, Beliefs, Values and Behavior; The process of Persuasion: Analysis of Audience; Classification of Audience; Egoistic and Non-Egoistic; Specific Techniques for Specific Audience; Skills of Persuasion, Steps to Persuasion/Influence, Negotiation: Definition; Process of Negotiation: Characteristics; Qualities of good negotiator; Approaches to Negotiation.

UNIT V

Communication Skills Introduction to oral communication, Nuances & Modes of Speech Delivery, Public speaking: confidence, clarity, and fluency, Non verbal Communication: Kinesics, Paralinguistic features of Voice-Dynamics, Proxemics, Chronemics, and Presentation Strategies: planning, preparation, organization, delivery.

Text Books:

1. Technical Communication, (Second Ed.); O.U.P., Meenakshi Raman & S.Sharma New Delhi, 2011
2. Business Communication for Managers, Payal Mehra, Pearson, Delhi, 2012.
3. Personality Development, Harold R. Wallace et. al, Cengage Learning India Pvt. Ltd; New Delhi 2006

Reference Books:

1. Practical Communication by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.
2. Personality Development & Soft Skills, Barun K.Mitra, Oxford University Press, New Delhi, 2012.
3. Public Speaking, William S. Pfeiffer, Pearson, Delhi, 2012. 7. Human Values, A.N. Tripathi, New Age International Pvt. Ltd. Publishers New Delhi ,2005

CIT 361   **ARTIFICIAL INTELLIGENCE LAB**   **L T P C**
                                                              0 0 3 1.5

LIST OF EXPERIMENTS:

1. Write predicates One converts centigrade temperatures to Fahrenheit, the other checks if a temperature is below freezing
2. Write a program to solve the Monkey Banana problem.
3. Write a program to implement factorial, Fibonacci of a given number
4. Write a program to solve 4-Queen and 8-puzzle problem.
5. Write a program to solve traveling salesman problem.
6. Write a program to solve water jug problem using LISP
7. Implementation of A* Algorithm using LISP /PROLOG
8. Implementation of Hill Climbing Algorithm using LISP /PROLOG
9. Implementation of DFS and BFS for water jug problem using LISP /PROLOG
10. Implementation of Towers of Hanoi Problem using LISP /PROLOG

CIT 362   DATA MINING LAB With R/PYTHON/OCTAVE LAB

L T P C

0 0 3 1.5

LIST OF EXPERIMENTS:

Week 1: Demonstration of preprocessing on datasets student.arff and labor.arff

Week 2: Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm

Week 3: Demonstration of Association rule process on dataset supermarket.arff using apriori algorithm

Week 4: Demonstration of classification rule process on dataset student.arff and employee.arff using j48 algorithm

Week 5: Demonstration of classification ruleprocess on dataset employee.arff using id3Algorithm

Week 6: Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm

Week 7: Demonstration of clustering rule process on datasets iris.arff and student.arff using simple k-means

Week 8: Implement Statisticalanalysis and Inferential statistics and Hypothesis Testing for Kaggle competition andData.Gov data sets using R

CIT 363   **INERNET OF THINGS LAB**   L T P C
                                                           0 0 3 1.5

LIST OF EXPERIMENTS:

1. Write an arduino program for LED RED, GREEN and BLUE sensors.

2. Write an arduino program for touch sensor.

3. Write an arduino program for push button sensor.

4. Write an arduino program for motion sensor.

5. Write an arduino program for buzzer ringing based on the input.

6. Write an arduino program for temperature sensor.

7. Write an arduino program for gas sensor

8. Write an arduino program for rotation sensor

9. Write an arduino program for light sensor

10. Write an arduino program for ultrasonic sensor.

11. Write an arduino program for moisture sensor

12. Write an arduino program for sound sensor

13. Write an arduino program for magnetic sensor

14. Write an arduino program for sending message to the mobile.

CIT 411 (A)   **PE-3: BIG DATA & HADOOP**   **L T P C**
                                                      3 0 0 3

Course Objectives:
- Understand the Big Data Platform and its Use cases.
- Provide an overview of Apache Hadoop.
- Provide HDFS Concepts and Interfacing with HDFS.
- Apply analytics on Structured, Unstructured Data.

UNIT-I

Introduction to Big Data and Hadoop: Introduction to Big Data, Big Data Analytics, Big Data – Definition, Characteristic Features – Big Data - Applications - Big Data Vs Traditional Data - Risks of Big Data - Structure of Big Data – Challenges of Conventional Systems -History of Hadoop, Apache Hadoop, Analyzing Data with Unix tools, Analyzing Data with Hadoop, Hadoop Streaming, Hadoop Echo System, IBM Big Data Strategy, Introduction to Infosphere Big Insights and Big Sheets.

UNIT-II

Hadoop Framework: Hadoop – Requirement of Hadoop Framework - Design principle of Hadoop –Comparison with other system - Hadoop Components – Hadoop Daemon's –Working with HDFS Commands.

UNIT-III

HDFS (Hadoop Distributed File System): The Design of HDFS, HDFS Concepts, Command Line Interface, Hadoop file system interfaces, Data flow, Data Ingest with Flume and Scoop and Hadoop archives,
Hadoop I/O: Compression, Serialization, Avro and File-Based Data structures.

UNIT-IV

Map Reduce: Anatomy of a Map Reduce Job Run, Failures, Job Scheduling, Shuffle and Sort, Task Execution, Map Reduce Types and Formats, Map Reduce Features. , Algorithms using Map Reduce, Matrix-Vector Multiplication

UNIT-V

Hadoop Eco System:Pig : Introduction to PIG, Execution Modes   of   Pig, Comparison of Pig with Databases, Grunt, Pig Latin, User Defined Functions, Data Processing operators.
Hive : Hive Shell, Hive Services, Hive Metastore, Comparison with Traditional Databases, HiveQL, Tables, Querying Data and User Defined Functions.
Hbase : HBasics, Concepts, Clients, Example, Hbase Versus RDBMS.

Text books:
1. Tom White " Hadoop: The Definitive Guide" Third Edit on, O'reily Media, 2012.
2. Bart Baesens, Analytics in a Big Data World: The Essential Guide to Data Science and its Applications, Wiley, 2014.
3. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

References:
1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Jay Liebowitz, "Big Data and Business Analytics" Auerbach Publications, CRC press (2013)
3. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.

CIT 411 (B) PE-3: PRINCIPLES OF SOFTWARE ENGINEERING   L T P C
                                                              3 0 0 3
Course Objectives:

• To comprehend the various software process models.

• To understand the types of software requirements and SRS document.

• To know the different software design and architectural styles.

• To learn the software testing approaches and metrics used in software development.

UNIT-I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths. A Generic view of process: Software engineering- A layered technology, a process framework, Process patterns, process assessment.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process, Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools

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.

System models: Context Models, Behavioral models, Data models, Object models, structured methods. UML Diagrams.

UNIT-III

Design Engineering: Design process and Design quality, Design concepts, the design model. **Creating an architectural design:** Software architecture, Data design, Architectural styles and patterns, Architectural Design. Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT-IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, 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, Statistical Software quality Assurance, The Capability Maturity Model Integration (CMMI), Software reliability, The ISO 9000 quality standards.

Text books:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.

2. Software Engineering- Sommerville, 7th edition, Pearson Education.

References:

1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.

2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.

3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education

CIT 411 (C)   **PE-3: CYBER SECURITY**   **L T P C**

                                                                          3 0 0 3

Course Objectives:

1. To understand basic concepts of Cyber Security.

2. To be able to secure a message over insecure channel by various means.

3. To learn about how to maintain the Confidentiality, Integrity and Availability of a data.

4. To differentiate various protocols for network security to protect against the threats in the networks.

UNIT-I

SECURITY BASICS: Introduction, Elements of Information security, security policies, Techniques. Viruses, malware, Trojan**,** Types of cyber security attacks: malware, phishing, SQL injection attack, cross-site scripting, denial of service, session hijacking and man-in the middle attacks.

UNIT-II

SECURITY IN OPERATING SYSTEM & NETWORKS: Security in Operating Systems - Security in the Design of Operating Systems -Rootkit - Network security attack- Threats to Network Communications - Wireless Network Security - Denial of Service - Distributed Denial-of-Service.

UNIT-III

SECURITY COUNTERMEASURES: Cryptography in Network Security - Firewalls - Intrusion Detection and Prevention Systems - Network Management - Databases - Security Requirements of Databases - Reliability and Integrity - Database Disclosure.

UNIT-IV

IP SECURITY: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations. **Data backup:** What is Data Backup, Types of Backup, Types of Storage, Data Backup using rsync, Backup Safety Checks, Features of a Good Backup Strategy.

UNIT-V

WEB SECURITY: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Viruses and related threats.

Text Books :

1. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition , Pearson Education , 2015.

2. George K.Kostopoulous, Cyber Space and Cyber Security, CRC Press, 2013.

Reference Books:

1.MarttiLehto, Pekka Neittaanmaki, Cyber Security: Analytics, Technology and Automation edited, Springer International Publishing Switzerland 2015 .

2. Nelson Phillips and Enfinger Steuart, ―Computer Forensics and Investigations, Cengage Learning, New Delhi, 2009.

CIT 411 (D)   PE-3 : INFORMATION RETRIEVAL SYSTEMS   L T P C

                                                            3 0 0 3

Course Objectives:

* To provide the foundation knowledge in information retrieval.
* To equip students with sound skills to solve computational search problems.
* To appreciate how to evaluate search engines.
* To appreciate the different applications of information retrieval techniques in the Internet or Web environment.

UNIT I

Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms.

UNIT II

Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.

Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.

UNIT – III

New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.

UNIT-IV

Stemming Algorithms: Introduction, Types of Stemming Algorithms, and Experimental Evaluations of Stemming to Compress Inverted Files.

UNIT-V

Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri.

Textbooks:
  1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
  2. 2. Modern Information Retrieval by Yates Pearson Education.

Reference books:

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Information retrieval Algorithms and Heuristics, 2ed, Springer

CIT 412 (A)   PE-4 : SOFTWARE TESTING METHODOLOGIES   L T P C
                                                            3 0 0 3

Course Objectives:

- To study the fundamental concepts of software testing which includes objectives, process, criteria, strategies, and methods.
- To discuss various software testing types and levels of testing like black and white box testing along with levels unit test, integration, regression, and system testing.
- It also helps to learn the types of bugs, testing levels with which the student can very well identify a bug and correct as when it happens.
- It provides knowledge on transaction flow testing and data flow testing techniques so that the flow of the program is tested as well.

UNIT-I

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

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

UNIT-II

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

Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

UNIT-III

Domain Testing: Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domains and testability.

UNIT-IV

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

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

UNIT-V

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

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools

Text books:

1. Software Testing techniques – Boris Beizer, Dreamtech, Second Edition.
2. The craft of software testing – Brian Marick, Pearson Education.

References:

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

CIT 412 (B)   **PE-4 : MACHINE LEARNING**   **L T P C**

                                                                     3 0 0 3

Course Objectives:

- The student will be able to describe why a particular model is appropriate in a given situation.
- The student will be able to analytically demonstrate how different models and different algorithms are related to one another.
- Student will be able to develop an appropriate algorithm from a given model and demonstrate the use of that method.
- Discuss how different methods relate to one another and will be able to develop new and appropriate Machine Learning methods appropriate for particular problems.

UNIT I

Introduction to machine learning: Concept Learning and the General to Specific Ordering: Concept learning task, concept learning as search, Find-S: finding a Maximally Specific hypothesis, Version Spaces and the Candidate-Elimination algorithm, remarks on Version Spaces and Candidate-Elimination and inductive bias.

Decision Tree Learning: Decision Tree representation, appropriate problems for Decision Tree learning, hypothesis space search in Decision Tree learning, inductive bias in Decision Tree learning and issues in Decision Tree learning.

UNIT II

Artificial Neural Networks: Neural Network representations, appropriate problems for Neural Network learning, Perceptrons, Multilayer Networks and the Backpropagation algorithm and remarks on the Backpropagation algorithm.

Evaluating Hypotheses: Estimating hypothesis accuracy, basics of sampling theory, general approach for deriving confidence intervals, difference in error of two hypotheses and comparing learning algorithms.

UNIT – III

Bayesian Learning: Bayes theorem and concept learning, maximum likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classier, Gibbs algorithm, Naive Bayes classier, Bayesian belief networks and EM algorithm.

Computational learning theory: Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis spaces, and sample complexity for infinite hypothesis spaces and mistake bound model of learning.

UNIT-IV

Instance Based Learning: Introduction, k-Nearest Neighbor learning, locally weighted regression, radial basis functions, Case Based Reasoning and remarks on Lazy and Eager learning.

UNIT-V

Genetic Algorithms: Introduction, hypothesis space search, Genetic programming and models of evolution and learning.

Textbooks:

1. Tom M. Mitchell, "Machine Learning", Mc. Graw Hill Publishing.

Reference Books:

1. Christopher M.Bishop "Pattern Recognition and Machine Learning
2. Oliver Theobald, " Machine Learning for Absolute Beginners", ScatterplotPress
3. Trevor Hastie, Robert Tibshirani, and Jerome Friedman, "The Elements of Statistical Learning", Springer.

CIT 412 (C)   PE-4 : BLOCK CHAIN TECHNOLOGY   L T P C
                                                      3 0 0 3

Course Objectives:
- Develop familiarity of current technologies, tools.
- Impart strong technical understanding of Block Chain technologies.
- Explore the Smart Contracts and Etherum implementation strategies.
- Introduce the current scenario and practical application areas of Hyper ledger.

UNIT-I

Block Chain 101- Distributed Systems, History of blockchain, Introduction to blockchain, Types of block chain, CAP theorem and blockchain, benefits and limitations of blockchain,

Decentralization- Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Blockchain and full eco system decentralization, Smart contract, Decentralized Organizations, Decentralized autonomous organizations, Decentralized autonomous corporations, Decentralized autonomous societies, Decentralized applications, Platforms for Decentralization.

UNIT-II

Cryptography and Technical Foundations- Introduction, Cryptographic primitives, Asymmetric Cryptography, Public and Private-keys, Financial -market and trading, Summary.

Bitcoin- Bitcoin, Transactions, Blockchain, Bitcoin Payments.

UNIT-III

Smart Contracts- History, Definition, Recardian Contracts.

Ethereum 101-Introduction, Ethereum blockchain, Elements of the Ethereum block chain, Precompiled contracts, Accounts, Block, Ether, Messages, Mining, Clients and Wallets, Trading and investment, The Yellow paper, The Ethereum Network, Applications developed on Ethereum, Scalability and security issues.

UNIT-IV

Hyper Ledger- Projects, Hyperledger as a Protocol, Fabric, Hyperledger Fabric, Sawtooth lake, Corda,

UNIT-V

Alternative Block Chain- Block chains, Platforms.

Scalability and Other Challenges- Scalability, Privacy, Security,

Text books:
1. Seberrius Jeffery," Block Chain" 2nd Edition Publishers details 2015

References:
1. Narayanan, Bonneau, Felten, Miller and Goldfeder, "Bitcoin and Cryptocurrency Technologies – A Comprehensive Introduction", Princeton University Press.

2. Josh Thompson, 'Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming', Create Space Independent Publishing Platform, 2017.

CIT 412 (D) **PE-4 : COMPUTER FORENSICS** **L T P C**

3 0 0 3

Course Objectives:

• To provide an understanding of computer forensics fundamentals.

• To analyze various computer forensics technologies.

• To know about computer forensics tools

• To identify methods for data recovery.

UNIT-I

Introduction to Computer Forensics: computer crimes, evidence, extraction, preservation, etc.

Overview of hardware and operating systems: structure of storage media/devices; windows/Macintosh/ Linux -- registry, boot process, file systems, file metadata.

UNIT-II

Data recovery: identifying hidden data, Encryption/Decryption, Steganography, recovering deleted files. Digital evidence controls: uncovering attacks that evade detection by Event Viewer, Task Manager, and other Windows GUI tools, data acquisition, disk imaging, recovering swap files, temporary &cache files

UNIT-III

Computer Forensic tools: Encase, Helix, FTK, Autopsy, Sleuth kit Forensic Browser, FIRE, Found stone Forensic ToolKit, WinHex, Linux dd.

Network Forensic: Collecting and analyzing network-based evidence, reconstructing web browsing, email activity, and windows registry changes, intrusion detection, tracking offenders, etc.

UNIT-IV

Mobile Network Forensic: Introduction, Mobile Network Technology, Investigations, Collecting Evidence, Where to seek Digital Data for further Investigations, Interpretation of Digital Evidence on Mobile Network.

Software Reverse Engineering: defend against software targets for viruses, worms and other malware, improving third-party software library, identifying hostile codes-buffer overflow, provision of unexpected inputs, etc.

UNIT-V

Computer crime and Legal issues: Intellectual property, privacy issues, Criminal Justice system for forensic, audit/investigative situations and digital crime scene, investigative procedure/standards for extraction, preservation, and deposition of legal evidence in a court of law.

Text books:

1. Digital Forensics with Open Source Tools. Cory Altheide and Harlan Carvey, ISBN: 978-1- 59749- 586-8, Elsevier publication, April 2011

2. Network Forensics: Tracking Hackers Through Cyberspace, Sherri Davidoff, Jonathan Ham Prentice Hall, 2012

References:

1. Guide to Computer Forensics and Investigations (4 th edition). By B. Nelson, A. Phillips, F. Enfinger, C. Steuart. ISBN 0-619-21706-5, Thomson, 2009.

2. Computer Forensics: Hard Disk and Operating Systems, EC Council, September 17, 2009.

Course Objectives:
- Design Multi-Layer neural network to solve Supervised Learning problems.
- Design Auto encoders to solve Unsupervised Learning problems.
- Apply Regularization methods Early stopping, data augmentation, dropout etc. for optimization results.
- Apply Classical Supervised methods CNN'S, FCN, RCNN etc. for Image Denoising, Segmentation and Object detection problems.

UNIT-I
History of Deep Learning, Deep Learning Success Stories, McCulloch Pitts Neuron, Multilayer Perceptions (MLPs), Representation Power of MLPs, Sigmoid Neurons, Gradient Descent, Feed Forward Neural Networks, Back propagation.

UNIT-II
Optimizers: Gradient Descent (GD), Momentum Based GD, Nesterov Accelerated GD, Stochastic GD; Principal Component Analysis and its interpretations, Singular Value Decomposition; Auto encoders and relation to PCA, Regularization in auto encoders, Denoising auto encoders, Sparse auto encoders.

UNIT-III
Regularization: Bias Variance Tradeoff, L2 regularization, Early stopping, Dataset augmentation, Dropout, Drop connect; Greedy Layer wise Pretraining, Better activation functions, Better weight initialization methods, Batch Normalization; Learning Vectorial Representations of Words.

UNIT-IV
Convolutional Neural Networks, LeNet, AlexNet, ZFNet, VGGNet, GoogLeNet, ResNet; Recurrent Neural Networks, Back propagation through time (BPTT), Vanishing and Exploding Gradients, Truncated BPTT, GRU, LSTMs; Semantic Segmentation, Instance Segmentation, FCN, Unet.

UNIT-V
Object Localization, Region Proposal Networks, RCNN, RFCN, DeYolo; Encoder Decoder Models, Generative Adversarial Networks, GAN, VAE, One Shot Learning, Deep Reinforcement Learning, Attention Mechanism, Attention over images.

Text books:
1. Ian Goodfelllow, Yoshua Benjio, Aaron Courville, "Deep Learning", The MIT Press.
2. Christopher Bishop, "Pattern Recognition and Machine Learning", Springer, 2006.

References:
1. Charu C. Aggarwal, "Neural Networks and Deep Learning", Springer, 2018.
2. https://nptel.ac.in/courses/106/106/106106184

CIT 415 (B) PE-5 : SOFTWARE ARCHITECTURE AND DESIGN PATTERNS
L T P C

3 0 0 3

Course Objectives:
- The aim of the course will become familiar with a variety of currently available genomic and proteomic databases.
- Assessment will be based upon performance on computer assignments and exam questions.
- Topics incluede be able to search and retrieve information from genomic and proteomic databases (e.g. GenBank, Swiss-Prot), and to analyze their search results using software available on the internet (e.g. BLAST, ClustalW).
- Assessment will be based upon performance on computer assignments and exam questions.

UNIT-I
Introduction: what is a design pattern? Describing design patterns, the catalog of design pattern, organizing the catalog, how design patterns solve design problems, how to select a design pattern, how to use a design pattern. What is object-oriented development? , key concepts of object oriented design other related concepts, benefits and drawbacks of the paradigm.

UNIT-II
Analysis a System: overview of the analysis phase, stage 1: gathering the requirements functional requirements specification, defining conceptual classes and relationships, using the knowledge of the domain. Design and Implementation, discussions and further reading.

UNIT-III
Design Pattern Catalog: Structural patterns, Adapter, bridge, composite, decorator, facade, flyweight, proxy.
UNIT-IV
Interactive systems and the MVC architecture: Introduction , The MVC architectural pattern, analyzing a simple drawing program , designing the system, designing of the subsystems, getting into implementation, implementing undo operation , drawing incomplete items, adding a new feature , pattern based solutions..

UNIT-V
Designing with Distributed Objects: Client server system, java remote method invocation, implementing an object oriented system on the web (discussions and further reading) a note on input and output, selection statements, loops arrays.

Text books:
1. Object-oriented analysis, design and implementation, brahma dathan, sarnath rammath, universities press,2017
2. 2. Design patterns, erich gamma, Richard helan, Ralph johman , john vlissides ,PEARSON Publication,2013

References:
1. Frank Bachmann, RegineMeunier, Hans Rohnert "Pattern Oriented Software Architecture" –Volume 1, 1996.

Course Objectives:
1. Understand and apply key concepts in social media metrics.
2. Understand and apply social media analytics tools.
3. Collect social media data.
4. Monitor consumers and competitors and glean deeper consumer insights based on advanced social media data modeling.

UNIT-I

Introduction to Social Media Analytics (SMA): Social media landscape, Need for SMA; SMA in Small organizations; SMA in large organizations; Application of SMA in different areas

Network Fundamentals and Models: The social networks perspective - nodes, ties and influencers, Social network and web data and methods. Graphs and Matrices- Basic measures for individuals and networks. Information visualization.

UNIT-II

Making Connections: Link analysis. Random graphs and network evolution. Social contexts: Affiliation and identity.

Web Analytics Tools: Click stream analysis, A/B testing, online surveys, Web crawling and Indexing. Natural Language Processing Techniques for Micro-text Analysis.

UNIT-III

Face book Analytics: Introduction, parameters, demographics. Analyzing page audience. Reach and Engagement analysis. Post- performance on FB. Social campaigns. Measuring and analyzing social campaigns, defining goals and evaluating outcomes, Network Analysis. (LinkedIn, Instagram, YouTube, Twitter etc.

UNIT-IV

Practical: Students should analyze the social media of any ongoing campaigns and present the findings.

UNIT-V

Google Analytics: Introduction. (Websites) Processing and Visualizing Data, Influence Maximization, Link Prediction, Collective Classification, Applications in Advertising and Game Analytics Introduction to Python Programming, Collecting and analyzing social media data; visualization and exploration.

Text books:
1. Social Media Analytics: Techniques and Insights for Extracting Business Value Out of Social Media, Matthew Ganis, Avinash Kohirkar, Pearson-2016 edition.

2. Social Media Metrics: How to Measure and Optimize Your Marketing Investment, Jim Sterne, Wiley publisher, Latest edition.

Reference Books:
1. Social Media ROI: Managing and Measuring Social Media Efforts in Your Organization (Que Biz- Tech), Oliver Blanchard, Que Publishing, Latest edition.

2. Social Media Analytics, Marshall Sponder, McGraw Hill, Latest edition.References:

CIT 415 (D)   PE-4 : DATA ANALYTICS THROUGH R   L T P C
3 0 0 3

Course Objectives:
- Understand the use of R, Basics of R, Advanced data structures, reading/writing data into R.
- Manipulate data using SQL statements and visualization of data using different plots.
- Understand the normal, binomial distributions, correlation and covariance, T-test, ANOVA, Manipulation string, and linear models.
- Understand the cluster analysis and classification.

UNIT-I

Introduction to R - Why use R?, Obtaining and installing R, The R Environment - Command line interface, RStudio, R Packages - Installing packages, loading packages, Building packages.

Basics of R - basic Math, variables, Data types, vectors, calling function, function documentation, missing data. Advanced Data Structures- data Frames, Lists, Matrices, Arrays, Reading Data into R-Reading CSVs, Excel data, reading from databases.

UNIT-II

Basic Data Management - A working example, creating new variables, recoding variables, renaming variables, missing values, date values, type conversion, sorting data, merging data set, sub-setting datasets, Using SQL statement to manipulate data.

UNIT-III

Data Management Challenge - Numerical and character functions, a solution for data management challenge, control flow, User Written functions, Aggregate and reshaping, Bar plot, pie chart, Histograms, Kernel Density plots, Box plots, dot plots.

UNIT-IV

Data Distribution and Regression- Normal distribution, binomial distribution, summary statistics, correlation and covariance, T-test, ANOVA, paste, sprintf, extracting text, regular expression, Simple linear regression, multiple linear regressions, logistic regression.

UNIT-V

Cluster Analysis- Common steps in cluster analysis, calculating distances, Hierarchical cluster analysis, Partitioning cluster analysis, avoiding nonexistence clusters, Preparing the data, decision trees, random forests, support vector machines, choosing a best predictive solution.

Text books:
1. R for Every One, Advanced analytics and graphics by Jared P Lander, Addison Wisley Data and Analytics series.
2. R in Action, Data Analysis and graphics with R, Robert L Kaacoff, Manning Publisher

References:
1. Beginning R by Dr.Mark Gardener, Wrox publisher.
2. Associate Analytics Facilitator Guide provided by NASSCOM.

CIT 416 (A)   HS-1 : MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
                                                                    L T P C
                                                                     3 0 0 3
Course Objectives:
- To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations that are needed for sound economic decision making.
- The main purpose is to provide inputs on an overall analysis of an individual firm namely: demand and supply, production function, cost analysis, markets etc.
- To understand and analyze the financial formats of the organization for smooth running of the business.

UNIT-I
Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics, Micro and Macroeconomic Concepts.
Demand Analysis: Demand Determinants, Law of Demand and exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of elasticity of Demand.
Demand Forecasting: Factors governing Demand Forecasting, Methods of Demand Forecasting (Survey Methods, Expert Opinion, Test Marketing, Controlled Experience, Judgmental Approach, and Time Series Analysis).

UNIT-II
Production & Cost Analysis: Production Function- Isocost and Isoquants, MRTS, Least Cost, Combination of Inputs, Cobb-Douglas Production Function, Laws of Returns, Internal and External Economies of Scale.
Cost Analysis: Cost Concepts. Break-Even Analysis (BEA) - Determination of Break-Even Point(Simple Problems).

UNIT-III
Markets: Types of Competition and Markets, Features of Perfect Competition, Monopoly and Monopolistic Competition;
Pricing: Objectives, Methods of Pricing;
Business: Features of different forms of Business Organization (Sole Trader, Partnership, Joint Stock Company, Cooperative Society, and Public Enterprises).

UNIT-IV
Introduction to Capital and Financial Accounting: Need for Capital, Types of Capital, Working Capital Analysis, Methods and Sources of raising Finance.
Accounting: Definition, Concepts and Conventions (GAAP); Accounting Cycle; Formats for preparation of Trial Balance and Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet).

UNIT-V
Investment Decision: Capital Budgeting - Features, Objectives, and Methods (Payback Method, Accounting Rate of Return and Net Present Value) - advantages & disadvantages. (Simple Problems).
Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, Capital Structure Ratios and Profitability Ratios. (Simple Problems).

Text books:
1. Managerial Economics & Financial Analysis, Special Edition McGraw Hill Publications, 2017
2. D.N. Dwivedi, Managerial Economics, Vikas Publications.
3. Justin Paul, Leena, Sebastian, Managerial Economics, Cengage.

References:
1. P.L. Mehta, Managerial Economics: Analysis, Problems and Cases, Sultan Chand & Sons.
2. S. N. Maheswari & S. K. Maheswari, Financial Accounting, Vikas Publications.
3. M. Y. Khan and P. K. Jain, Financial Management, McGraw Hill.

**CIT 416 (B)   HS-1 : INTRODUCTION TO INDUSTRIAL   L T P C
                   MANAGEMENT**

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Course Objectives:
- To familiarize the students to study the evolution of Management, functions and principles of management

UNIT-I
Management-Concept-Meaning- Need for Management-Managerial Roles-Functions of management – Managerial skills-The evolution of Management thought- Principles of management-F.W.Taylor and Henry Fayol's Principles-Corporate social responsibility.

UNIT-II
Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – Strategic Management – Planning Tools and Techniques– Decision making steps and process.

UNIT-III
Nature and purpose – Formal and informal organization – organization chart – organization structure– Types – Line and staff authority – departmentalization – delegation of authority – centralization and decentralization –Staffing -Systems approach to staffing- Recruitment and Selection – Concept of HRD.

UNIT-IV
Foundations of individual and group behavior – motivation – motivation theories – motivational techniques – job satisfaction – job enrichment.

UNIT-V
leadership – types and theories of leadership – communication – process of communication – barrier in communication – effective communication – communication–Importance-Steps in controlling process-Pre-requisites for effective control.

Text Books:
1. Harold Koontz & Heinz Weihrich "Essentials of Management" Tata McGraw Hill, 2010.
2. Stephen P. Robbins & Mary Coulter, "Management", 10th Edition, Prentice Hall (India) Pvt. Ltd., 2009.
3. JAF Stoner, Freeman R.E and Daniel R Gilbert "Management", 6th Edition, Pearson Education, 2004.

Reference Books:
1. Stephen A. Robbins & David A. Decenzo & Mary Coulter, "Fundamentals of Management" 7th Edition, Pearson Education, 2011.
2. Robert Kreitner & Mamata Mohapatra, "Management", Biztantra, 2008.
3. Tripathy PC & Reddy PN, "Principles of Management", Tata McGraw Hill, 1999.
4. VSP Rao, V. Harikrishna 2010, Management – Text and Cases, Excel Books, New Delhi.

CIT 416 (C) HS-1 : HUMAN RESOURCE MANAGEMENT & ORGANIZATIONAL BEHAVIOUR   L T P C
                                                                              3 0 0 3

Course Objectives:
* To familiarize the student with the fundamental aspects of various issues associated with Human Resource Management and Organizational Behavior.
* This course aims to give a comprehensive overview about Career Planning, theories of Motivation and styles of Leadership.
* To introduce the basic concept of Individual Behavior.
* To enhance the awareness of Group Behavior.

UNIT-I
Human Resource Management: Nature – significance – functions of HRM –.Job Analysis – Objectives and methods of Job Analysis – Job Description – Job Specification – Job Rotation – Job Enlargement – Job Enrichment – Job Evaluation & its Methods.

UNIT-II
Career Planning & Motivation: Career Planning and Development - Career Stages - Compensation – Components of Pay Structure - Wage and Salary administration - Incentives and Employee Benefits - Motivation: Maslow's Theory - Herzberg Two Factors Theory of Motivation - Mc.Gregors Theory X and Y - Vroom's Expectancy Theory – Leadership: Theories of Leadership and its Styles.

UNIT III
Introduction to Organizational Behavior: Meaning- Importance - Nature & Scope of OB – Contribution of other Disciplines to OB – Need for Development of individual Skills; Perception – Process of Perception – Enhancing Perceptual Skills – Learning – Theories of learning – Personality – Stages of personality Development – Determinants of personality.

UNIT – IV
Groups: Meaning & Definition of Group and Group Dynamics – Dynamics of Group Formation – Reasons for Group Formation – Types of Groups.

UNIT-V
Teams: Concept and Definition of Team – Types of Teams – Work Teams – Cross-functional Teams - Virtual Teams - Group/Team Effectiveness – How to make Teams more Effective – Team Building - Collaboration – Group Leadership.

Text Books:
1. Aswathappa.K., Human Resource and Personnel Management, 2nd Edition, Tata McGraw Hill, New Delhi, 2001.
2. De Cenzo. & Stephen P.Robbins, Personnel/ Human Resource Management, Pearson Publications.
Reference Books:

1. Stephen P.Robbins, Organisational Behavior, Prentice Hall of India, 9th edition
2. Edwin B.Flippo, Personnel Management, McGraw-Hill.
3. Aswathappa.K., Organisational Behaviour , Himalaya Publishing House, New Delhi

CIT 416 (D) HS-1 : PROJECT MANAGEMENT & ENTREPRENEURSHIP

L T P C
3 0 0 3

Course Objectives:
* The objective of this course is to develop conceptual understanding to develop the understanding of performing a project / start-up in India and the importance of Project Management from entrepreneurs' point of view.
* The students also comprehend the environment of making of an Entrepreneur.

UNIT-I
Project Management Concepts: Meaning of Project, Need for Project Management, Project Management Knowledge Areas and Processes, The Project Life Cycle. The Project Manager (PM), Phases of Project Management Life Cycle, Project Management Processes, Impact of Delays in Project Completions, Essentials of Project Management Philosophy, Project Management Principles, Pre-Feasibility Study, Feasibility study.

UNIT-II
Project preparation and Financing Ventures: Meaning of and Preparation of Project – Importance of Report – Content; Guidelines for Report preparation – Network Analysis – PERT and CPM – Sources of Finance – Concept of working Capital and Estimation – Seed Capital – Venture Capital.

UNIT III
Entrepreneur: Evolution of the Concept of Entrepreneur – Characteristics of Entrepreneur – Distinction between an Entrepreneur and Entrepreneur and a Manager – Functions of an Entrepreneur – Types of entrepreneurs.

UNIT – IV
Entrepreneurship: Concept of Entrepreneurship – Functions, Problems, Entrepreneurial process – Growth of Entrepreneurship in India – Recent Trends of Women Entrepreneurship – Meaning of and Need for Rural Entrepreneurship.

UNIT-V
MSME Enterprises: Definitions, Characteristics – Relationships of MSME – Relationship with large units – Export Oriented Units - Rationale – Objectives – Scope of Small Enterprises – Opportunities for an Entrepreneurial career – Role of Small Enterprises in Economic Development – Causes and Symptoms of Sickness – Cure for Sickness.

Text Books:
1. Vijay Sathe, "Corporate Entrepreneurship" 1st edition, 2009, Cambridge
2. S.S. Khanka, "Entrepreneurial Development", 2007, S. Chand & Co. Ltd.
3. Vasanth Desai, "Dynamics of Entrepreneurial Development and Management", 2007, HPH,Millenium Edition.

Reference Books:

1. Dr. Vasant Desai, "Small Scale Industries and Entrepreneurship", 2006, HPH.
2. P. Narayana Reddy, "Entrepreneurship – Text and Cases", 2010, 1st Ed. Cengage Learning.
3. David H. Hott, "Entrepreneurship New Venture Creation", 2004, PHI