REGULATIONS (R-20), SYLLABI

for

B.Tech. Degree Program

COMPUTER SCIENCE & ENGINEERING

CHALAPATHI INSTITUTE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
Accredited by NAAC with 'A' Grade & NBA
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	CS 111	Mathematics-I	5	1	0	30	70	3	BSC
2	CS 112	Engineering Physics	5	0	0	30	70	3	BSC
3	CS 113	Engineering Graphics	2	0	4	30	70	3	ESC
4	CS 114	Problem Solving using C	5	0	0	30	70	3	ESC
5	CS 115	Basic Electrical Engineering	5	0	0	30	70	3	ESC
6	CS 151	Engineering Physics Lab	0	0	3	30	70	1.5	BSC
7	CS 152	Introduction to Computing Lab	0	0	3	30	70	1.5	ESC
8	CS 153	Problem Solving using C 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	CS 121	Mathematics-II	4	1	0	30	70	3	BSC
2	CS 122	Engineering Chemistry	4	0	0	30	70	3	BSC
3	CS 123	Professional Communication	4	0	0	30	70	3	HSC
4	CS 124	Python programming	4	1	0	30	70	3	ESC
5	CS 125	Digital Logic Design	4	1	0	30	70	3	ESC
6	CS 126	Environmental Science	4	0	0	30	70	0	MC
7	CS 161	Engineering Chemistry Lab	0	0	3	30	70	1.5	BSC
8	CS 162	Professional Communication Skills Lab	0	0	3	30	70	1.5	HSC
9	CS 163	Python programming Lab	0	0	3	30	70	1.5	ESC
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	CS 211	Probability & Statistics	4	1	0	30	70	3	BSC
2	CS 212	Data Structures	4	0	0	30	70	3	PCC
3	CS 213	Micro Processors & Micro Controllers	4	0	0	30	70	3	ESC
4	CS 214	Principles of Programming Languages	3	0	0	30	70	3	PCC
5	CS 215	Operating Systems	3	1	0	30	70	3	PCC
6	CS 216	Design Thinking	4	0	0	30	70	0	MC
7	CS 251	Operating Systems Lab	0	0	3	30	70	1.5	PCC
8	CS 252	Data Structures Lab	0	0	3	30	70	1.5	PCC
9	CS 253	Micro Processors & Micro controllers Lab	0	0	3	30	70	1.5	ESC
		Skill Oriented Course*	1	0	2			2	SC
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	CS 221	Mathematics-IV	4	1	0	30	70	3	BSC
2	CS 222	Database Management Systems	4	1	0	30	70	3	PCC
3	CS 223	Java Programming	4	1	0	30	70	3	PCC
4	CS 224	Design & Analysis of Algorithms	4	1	0	30	70	3	PCC
5	CS 225	Professional Ethics and Human Values	4	0	0	30	70	3	HSC
6	CS 261	Database Management systems Lab	0	0	3	30	70	1.5	PCC
7	CS 262	Java Programming Lab	0	0	3	30	70	1.5	PCC
8	CS 263	Algorithms Lab	0	0	3	30	70	1.5	PCC
		Skill Oriented Course*	1	0	2			2	
Total			21	4	11	240	560	21.5	

III YEAR I Semester

COURSE STRUCTURE
(Yet to be Finalized)

S.No.	CODE.NO	SUBJECT	Scheme of Instruction periods per week			Scheme of examination			Category Code
			L	T	P	INT	EXT	CREDITS	
1	CS 311	Computer Networks	4	1	0	30	70	3	PCC
2	CS 312	Web Technologies	3	1	0	30	70	3	PCC
3	CS 313	Automata Theory and Formal Languages	3	1	0	30	70	3	PCC
4	CS 314	Professional Elective-1	3	1	0	30	70	3	PEC
5	CS 315	Open Elective-1	3	1	0	30	70	3	OEC
7	CS 316	Constitution of India	2	0	0	30	70	0	MC
8	CS 351	Computer Networks Lab	0	0	3	30	70	1.5	PCC
9	CS 352	Web Technologies Lab	0	0	3	30	70	1.5	PCC
10	CS 353	Summer Internship	0	0	0	30	70	1.5	PROJ
		Honors/Minor courses	4	0	0			4	
		Skill Advanced Course/Soft skill Course *	1	0	2			2	
Total			23	5	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	CS 321	Artificial Intelligence	3	1	0	30	70	3	PCC
2	CS 322	Data Engineering	3	1	0	30	70	3	PCC
3	CS 323	Open Elective-II	3	0	0	30	70	3	OEC
4	CS 324	Professional Elective-II	3	0	0	30	70	3	PEC
5	CS 325	Internet of Things	3	1	0	30	70	3	PCC
6	CS 326	Life Sciences	2	0	0	30	70	0	MC
7	CS 361	Artificial Intelligence Lab	0	0	3	30	70	1.5	PCC
8	CS 362	Data Engineering Lab	0	0	3	30	70	1.5	PCC
9	CS 363	Internet of Things Lab	0	0	3	30	70	1.5	PCC
		Honors/Minor courses	4	0	0			4	
		Skill Advanced Course/Soft skill Course *	1	0	2			2	SC
Total			22	3	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	CS 411	Professional Elective-III	4	1	-	30	70	3	PEC
2	CS 412	Professional Elective-IV	4	1	-	30	70	3	PEC
3	CS 413	OPEN ELECTIVE-III	4	1	-	30	70	3	OEC
4	CS 414	OPEN ELECTIVE-IV	4	1	-	30	70	3	OEC
5	CS 415	Professional Elective-V	4	1	-	30	70	3	PEC
6	CS 416	Humanities And Social Elective	3	-	-	30	70	3	HSC
7	CS 417	Summer Internship	0	0	0	30	70	1.5	PROJ
		Honors/Minor courses	4	0	0			4	
		SKILL Advanced Courses*	3	1		30	70	2	
Total			26	5		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	CS 421	MAJOR PROJECT (Project WORK, Seminar And Internship In Industry)	0	0	0			14	
Total			0	0	0			14	

Professional Elective Courses:

PE-1:
1. Computer Graphics
2. Computer Organization & Architecture
3. Advanced Computer Architecture
4. Cryptography and Network security

PE-2:
1. Compiler Design
2. Networking Programming
3. Cloud Computing
4. Cyber Security

PE-3:
1. Software Engineering
2. Big Data & Hadoop
3. Image Processing
4. Computer Forensics

PE-4:
1. Software Testing Methodologies
2. Mobile Computing
3. Block chain Technology
4. Machine Learning

PE-5:
1. Deep Learning
2. Bio Informatics
3. Soft computing
4. Data Analytics through R

Open Elective Courses:

OE-1: Java Programming
OE-2: Data Base Management Systems
OE-3: Artificial Intelligence
OE-4: Machine Learning

Humanities and Social Sciences Electives:

1. Entrepreneurship
2. Managerial Economics and Financial Analysis
3. Universal Human Values
4. ACM Code of Ethics

CS 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.
- To describe the role of multiple integrals in calculating areas and volumes.

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 Publishers, 2013.
3. Glyn James, Advanced Modern Engineering Mathematics, 4/e, Pearson publishers.

CS 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

CS 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.

CS 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

CS 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, 6thEdition, 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, 6thediton 2003.

CS 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

CS 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.

CS 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

CS 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.

CS 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.

CS 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

CS 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

CS 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.

CS 126	ENVIRONMENTAL SCIENCE (Mandatory)	L	T	P	C
		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.

CS 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

CS 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

CS 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

CS 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.

CS 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

CS 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.

CS 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.

CS 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.

CS 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.

CS 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

CS 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

CS 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

SECOND YEAR SECOND SEMESTER

CS 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).

CS 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.

CS 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

CS 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.

CS 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

CS 261 DATABASE MANAGEMENT SYSTEMS LAB **L T P C**
0 0 3 1.5

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.

CS 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.

CS 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.