SCHEME AND SYLLABUS FOR FIRST & SECOND YEARS OF FOUR YEAR UNDER GRADUATE DEGREE COURSE B. TECH (COMPUTER SCIENCE & ENGINEERING) [W.E.F. 2022 - 2023 ADMITTED BATCH]

DEPARTMENT OF COMPUTER SCIENCE & SYSTEMS ENGINEERING
ANDHRA UNIVERSITY COLLEGE OF ENGINEERING
ANDHRA UNIVERSITY
VISAKHAPATNAM-530 003

ANDHRA UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE AND SYSTEM ENGINEERING
SCHEME AND SYLLABI
(With effect from 2022-23 admitted batch)
Common for CSE & IT

B.Tech & B.Tech + M.Tech
(Computer Science & Engineering)

I Year – I Semester

Course code	Category	Course Title	Hours per week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
CS1101	BS	Engineering Mathematics –I	4	0	30	70	100	3
CS1102	BS	Green Chemistry	4	0	30	70	100	3
CS1103	HSS	English	4	0	30	70	100	3
CS1104	ES	Computer Programming Using C	4	0	30	70	100	3
CS1105	ES	IT Essentials	4	0	30	70	100	3
CS1106	HSS	Communication skills Lab	0	3	50	50	100	1.5
CS1107	ES	Computer Engineering Workshop Lab	0	3	50	50	100	1.5
CS1108	ES	Computer Programming using C lab	0	3	50	50	100	1.5
Total Credits								**19.5**

B.Tech & B.Tech + M.Tech

I Year-II Semester

Course code	Category	Course Title	Hours per week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
CS1201	BS	Engineering Mathematics–II	4	0	30	70	100	3
CS1202	BS	Engineering Physics	4	0	30	70	100	3
CS1203	ES	Elements of Electronics Engineering	4	0	30	70	100	3
CS1204	ES	Data Structures Using C	4	0	30	70	100	3
CS1205	ES	Digital Logic Design	4	0	30	70	100	3
CS1206	ES	Linux Administration Lab	0	3	50	50	100	1.5
CS1207	BS	Engineering Physics Lab	0	3	50	50	100	1.5
CS1208	ES	Data Structures Lab	0	3	50	50	100	1.5
Total Credits								**19.5**

B.Tech & B.Tech + M.Tech
(Computer Science & Engineering)
II Year - I Semester

Course code	Category	Course Title	Hours per week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
CS2101	ES	Discrete Mathematical Structures	4	0	30	70	100	3
CS2102	PC	Computer Organization and Architecture	4	0	30	70	100	3
CS2103	BS	Probability, Statistics and Queuing theory	4	0	30	70	100	3
CS2104	PC	Operating Systems	4	0	30	70	100	3
CS2105	PC	Object Oriented Programming Through Java	4	0	30	70	100	3
CS2106	PC	Computer Organization & Architecture Lab	0	3	30	70	100	1.5
CS2107	PC	Object Oriented Programming Through Java Lab	0	3	50	50	100	1.5
CS2108	PC	Operating Systems Lab	0	3	50	50	100	1.5
CS2109	SC	Intellectual Property Rights (Internal)	1	2	100	0	100	2
CS2110	MC	Environmental Science	0	0	-	100	100	0
Total credits								**21.5**

B.Tech & B.Tech + M.Tech
II Year - II Semester

Course code	Category	Course Title	Hours per week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
CS2201	ES	Microprocessors	4	0	30	70	100	3
CS2202	PC	Design and Analysis of Algorithms	4	0	30	70	100	3
CS2203	PC	Database Management Systems	4	0	30	70	100	3
CS2204	PC	Formal Languages & Automata Theory	4	0	30	70	100	3
CS2205	HSS	Managerial Economics	4	0	30	70	100	3
CS2206	PC	Algorithms Lab through C++.	0	3	50	50	100	1.5
CS2207	PC	Database Management Systems Lab	0	3	50	50	100	1.5
CS2208	SC	Web Technologies	1	2	50	50	100	2
CS2209	MC	Professional Ethics & Universal Human Values	0	0	0	100	100	0
CS2210	MC	NCC/NSS	0	2	-	-	-	0
Total credits								**20**
Internship-I								

B.Tech & B.Tech + M.Tech
(Computer Science & Engineering)

I Year – I Semester

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CS1101	BS	Engineering Mathematics –I	4	0	30	70	100	3
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CS1107	ES	Computer Engineering Workshop Lab	0	3	50	50	100	1.5
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Total Credits								**19.5**

CS1101 ENGINEERING MATHEMATICS-I

Course Objectives

- To transmit the knowledge of Partial differentiation.
- To know of getting maxima and minima of function of two variables and finding errors and approximations.
- To evaluate double and triple integrals, volumes of solids and area of curved surfaces.
- To expand a periodical function as Fourier series and half-range Fourier series

Course Outcomes

- Find the partial derivatives of functions of two or more variables.
- Evaluate maxima and minima, errors and approximations.
- Evaluate double and triple integrals, volumes of solids and area of curved surfaces.
- To expand a periodical function as Fourier series and half-range Fourier series.
- Have a fundamental understanding of Fourier series and be able to give Fourier expansions of a given function.

SYLLABUS

Partial Differentiation: Introduction - Functions of two or more variables - Partial derivatives - Homogeneous functions – Euler's theorem - Total derivative - Change of variables – Jacobins. Mean value Theorems (without proofs)

Applications of Partial Differentiation: Geometrical interpretation -Tangent plane and Normal to a surface -Taylor's theorem for functions of two variables - Errors and approximations -Total differential. Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers - Differentiation under the integral Sign - Leibnitz's rule.

Multiple Integrals: Introduction - Double Integrals - Change of Order of Integration - Double Integrals in Polar Coordinates - Triple Integrals - Change of Variables.

Multiple Integrals-Applications: Area enclosed by plane curves - Volumes of solids - Area of a curved surface - Calculation of Mass - Centre of gravity - Moment of inertia - product of

inertia – principal axes- Beta Function - Gamma Function - Relation between Beta and Gamma Functions. Error Function or Probability Integral.

Fourier Series: Introduction - Euler's Formulae - Conditions for a Fourier Expansion - Functions having points of discontinuity - Change of Interval - Odd and Even Functions - Expansions of Odd or Even Periodic Functions, Half-Range Series - Parseval's Formula. Practical Harmonic analysis

Text Book

1. Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43rd Edition, Khanna publishers.

Reference Books

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K.International publishing house Pvt. Ltd.
2. Advanced Engineering Mathematics by Erwin Kreyszig.
3. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal, Lakshmi Publications.
4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company. 6.
6. Higher Engineering Mathematics by Dr. M.K.Venkataraman.

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CS1102 GREEN CHEMISTRY

Course Objectives:

- To apply the basic knowledge of Chemistry to the Engineering Discipline.
- To develop knowledge about water and its treatment for industrial and potable purposes.
- To develop understanding in the areas of Batteries, Fuels Mechanism of Corrosion of Metals and Corrosion Control Methods, Green Chemistry and Technology and Processes involving Green Chemistry and apply the knowledge for solving existing challenges faced in various engineering and societal areas.

Learning outcome:

- The students are able to apply the basic concepts and principles studied in Chemistry to the field of Engineering.
- The students are able to apply chemistry to different branches of engineering
- The students are able to acquire the knowledge in the areas of Water Chemistry, Mechanism of Corrosion of Metals and Corrosion Control Methods, Batteries, Fuel Cells, Green Chemistry and Technology and Processes involving Green Chemistry and suggest innovative solutions for existing challenges in these areas.

SYLLABUS

Water Technology
Sources of Water – Impurities and their influence of living systems – WHO Limits – Hardness and its Determination – Boiler Troubles and their removal – Water Softening Methods – Lime-Soda, Zeolite and Ion Exchange - Municipal Water Treatment-Break Point Chlorination – Desalination of Sea Water – Reverse Osmosis Method, Electro-dialysis.

Batteries
Primary batteries: The chemistry - Types: Zinc-carbon (Leclanche type), zinc alkaline (Duracell), zinc/air batteries; Lithium primary cells – liquid cathode, solid cathode and lithium-ferrous sulphide cells. Secondary batteries: Lead acid and VRLA (valve regulated (sealed) lead acid), nickel-cadmium, nickel-zinc, nickel-metal hydride batteries, lithium ion batteries, ultrathin lithium polymer cells. Advanced Batteries for electric vehicles, requirements of the battery – sodium-beta and redox batteries.

Fuel Cells
Fuel Cells: Description, working principle, anodic, cathodic and cell reactions, fabrication of electrodes and other components, applications, advantages, disadvantages and environmental aspects of the following types of fuel cells: Proton Exchange Membrane Fuel Cells, alkaline fuel cells, phosphoric acid, solid oxide, molten carbonate, direct methanol fuel cells-Membranes and Fuels

Corrosion
Corrosion: Origin and Theory – Types of Corrosion: Chemical and Electrochemical; Pitting, Inter granular, Waterline, Stress – Galvanic Series – Factors Effecting Corrosion. Corrosion

Controlling Methods, Protective Coatings, Metallic Coatings, Electroplating and Electroless Plating.

Green Chemistry and Technology

Introduction and significance of green chemistry, Goals of green chemistry, 12 principles of green chemistry, toxicity of chemicals, material safety data sheet (MSDS), concept of zero pollution technologies, atom economy, functional toxicity vs non-functional toxicity, functional group approaches to green chemistry, Elimination of toxic functional group, optimization of frameworks for the design of greener synthetic pathways, Applications of green chemistry - Green solvents, green fuels and propellants, biocatalysis.

Text Books

1. Engineering Chemistry – PC Jain and M. Jain – Dhanpath Rai and Sons, New Delhi.
2. A Text book of Engineering Chemistry – S. S. Dara – S. Chand & Co. New Delhi.
3. Hand Book of Green Chemistry and Technology; by James Clarke and Duncan Macquarrie; Blakwell Publishing.

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CS1103 ENGLISH

Course Objectives

- To make students understand the explicit and implicit meanings of a text/topic;
- To give exposure to new words and phrases, and aid to use them in different contexts;
- To apply relevant writing formats to draft essays, letters, emails and presentations; and
- To adapt oneself to a given situation and develop a functional approach to finding solutions: adaptability and problem solving.

Course Outcomes

- Students will be able to analyse a given text and discover the various aspects related to language and literature;
- Learn the various language structures, parts of speech and figures of speech;
- Develop one's reading and writing abilities for enhanced communication; and
- Learn to apply the topics in real-life situations for creative and critical use.

SYLLABUS

On the conduct of life: William Hazlitt

Life skills: Values and Ethics

If: Rudyard Kipling

The Brook: Alfred Tennyson

Life skills: Self-Improvement

How I Became a Public Speaker: George Bernard Shaw

The Death Trap: Saki

Life skills: Time Management

On saving Time: Seneca

Chindu Yellama

Life skills: Innovation

Muhammad Yunus

Politics and the English Language: George Orwell

Life skills: Motivation

Dancer with a White Parasol: Ranjana Dave

Grammar: Prepositions – Articles – Noun-Pronoun Agreement, Subject-Verb Agreement – Misplaced Modifiers–Clichés, Redundancies.

Vocabulary: Introduction to Word Formation – Root Words from other Languages –Prefixes and Suffixes–Synonyms, Antonyms– Common Abbreviations

Writing: Clauses and Sentences – Punctuation – Principals of Good Writing – Essay Writing – Writing a Summary

Writing: Essay Writing

Life skills: Innovation

Muhammad Yunus

Textbook

1. Language and Life: A Skills Approach Board of Editors, Orient Blackswan Publishers, India.2018.

References

1. Practical English Usage, Michael Swan. OUP. 1995.
2. Remedial English Grammar, F.T. Wood. Macmillan.2007
3. On Writing Well, William Zinsser. Harper Resource Book. 2001
4. Study Writing, Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills, Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
6. Exercises in Spoken English, Parts. I-III. CIEFL, Hyderabad. Oxford University Press.

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CS1104 COMPUTER PROGRAMMING USING C

Course Objectives

- The course is designed to provide complete knowledge of C language.
- To provide students with understanding of code organization and functional hierarchical decomposition with using complex data types.
- To provide knowledge to the students to develop logics which will help them to create programs, applications in C.
- This course aims to identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.
- This course provides the fundamental knowledge which is useful in understanding the other programming languages.

Course Outcomes

- Identify basic elements of C programming structures like data types, expressions, control statements, various simple functions and apply them in problem solving.
- Apply various operations on derived data types like arrays and strings in problem solving.
- Design and implement of modular Programming and memory management using Functions, pointers.
- Apply Structure, Unions and File handling techniques to Design and Solve different engineering programs with minimal complexity.
- Apply Numerical methods to Solve the complex Engineering problems.

SYLLABUS

Introduction to C: Basic structure of C program, Constants, Variables and data types, Operators and Expressions, Arithmetic Precedence and associativity, Type Conversions. Managing Input and Output Operations Formatted Input, Formatted Output.

Decision Making, Branching, Looping: Decision making with if statement, Simple if statement, The if…else statement, Nesting of if…else statement, the else.. if ladder, switch statement, the (?:) operator, the GOTO statement., The while statement, the do statement, The for statement, Jumps in Loops.

Arrays & Strings: One, Two-dimensional Arrays, Character Arrays. Declaration and initialization of Strings, reading and writing of strings, String handling functions, Table of strings.

Functions: Definition of Functions, Return Values and their Types, Function Calls, Function Declaration, Category of Functions: No Arguments and no Return Values, Arguments but no Return Values, Arguments with Return Values, No Argument but Returns a Value, Functions that Return Multiple Values. Nesting of functions, recursion, passing arrays to functions, passing strings to functions, the scope, visibility and lifetime of variables.

Pointers: Accessing the address of a variable, declaring pointer variables, initializing of pointer variables, accessing variables using pointers, chain of pointers, pointer expressions, pointers and arrays, pointers and character strings, array of pointes, pointers as function arguments, functions returning pointers, pointers to functions, pointers to structures-Program Applications.

Structure and Unions: Defining a structure, declaring structure variables, accessing structure members, structure initialization, copying and comparing structure variables, arrays of structures, arrays within structures, structures within structures, structures and functions and unions, size of structures and bit-fields- Program applications.

File handling: Defining and opening a file, closing a file, Input/ Output operations on files, Error handling during I/O operations, random access to files and Command Line Arguments-Program Applications.

Text Books

1. Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India) Private Limited.

Reference Books

1. Let Us C ,Yashwant Kanetkar, BPB Publications, 5th Edition.
2. Computer Science, A structured programming approach using C", B.A.Forouzan and R.F.Gilberg, " 3rd Edition, Thomson, 2007.
3. The C –Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI.
4. Scientific Programming: C-Language, Algorithms and Models in Science, Luciano M. Barone (Author), EnzoMarinari (Author), Giovanni Organtini, World Scientific.

CS1105 IT ESSENTIALS

Course Objectives

- Select the appropriate computer components to build, repair, or upgrade personal computers.
- Explain how to correctly use tools and safely work in a lab.
- Install components to build, repair, or upgrade personal computers.
- Configure computers to communicate on a network
- Configure devices to connect to the Internet and Cloud services
- Explain how to use, configure, and manage laptops and mobile devices

Course Outcomes

- Understands the roles and responsibilities of the IT professional
- Able to Troubleshoot advanced hardware and software problems
- Provides an experience-oriented course that employs industry-relevant instructional approaches to prepare students for entry-level jobs in the industry.

Syllabus

Introduction to the Personal Computer Describe a Computer System, Identify the Names, Purposes, and Characteristics of Cases and Power Supplies, Identify the Names, Purposes, and Characteristics of Internal Components, Identify the Names, Purposes, and Characteristics of Ports and Cables, Identify the Names, Purposes, and Characteristics of Input Devices, Identify the Names, Purposes, and Characteristics of Output Devices, Explain System Resources and Their Purposes.

Safe Lab Procedures and Tool Use Explain the Purpose of Safe Working Conditions and Procedures, Identify Tools and Software Used with Personal Computer Components and Their Purposes, Implement Proper Tool Use.

Computer Assembly Attach the Components to the Motherboard and Install the Motherboard, Install Internal Drives, Install Drives in External Bays, Install Adapter Cards, Connect the Power Cables Reattach the Side Panels to the Case, Boot the Computer for the First Time. **Basics of Preventive Maintenance and Troubleshooting** Explain the Purpose of Preventive Maintenance, Identify the Steps of the Troubleshooting Process.

Fundamental Laptops and Portable Devices Identify Common Preventive Maintenance Techniques for Laptops and Portable Devices, Describe How to Troubleshoot Laptops and Portable Devices.

Fundamental Operating Systems Explain the Purpose of an Operating System, Describe and Compare Operating Systems to Include Purpose, Limitations, and Compatibilities, Determine Operating System Based on Customer Needs, Install an Operating System, Identify and Apply Common Preventive Maintenance Techniques for Operating Systems, Troubleshoot Operating Systems.

Fundamental Networks Explain the Principles of Networking, Describe Types of Networks, Describe Basic Networking Concepts and Technologies, Describe the Physical Components of a Network, Describe LAN Topologies and Architectures.

Fundamental Security: Explain Why Security Is Important, Describe Security Threats, Identify Security Procedures, Identify Common Preventive Maintenance Techniques for Security, Troubleshoot Security.

Text books:

1. IT Essentials: PC Hardware and Software Companion Guide Fourth Edition, Cisco Networking Academy.

References:

1. Network security essentials application and standrads, by William stallings, 4th edition, prentice hall.
2. Mike Meyers' CompTIA A+ Guide to Managing and Troubleshooting PCs, Sixth Edition 6th Edition

CS1106 COMMUNICATION SKILLS LAB

Course Objectives

- To make students recognize the sounds of English through Audio-Visual aids;
- To help students build their confidence and help them to overcome their inhibitions and self- consciousness while speaking in English;
- To familiarize the students with stress and intonation and enable them to speak English effectively; and
- To give learners exposure to and practice in speaking in both formal and informal contexts.

Course Outcomes

- Students will be sensitized towards recognition of English sound patterns and the fluency in their speech will be enhanced;
- A study of the communicative items in the laboratory will help students become successful in the competitive world;
- Students will be able to participate in group activities like roleplays, group discussions and debates; and
- Students will be able to express themselves fluently and accurately in social as well professional context.

SYLLABUS

Introduction to Phonetics: The Sounds of English (Speech sound – vowels and consonants) - Stress and Intonation - Accent and Rhythm.

Listening Skills: Listening for gist and specific information - listening for Note taking, summarizing and for opinions - Listening to the speeches of eminent personalities.

Speaking Skills: Self-introduction - Conversation Skills (Introducing and taking leave) - Giving and asking for information - Role Play - Just A Minute (JAM) session - Telephone etiquette.

Reading and Writing skills: Reading Comprehension – Précis Writing - E-Mail writing - Punctuation.

Presentation skills: Verbal and non-verbal communication - Body Language - Making a Presentation

Reference Books

1. Ashraf Rizvi. Effective Technical Communication. Tata McGraw Hill Education Private Limited, New Delhi.
2. Speak Well. Orient Blackswan Publishers, Hyderabad.
3. Allan Pease. Body Language. Manjul Publishing House, New Delhi.

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CS1107 COMPUTER ENGINEERING WORKSHOP LAB

Course Objectives

- Explain the internal parts of a computer, peripherals, I/O ports, connecting cables
- Demonstrate basic command line interface commands on LINUX
- Teach the usage of Internet for productivity and self-paced lifelong learning
- Describe about Compression, Multimedia and Antivirus tools
- Demonstrate Office Tools such as Word processors, Spreadsheets and Presentation tools

Course Outcomes

- Assemble and disassemble components of a PC
- Construct a fully functional virtual machine, Summarize various LINUX operating system commands.
- Able to Troubleshoot hardware and software problems.

Syllabus

Module I – Hardware Concepts

1. Every student should identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor. Every student should disassemble and assemble the PC back to working condition.

Module II – Software Installations

1. Every student should individually install operating system like LINUX or MS windows on the personal computer. The system should be configured as dual boot with both windows and LINUX.
2. Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition.
3. Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition.
4. Cyber Hygiene: Students should learn about viruses on the internet and install antivirus software. Student should learn to customize the browsers to block pop ups, block active x downloads to avoid viruses and/or worms.
5. Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and popup blockers.

Module III – MS-Office

1. MS Word - Features to be covered: Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date.
2. Creating project abstract Features to be covered: Formatting Styles, inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.
3. Creating a Newsletter: Features to be covered: Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs in word.
4. Spreadsheet Orientation: Accessing, overview of toolbars, saving spreadsheet files, Using help and resources. Creating a Scheduler: Gridlines, Format Cells, Summation, auto fill, Formatting Text.
5. Calculating GPA - Features to be covered: Cell Referencing, Formulae in spreadsheet – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, Sorting, Conditional formatting.
6. Creating Power Point: Student should work on basic power point utilities and tools in Latex and Ms Office/equivalent (FOSS) which help them create basic power point presentation. PPT Orientation, Slide Layouts, Inserting Text, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting Images, Tables and charts.

CS1108 Computer Programming Using C Lab

Course Objectives

- To impart writing skill of C programming to the students and solving problems.
- To write and execute programs in C to solve problems such as Modularize the problems into small modules and then convert them into programs.,
- To write and execute programs in C to solve problems such as arrays, files, strings, structures and different numerical methods.
- This reference has been prepared for the beginners to help them understand the basic to advanced concepts related to Objective-C Programming languages.

Course Outcomes

- Understand various computer components, Installation of software. C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
- Analysing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
- Construct programs that demonstrate effective use of C features including arrays, strings, structures, pointers and files.
- Apply and practice logical ability to solve the real-world problems.
- Apply Numerical methods to Solve the complex Engineering problems.

Syllabus

Practice the following concepts with algorithm, flow chart and implementation.

1. C – Tokens, Data Types - Format Specifiers, I/O Statements.
2. Operators in C, their Precedence and Associativity, Arithmetic Expressions/Instructions, Type casting, Math.h functions.
3. Control Statements (Conditional): If and its Variants, Switch (Break).
4. Goto Statement, Control Statements (Looping): While, Do-While, For Loop, Continue & Break (Unconditional), Nested Loops
5. Arrays, One Dimensional Array: Declaration and Initialization, Accessing Array Elements.
6. Two Dimensional Array: Declaration and Initialization, Accessing Array Elements.
7. Strings: Read & Write, “String.h” Predefined Functions, without predefined functions.

8. Pointers: Declarations, Types, Pointers to Arrays, Pointers to Character Strings, Pointers to Pointers, Array of Pointers
9. Structures: Nested Structures, Pointers to Structures, Unions.
10. Functions: Function Declaration, Classification (Arguments and Return Type), Storage Classes.
11. Parameter Passing Techniques, Passing Parameters Types, Recursion
12. Files: Opening, Closing of Files, Reading and Writing of Files.
13. Binary Files, Random Accessing of Files, Enum, Typedef, Pre-processor Commands.
14. Numerical methods: Bisection method, Newton Raphson method, Lagrange's interpolation, Simpson's rule for numerical integration.

References:

1. Programming in ANSI C, E Balagurusamy, 6th Edition. McGraw Hill Education (India) Private Limited.
2. Introduction to Numerical Methods, SS Sastry, Prentice Hall

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CS1205	ES	Digital Logic Design	4	0	30	70	100	3
CS1206	ES	LINUX Administration Lab	0	3	50	50	100	1.5
CS1207	BS	Engineering Physics Lab	0	3	50	50	100	1.5
CS1208	ES	Data Structures Lab	0	3	50	50	100	1.5
Total Credits								**19.5**

CS1201 ENGINEERING MATHEMATICS – II

Course Objectives

- The way of obtaining rank, eigen values and eigen vectors of a matrix.
- To know the importance of Cayley-Hamilton theorem and getting canonical form from a given quadratic form.
- To solve the system of equations by using direct and indirect methods.
- To solve first order and higher order differential equations by various methods.
- To obtain the Laplace transforms and inverse Laplace transforms for a given functions and their applications.

Course Outcomes

- Find rank, eigen values and eigen vectors of a matrix and understand the importance of Cayley- Hamilton theorem.
- Reduce quadratic form to canonical forms and solving linear systems by direct and indirect methods.
- Demonstrate solutions to first order differential equations by various methods and solve basic applications problems related to electrical circuits, orthogonal trajectories and Newton's law of cooling
- Discriminate among the structure and procedure of solving higher order differential equations with constant and variable coefficients.
- Understand Laplace transforms and its properties and finding the solution of ordinary differential equations.

SYLLABUS

Linear Algebra: Rank of a matrix- Echelon form, Normal Form - Solution of Linear System of Equations - Consistency of Linear System of Equations - Direct & Indirect Methods: Gauss elimination method, LU Factorization method, Gauss Seidal Method. Complex Matrices: Hermitian, Skew-Hermitian and Unitary Matrices and their Properties.

Eigen Values and Eigen Vectors: Eigen Values and Eigen Vectors of a Matrix - Cayley-Hamilton theorem - Inverse and Powers of a Matrix using Cayley-Hamilton's theorem and its applications. Diagonalization of a Matrix - Quadratic Forms - Reduction of Quadratic Form to Canonical Form - Nature of a Quadratic Form.

Ordinary Differential Equations of First Order and its Applications: Formation of ordinary differential equations (ODEs) - Solution of an ordinary differential equation - Equations of the first order and first degree - Linear differential equation - Bernoulli's equation - Exact differential equations - Equations reducible to exact equations - Orthogonal Trajectories - Simple Electric (LR & CR) Circuits - Newton's Law of Cooling - Law of Natural growth and decay.

Differential Equations of Higher Order: Solutions of Linear Ordinary Differential Equations with Constant Coefficients - Rules for finding the complimentary function - Rules for finding the particular integral - Method of variation of parameters - Cauchy's linear equation - Legendre's linear equation - Simultaneous linear differential equations.

Laplace Transforms: Introduction - Existence Conditions - Transforms of Elementary Functions - Properties of Laplace Transforms - Transforms of Derivatives - Transforms of Integrals - Multiplication by tn - Division by t – Evaluation of integrals by Laplace Transforms - Inverse Laplace Transform - Applications of Laplace Transforms to Ordinary Differential Equations - Simultaneous Linear Differential Equations with Constant Coefficients - Second Shifting Theorem - Laplace Transforms of Unit Step Function, Unit Impulse Function and Laplace Transforms of Periodic Functions.

Text Book

1. Scope and Treatment as in "Higher Engineering Mathematics", by Dr. B.S. Grewal, 43rd edition, Khanna publishers.

Reference Books

1. Graduate Engineering Mathematics by V B Kumar Vatti., I.K. International publishing house Pvt. Ltd.
2. Advanced Engineering Mathematics by Erwin Kreyszig.
3. A text book of Engineering Mathematics, by N.P. Bali and Dr. Manish Goyal. Lakshmi Publications.
4. Advanced Engineering Mathematics by H.K. Dass. S. Chand Company.
5. Higher Engineering Mathematics by B.V. Ramana, Tata Mc Graw Hill Company.

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CS1202 ENGINERING PHYSICS

Course Objectives

- To impart knowledge in basic concept of physics of Thermodynamics relevant to engineering applications.
- To grasp the concepts of physics for electromagnetism and its application to engineering. Learn production of Ultrasonics and their applications in engineering.
- To Develop understanding of interference, diffraction and polarization: connect it to a few engineering applications.
- To Learn basics of lasers and optical fibres and their use in some applications.
- To Understand concepts and principles in quantum mechanics and Nanophase Materials. Relate them to some applications.

Course Outcomes

- Understand the fundamentals of Thermodynamics and Laws of thermodynamics. Understand the working of Carnot cycle and concept of entropy.
- Gain Knowledge on the basic concepts of electric and magnetic fields. Understand the concept of the nature of magnetic materials. Gain knowledge on electromagnetic induction and its applications.
- Understand the Theory of Superposition of waves. Understand the formation of Newton's rings and the working of Michelson's interferometer. Remember the basics of diffraction, Evaluate the path difference. Analysis of Fraunhofer Diffraction due to a single slit
- Understand the interaction of matter with radiation, Characteristics of Lasers, Principle, working schemes of Laser and Principle of Optical Fibre. Realize their role in optical fibre communication.
- Understand the intuitive ideas of the Quantum physics and understand dual nature of matter. Compute Eigen values, Eigen functions, momentum of Atomic and subatomic particles using Time independent one-Dimensional Schrodinger's wave equation. Understand the fundamentals and synthesis processes of Nanophase materials.

SYLLABUS

Thermodynamics: Introduction, Heat and Work, First law of thermodynamics and applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Second law of

thermodynamics, Carnot's Theorem, Entropy, Second law in terms of entropy, Entropy and disorder, Third law of thermodynamics (statement only).

Electromagnetism: Concept of electric flux, Gauss's law - some applications, Magnetic field - Magnetic force on current, torque on current loop, The Biot-Savart's Law, B near a long wire, B for a circular Current loop, Ampere's law, B for a solenoid, Hall effect, Faraday's law of induction, Lenz's law, Induced magnetic fields, Displacement current, Maxwell's equations (no derivation), Magnetic materials: Classification of magnetic materials and properties.

Ultrasonics: Introduction, Production of Ultrasonics – Piezoelectric and Magnetostriction methods, acoustic grating, applications of ultrasonics.

Optics-

Interference: Principles of superposition – Young's Experiment – Coherence - Interference in thin films (reflected light), Newton's Rings, Michelson Interferometer and its applications.

Diffraction: Introduction, Differences between interference and diffraction, Fresnel and Fraunhofer diffraction, Fraunhofer diffraction at a single slit (Qualitative and quantitative treatment).

Polarisation: Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization.

Lasers And Fibre Optics: Introduction, characteristics of a laser beam, spontaneous and stimulated emission of radiation, population inversion, Ruby laser, He-Ne laser, Semiconductor laser, applications of lasers Introduction to optical fibres, principle of propagation of light in optical fibres, Acceptance Angle and cone of a fibre, Numerical aperture, Modes of propagations, classification of fibres, Fibre optics in communications, Application of optical fibres.

Modern Physics-

Introduction, De Broglie concept of matter waves, Heisenberg uncertainty principle, Schrodinger time independent wave equation, application to a particle in a box. Free electron theory of metals, Kronig - Penney model (qualitative treatment), Origin of energy band formation in solids, Classification of materials into conductors, semi-conductors and insulators.

Nanophase Materials: Introduction, properties, Top-down and bottom-up approaches, Synthesis - Ball milling, Chemical vapour deposition method, sol-gel methods, Applications of nano materials.

Text Books

1. Physics by David Halliday and Robert Resnick – Part I and Part II - Wiley.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Engineering Physics by R.K. Gaurand S.L. Gupta–Dhanpat Rai

Reference Books

1. Modern Engineering Physics by A.S. Vadudeva
2. University Physics by Young and Freedman

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CS1203 ELEMENTS OF ELECTRONICS ENGINEERING

Course Objectives

- Introduce students to basics of semiconductors, their classification and properties
- To provide theory of PN junction diode, its characteristics and applications
- To introduce basics of rectifying circuits and bipolar junction transistor
- To provide basics of transistor biasing, transistor amplifiers and field effect transistors

Course Outcomes

By the end of the course, the student should be able to:

- Explain the basics of semiconductors and their classification
- Understand the theory of PN junction diode, rectifying circuits and bipolar junction transistor
- Explain the concepts of transistor biasing, transistor amplifiers and field effect transistors

SYLLABUS

Introduction to Electronics and Semiconductors: Energy band theory, Conduction in Insulators, Semiconductors and metals, Electron emission from metals, Classification of semiconductors, Carrier concentration in an intrinsic semiconductor, Properties of intrinsic semiconductor, Drift and diffusion currents.

Semi-Conductor Diode: Theory of PN junction diode, Open circuited PN junction, V-I characteristics of a PN diode, Diode current equation, Transition and diffusion capacitances, Break down in PN diode, Applications of PN diodes. Zener diode, Zener regulator, Tunnel diode, Schottky diode.

Rectifying circuits: Half wave and full wave rectifiers, Bridge rectifiers, Efficiency, Ripple and regulation of each rectifier, Capacitor filters.

Bipolar Junction Transistor: Introduction, construction, Operation of PNP and NPN Transistors – Transistor Circuit configurations- Characteristics of a CE configurations – h parameters, low frequency small signal equivalent circuit of a Transistor.

Transistor Biasing and thermal stabilization: Transistor Biasing, Stabilization, Different methods of transistor biasing – Fixed bias, Collector feedback bias – self bias – Bias compensation.

Transistor Amplifiers: CE, CB, CC amplifier configurations –Multistage amplifier – A Two Stage RC coupled amplifier – frequency response curve and bandwidth.

Field Effect Transistors: Junction Field Effect Transistors (JFET) – JFET characteristics, JFET Parameters, Small signal equivalent circuit – MOSFETS – Depletion and Enhancement MOSFETS.

Text Books:

1. Electronic Device and Circuits by Sanjeev Guptha.

Reference Books:

1. Electronic Device and Circuits Theory by Robert L. Boylested Electronic Device and Circuits by David. A. Bell

CS1204 DATA STRUCTURES USING C

Course objectives

- Assess how the choice of data structures and algorithm design methods impacts the performance of programs.
- Choose the appropriate data structure and algorithm design method for a specified application.
- Solve problems using data structures such as linear lists, stacks, queues, binary trees, heaps binary search trees, and graphs and writing programs for these solutions.

Course outcomes

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithm.
- Demonstrate different methods for traversing trees.
- Compare alternative implementations of data structures with respect to performance.
- Discuss the computational efficiency of the principal algorithms for sorting and searching

SYLLABUS

Introduction to Data Structures: Review of C Programming, Recursive Definition and Processes, Recursion in C, Simulation of Recursion, Efficiency of Recursion, Abstract Data Types, Meaning and Definition of Data Structures, Arrays.

Stacks: Stack as an Abstract Data Type, Primitive Operations, Implementing Stack Operations using Arrays, Infix, Postfix and Prefix: Definitions, Evaluation and Conversions.

Queues: Queue as an Abstract Data Type, Sequential Representation, Types of Queues, Operations, Implementation using Arrays.

Linked List: Operations, Implementation of Stacks, Queues and priority Queues using Linked Lists+, Circular Lists: Insertion, Deletion and Concatenation Operations, Stacks and Queues as Circular Lists, Doubly Linked Lists.

Trees: Binary Trees - Definitions and Operations, Binary Tree Representation: Node Representation, Implicit array Representation, Binary Tree Traversal, Threaded Binary Trees and their Traversal, Trees and their Applications; Tree Searching: Insertion and Deletion of a node from a Binary Search Tree, Efficiency of Binary Search Tree operations.

Searching: Basic Searching Techniques: Dictionary as an Abstract Data Type, Algorithmic Notation, Sequential Searching and its Efficiency, Binary Search, Interpolation Search.

Sorting: General Background: Efficiency, Asymptotic Notations, Efficiency of Sorting, Bubble Sort and Quick Sort and their Efficiency, Selection Sorting, Binary Tree Sort, Heap Sort, Insertion Sorts, Shell Sort, Address calculation Sort, Merge and Radix Sorts.

Graphs and Their Application: Definition of Graphs, Representation of Graphs, Transitive closure, Linked Representation of Graphs, Topological Ordering of nodes, Graph Traversal and Spanning Forests, Undirected Graphs and their Traversals, Applications of Graphs, Minimal Spanning Trees.

Textbooks

1. Data Structures Using C and C++ Yddish Langsam, Moshe J. Augenstein and Aaron M.Tanenbaum, Prentice Hall Of India (2nd Edition)
2. Data Structures, Algorithms and Applications with C++, Sahani Mc-Graw Hill.

CS1205 DIGITAL LOGIC DESIGN

Course objectives

- To introduce the basic principles for design of combinational circuit and sequential circuits.
- To learn simple digital circuits in preparation for computer engineering.

Course Outcomes

A student who successfully fulfils the course requirements will have demonstrated:

- An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
- An ability to understand the different Boolean algebra theorems and apply them for logic functions.
- An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
- An ability to define the following combinational circuits: multiplexer, de-multiplexers encoders/decoders, comparators, arithmetic-logic units; and to be able to build simple circuits.
- An ability to understand asynchronous and synchronous sequential circuits, like counters and shift registers.
- An ability to understand memories like RAM and ROM, Programmable Logic Array and Programmable Array Logic.

SYLLABUS

Binary Systems: Digital Systems. Binary Numbers. Number Base Conversions. Octal and Hexadecimal Numbers. Complements. Signed Binary Numbers. Binary Codes. Binary Storage and Registers. Binary Logic

Boolean Algebra and Logic Gates: Basic Definitions. Axiomatic Definition of Boolean Algebra. Basic Theorems and Properties of Boolean Algebra. Boolean Functions. Canonical and Standard Forms. Other Logic Operations. Digital Logic Gates. Integrated Circuits.

Combinational Logic Design, Gate-Level Minimization: The Map Method. Four Variable Map. Five-Variable Map. Product of Sums Simplification. Don't-Care Conditions. NAND and

NOR Implementation. Other Two- Level Implementations. Exclusive-OR Function. Hardware Description Language (HDL).

Combinational Logic: Combinational Circuits. Analysis Procedure. Design Procedure. Binary Adder Subtractor. Decimal Adder. Binary Multiplier. Magnitude Comparator. Decoders. Encoders. Multiplexers. HDL For Combinational Circuits.

Sequential Logic Design, Synchronous Sequential Logic: Sequential Circuits. Latches Flipflops. Analysis of Clocked Sequential Circuits. HDL For Sequential Circuits. State Reduction and Assignment. Design Procedure.

Registers ad Counters: Registers. Shift Registers. Ripple Counters. Synchronous Counters. Other Counters. HDL for Registers and Counters.

Memory and Programmable Logic: Introduction. Random-Access Memory. Memory Decoding, Error Detection and Correction. Read-Only Memory. Programmable Logic Array. Programmable Array Logic. Sequential Programmable Devices.

Text Book

1. DigitalDesign,3rdEdition, M. Morris Mano, Pearson Education.

Reference Books

1. Digital Logic Design Principles, Norman Balabanian & Bradley Carlson, John Wiley &Sons (Asia) Pvt.Ltd.,2002
2. Fundamentals of Digital Logic with VHDL Design, Stephen Brown and ZvonkoVranesic, TataMcGraw-HillEdition,2002.

CS1206 LINUX ADMINISTRATION LAB

Course Objectives

- To understand LINUX operating system and its internals.
- To understand LINUX file system structure and its operations.
- To understand LINUX shell environment and its programming.
- To understand communication in LINUX and the corresponding primitives.

Course Outcomes

- The student learns about LINUX features for multiuser, multitasking capabilities.
- The student learns about file system organization, file and directory manipulation, setting file permissions, and disk free space administration.
- The student learns about writing shell scripts for different applications.
- The student learns about how users communicate with each other in LINUX environment.

SYLLABUS

1) Study and practice on file system / handling files with commands, syntax, usage, application.
2) Practice on vi editor.
3) Study and practice on redirection operators with relevant commands, syntax, usage, application.
4) Study and practice on filters with relevant commands, syntax, usage, application.
5) Study and practice on Backup with relevant commands, syntax, usage, application.
6) Study and practice on internet related commands, syntax, usage, application.
7) Study and practice on shells/shell programming with relevant programming constructs, syntax, usage, application.
8) Study and practice on awk with relevant commands, syntax, usage, application.
9) Study and practice on regular expressions and the grep family with relevant commands, syntax, usage, application.
10) Study and practice on compilation process of C programs under UNIX.

References:

1. Unix concepts and applications by Sumitabha Das, TMH Publications.
2. Shell programming by Yashwanth Kanetkar.

CS1207 ENGINNERING PHYSICS LAB

Course Objectives

- To enable the students to acquire skill, technique and utilization of the Instruments
- Draw the relevance between the theoretical knowledge and to imply it in a practical manner with respect to analyse various electronic circuits and its components.
- To impart the practical knowledge in basic concepts of Wave optics, Lasers and fibre optics.
- To familiarize the handling of basic physical apparatus like Vernier callipers, screw gauge, spectrometers, travelling microscope, laser device, optical fibre, etc.

Course Outcomes

- Ability to design and conduct experiments as well as to analyse and interpret
- Ability to apply experimental skills to determine the physical quantities related to Heat, Electromagnetism and Optics
- The student will learn to draw the relevance between theoretical knowledge and the means to imply it in a practical manner by performing various relative experiments.

SYLLABUS

1. Determination of Radius of Curvature of a given Convex Lens By forming Newton's Rings.
2. Determination of Wavelength of Spectral Lines in the Mercury Spectrum by Normal Incidence method.
3. Study the Intensity Variation of the Magnetic Field along axis of Current Carrying Circular Coil.
4. Determination of Cauchy's Constants of a Given Material of the Prism using Spectrometer.
5. Determination of Refractive Index of Ordinary ray □o and Extraordinary □e ray.
6. Determination of Thickness Given Paper Strip by Wedge Method.
7. Calibration of Low Range Voltmeter.
8. Calibration of Low Range Ammeter.
9. Determination of Magnetic Moment and Horizontal Component of Earth's Magnetic Field.

10. Lees Method - Coefficient of thermal Conductivity of a Bad Conductor.

11. Carey Foster's Bridge – Verification of laws of Resistance and Determination of Specific Resistance.

12. Melde's Apparatus – Frequency of electrically maintained Tuning Fork.

13. Photoelectric cell-Characteristics.

14. Planks Constants.

15. Laser- Diffraction.

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CS1208 DATA STRUCTURES LAB

Course Objectives

- To implement stacks and queues using arrays and linked lists.
- To develop programs for searching and sorting algorithms.
- To write programs using concepts of various trees.
- To implement programs using graphs.

Course Outcomes

- Student will be able to write programs to implement stacks and queues.
- Ability to implement various searching and sorting techniques.
- Ability to implement programs using trees and graphs.

SYLLABUS

List of Programs:

1. Write a C program for sorting a list using Bubble sort and then apply binary search.
2. Write a C program for implementing the operations of a queue.
3. Write a C program to implement the operations on priority queues.
4. Write a C to implement the operations on circular queues.
5. Write a C program to implement the operations on stacks.
6. Write a C program for evaluating a given postfix expression using stack.
7. Write a C program for converting a given infix expression to postfix form using stack.
8. Write a C program to implement the operations on single linked list.
9. Write a C program for demonstrate operations on double linked list.
10. Write a C program for the representation of polynomials using circular linked list and for the addition of two such polynomials
11. Write a C program to create a binary search tree and for implementing the in order, Pre order, post order traversal using recursion
12. a) Write a C program for finding the transitive closure of a digraph
    b) Write a C program for finding the shortest path from a given source to any vertex in a digraph using Dijkstra's algorithm.
13. a) Write a C program for finding the Depth First Search of a graph.
    b) Write a C program for finding the Breadth First Search of a graph

References:

1. Data Structures Using C and C++ Yddish Langsam, Moshe J. Augenstein and Aaron M.Tanenbaum, Prentice Hall Of India (2nd Edition)

2. Data Structures, Algorithms and Applications with C++, Sahani Mc-Graw Hill.

B.Tech & B.Tech + M.Tech
(Computer Science & Engineering)
II Year - I Semester

Course code	Category	Course Title	Hours per week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
CS2101	ES	Discrete Mathematical Structures	4	0	30	70	100	3
CS2102	PC	Computer Organization and Architecture	4	0	30	70	100	3
CS2103	BS	Probability, Statistics and Queuing theory	4	0	30	70	100	3
CS2104	PC	Operating Systems	4	0	30	70	100	3
CS2105	PC	Object Oriented Programming Through Java	4	0	30	70	100	3
CS2106	PC	Computer Organization & Architecture Lab	0	3	30	70	100	1.5
CS2107	PC	Object Oriented Programming Through Java Lab	0	3	50	50	100	1.5
CS2108	PC	Operating Systems Lab	0	3	50	50	100	1.5
CS2109	SC	Intellectual Property Rights (Internal)	1	2	100	0	100	2
CS2110	MC	Environmental Science	0	0	-	100	100	0
Total credits								**21.5**

CS2101 DISCRETE MATHEMATICAL STRUCTURES

Course Objectives

- To understand mathematical arguments using logical connectives and quantifiers and verify the validity of logical flow of arguments using propositional, predicate logic and truth tables.
- To understand about permutations and combinations.
- To understand various types of relations and discuss various properties of the relations.
- To study the graphs, graph isomorphism and spanning trees.
- To study about Boolean algebra and Finite State Machines.

Course Outcomes

At the end of the course student will be able to

- Rewrite mathematical arguments using logical connectives and quantifiers and verify the validity of logical flow of arguments using propositional, predicate logic.
- Identify and give examples of various types of relations and describe various properties of the relations.
- Ability to solve problems using permutations and combinations.
- Determine isomorphism of graphs and spanning tree of a given graph using BFS/DFS algorithms. Also determine minimal spanning tree of a given graph.

SYLLABUS

The Foundations-Logic and Proofs: Propositional Logic, Propositional Equivalences, Predicates and Quantifiers, Nested Quantifiers Rules of Inference, Introduction to Proofs, Proof Methods and Strategy, Basic Structures-Sets, Functions, Sequences and Sums: Sets, Set Operations, Functions, Sequences and Summations.

The Fundamentals-Algorithms, the Integers and Matrices: Algorithms, The Growth of Functions, Complexity of Algorithms, The Integers and Division, Primes and Greatest Common Devisors, Integers and Algorithms, Applications of Number Theory, Matrices.

Induction and Recursion: Mathematical Induction, Strong Induction and Well-Ordering, Recursive Definitions and Structural Induction, Recursive Algorithms, Program Correctness.

Counting: The Basics of Counting, The Pigeonhole Principle, Permutations and Combinations, Binomial Coefficients, Generalized Permutations and Combinations, Generating Permutations and Combinations.

Advanced Counting Techniques: Recurrence Relations, Solving Linear Recurrence Relations, Divide-and-Conquer Algorithms and Recursion Relations, Generating Functions, Inclusion-Exclusion, and Applications of Inclusion-Exclusion.

Relations: Relations and their properties, n-ary relations, applications, Representation, closure, equivalence relations, Partial orderings.

Graphs: Graphs and Graph Models, Graph Terminology and Special Types of Graphs, Representing Graphs and Graph Isomorphism, Connectivity, Euler and Hamilton Paths, Shortest-Path Problems, Planar Graphs, Graph Colouring.

Trees: Introduction to Trees, Applications of Trees, Tree Traversal, Spanning Trees, Minimum Spanning Trees,

Boolean Algebra: Boolean Functions, Representing Boolean Functions, Logic Gates, Minimization of Circuits

Modelling Computation: Languages and Grammars, Finite-State Machines with Output, Finite-State Machines with No Output, Language Recognition, Turing Machines.

Text Book

1. Discrete Mathematics & Its Applications with Combinatorics and Graph Theory by Kenneth H Rosen, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

Reference Books

1. Discrete Mathematics for Computer Scientists & Mathematicians by Joe L. Mott, Abraham Kandel, Theodore P. Baker, Prentice-Hall, India.
2. Discrete Mathematics by Richard Johnson Baug, Pearson Education, New Delhi.
3. Discrete and Combinatorial Mathematics by Ralph. G. Grimaldi, Pearson Education, New Delhi.

CS2102 COMPUTER ORGANIZATION AND ARCHITECTURE

Course Objectives

- To study about structure and functional components of a computer.
- Understanding the hierarchical organization of a computer system which consists of instruction set of commands.
- Learn about the architecture of a computer from a programming view.
- To design a balance system that minimizes performance and utilization of all elements.

Course Outcomes

By the end of the course, the student should be able to:

- Demonstrate knowledge about major components of a computer such as processor, memory and I/O modules along with their interconnections internally with outside world.
- have detailed idea about architecture of central processing unit, functions of control unit, memory, I/O devices and their issues.
- Understand simple and multiple processor organization and their issues.

SYLLABUS

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, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input- Output and Interrupt, Complete Computer Description, Design of Basic Computer, Design of Accumulator Logic.

Micro programmed Control: Control Memory, Address Sequencing, Micro program Example, Design of Control Unit.

Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control,

Reduced Instruction Set Computer (RISC), Architecture and Programming of 8085 Microprocessor

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISK Pipeline, Vector Processing, Array Processors.

Input/output Organization: Peripheral Devices, I/O interface, Asynchronous data transfer, Modes of transfer, priority Interrupt, Direct memory access, Input-Output Processor (IOP), Serial Communication.

Memory Organization: Memory Hierarchy, Main memory, Auxiliary memory, Associate Memory, Cache Memory, and Virtual memory, Memory Management Hardware.

Text Books

1. Computer System Architecture, M. Morris Mano, Prentice Hall of India Pvt. Ltd., Third Edition, Sept.2008.
2. Computer Architecture and Organization, P.Chakraborty.
3. Microprocessor Architecture, Programming and Applications with the 8085by Ramesh S Gaonkar

Reference Books

1. Computer Architecture and Organization, William Stallings, PHI Pvt. Ltd., Eastern Economy Edition, Sixth Edition, 2003.
2. Computer Organization and Architecture, Linda Null, Julia Lobur, Narosa Publications ISBN81- 7319-609-5
3. Computer System Architecture", John. P.Hayes.

CS2103 PROBABILITY, STATISTICS AND QUEUING THEORY

Course objectives

- To provide foundations of probabilistic and statistical analysis
- To provide an understanding on concepts of probability, random variables, probability distributions, sampling, estimation, hypothesis testing, regression, correlation, multiple regression, hypothesis testing, sample test, queuing methods
- To explore applications of probabilistic and statistical tools to solve real world problems.

Course outcomes

After completion of the course the student should be able to:

- Define and explain basic concepts in probability theory and how to translate real-world problems into probability models
- Solve standard problems that include random variables, discrete and continuous probability distributions
- Perform Test of Hypothesis and construct a confidence interval to estimate population parameters
- Compute and interpret the results of Correlation Analysis, Multivariate Regression, Chi-Square test for Independence and Goodness of Fit
- Explain basic concepts in Markov processes, M/M/1 and M/M/C queueing systems.

SYLLABUS

Probability: Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Bayes Theorem of Probability and Geometric Probability.

Random variables and their properties: Discrete Random Variable, Continuous Random Variable, Probability Distribution, Joint Probability Distributions their Properties, Transformation Variables, Mathematical Expectations, Probability Generating Functions.

Probability Distributions: Discrete Distributions: Binomial, Poisson Negative Binominal Distributions and Their Properties; **Continuous Distributions:** Uniform, Normal, Exponential Distributions And Their Properties.

Multivariate Analysis: Correlation, Correlation Coefficient, Rank Correlation, Regression Analysis, Multiple Regression, Attributes, Coefficient Of Association, Chi Square Test For Goodness Of Fit, Test For Independence.

Estimation: Sample, Populations, Statistic, Parameter, Sampling Distribution, Standard Error, Un- biasedness, Efficiency, Maximum Likelihood Estimator, Notion & Interval Estimation.

Testing of Hypothesis: Formulation of Null hypothesis, critic al region, level of significance, power of the test;

Sample Tests: Small Sample Tests: Testing equality of means, testing equality of variances, test of correlation coefficient, test for Regression Coefficient; Large Sample tests: Tests based on normal distribution

Queuing Theory: Queue description, characteristics of a queuing model, study state solutions of M/M/1: Model, M/M/1; N Model, M/M/C: Model, M/M/C: N Model, Case studies.

Text Books

1. Probability & Statistics for Engineers and Scientists, Walpole, Myers, Myers, Ye. Pearson Education.
2. Probability, Statistics and Random Processes T.Veerarajan Tata McGraw – Hill

Reference Book

1. Probability & Statistics with Reliability, Queuing and Computer Applications, Kishor S. Trivedi, Prentice Hall of India ,1999

CS2104 OPERATING SYSTEMS

Course objectives:

- To understand evolution of Operating System.
- To understand operating system as a layer of abstraction above physical hardware that facilitates usage convenience and efficient resource management of computer system resources.
- To learn design and implementation of policies and mechanisms for OS subsystem.
- To investigate case studies to understand the design philosophies / paradigm for popular multiuser or single user operating system.

Course Outcomes:

- The student understands OS evolution, its structure and services provided by it.
- Learn process life cycle, process scheduling objectives, policies and mechanisms, process synchronization, inter process communication, deadlocks and other process subsystem related concepts.
- Learn memory hierarchy, allocation and deallocation policies and mechanism for main and auxiliary memory, file system design and implementation issues.
- investigate UNIX/ LINUX and Windows OS platforms w.r.t similarities and differences in design philosophies.

SYLLABUS

Introduction to Operating Systems: Over View of Operating Systems, Types of Operating Systems, Operating System Structures, Operating System Services, System Calls, Virtual Machines, Operating System Design and Implementation.

Process Management: Process Concepts, Operations on Processes, Cooperating Processes, Threads, Inter Process Communication, Process Scheduling, Scheduling Algorithms, Multiple-Processor Scheduling, Thread Scheduling.

Process Synchronization: The Critical Section Problem, Peterson's Solution, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors.

Deadlocks: System Model, Deadlock Characterization, Methods For Handling Deadlocks, Deadlock Prevention, Avoidance, Deadlock Detection, Recovery from Deadlocks.

Memory Management: Logical versus Physical Address, Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, Virtual Memory, Demand Paging, Page Replacement, Allocation of Frames, Thrashing, Memory-Mapped files.

File Systems, Implementation, and Secondary-storage Structure: Concept of a file, Access Methods, Directory Structure, Protection, File System Structure, Allocation Methods, Free Space Management, Directory Management, Device Drivers, overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, swap-space management.

Case study: Overview of LINUX, Windows Operating systems.

Text Book:

1. Operating Systems, Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, John Wiley Publ., Seventh Edition.
2. Operating Systems; A Practical Approach. Rajiv Chopra.

Reference Books:

1. Modern Operating Systems, Andrew S. Tanenbaum, ,2nd edition, 1995, PHI.
2. Operating Systems, William Stallings 5th Edition -PHI
3. Operating Systems: A Design-Oriented Approach', Charles Crowley, 'Tata Hill Co.,1998 edition.

CS2105 OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives:

- This subject will help to improve the analytical skills of object-oriented programming
- Overall development of problem solving and critical analysis
- Formal introduction to Java programming language

Course Outcome:

On successful completion of this course, the student should be able to:

- Show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard
- Understand the basic principles of the object-oriented programming
- Demonstrate an introductory understanding of graphical user interfaces, multi- threaded programming, and event-driven programming.

SYLLABUS

Introduction to Java: Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java.

Objects and Classes: Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, StringBuffer, File, this reference

Inheritance and Polymorphism: Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.

Event and GUI programming: Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing

I/O programming: Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files.

Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try-catch-finally, Collections in java, Introduction to JavaBeans and Network Programming.

Java Database Connectivity (JDBC): JDBC Product, Types of Drivers, Two-Tier Client/Server Model, Three-Tier Client/Server Model, Basic Steps of JDBC, Creating and Executing SQL Statement, The Result Set Object, Working with Database MetaData Interface

Reference Books:

1 Introduction to Java Programming (Comprehensive Version), Daniel Liang, Seventh Edition, Pearson.

2 Programming in Java, Sachin Malhotra & Saurabh Chaudhary, Oxford University Press.

3 Murach's Beginning Java 2, Doug Lowe, Joel Murach and Andrea Steelman, SPD.

4 Core Java Volume-I Fundamentals, Eight Edition, Horstmann & Cornell, Pearson Education.

5 The Complete Reference, Java 2 (Fourth Edition), Herbert Schild, TMH.

6 Java Programming, D. S. Malik, Cengage Learning.

CS2106 COMPUTER ORGANIZATION & ARCHITECTURE LAB

SCourse Objectives

- to design and analyse the operational behaviour of IC gates, multiplexers, decoders, flip-flops, counters, shift registers, binary adders and subtractors and ALU.
- to implement assembly language programming using various trainers.
- to make students familiar with Pentium class PC architecture.

Course Outcomes

After completion of the course the student should be able to:

- analyse the operational behaviour of various digital logic units such as multiplexers, decoders, flip-flops, counters, shift registers, binary adders and subtractors and ALU.
- write assembly language code using various trainers.
- understand Pentium class PC architecture.

SYLLABUS

I - Cycle: Digital Logic Design Experiments

TTL Characteristics and TTL IC Gates

Multiplexers & Decoders

Flip-Flops

Counters

Shift Registers

Binary Adders & Subtractors

A L U

II - CYCLE: 8085 Assembly Language Programming

8085 Assembly Language Programming according to theory course microprocessors-I using the following trainers:

Keyboard Monitor of 8085µP Trainer

Serial Monitor of 8085µP Trainer with Terminal

8085 Line Assembler of 8085μP Trainer with PC as Terminal

8085 Cross Assembler using In-Circuit Emulator (ICE) with 8085μP Trainer and PC as Terminal

Graded Problems are to be used according to the syllabus of computer organization Pentium class pc architecture familiarization hardware & software parts demonstration

Reference Books

1. Computer System Architecture, M. Morris Mano, Prentice Hall of India Pvt. Ltd., Third Edition, Sept.2008
2. Microprocessor Architecture, Programming and Applications with the 8085 by Ramesh S
   Gaonkar.

CS2107 OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Objectives:

- To develop programs using basic OOPS concepts such as classes and objects.
- To implement programs using Inheritance concepts.
- To implement programs using Exception handling.
- To develop programs using operator overloading concepts.

Course Outcomes:

- Student will be able to use OOPs concepts.
- Ability to apply Inheritance concepts to several problems.
- Ability to use Exception Handling concepts.

List of Programs:

1. Program to define a structure of a basic JAVA program
2. Program to define the data types, variable, operators, arrays and control structures.
3. Program to define class and constructors. Demonstrate constructors.
4. Program to define class, methods and objects. Demonstrate method overloading.
5. Program to define inheritance and show method overriding.
6. Program to demonstrate Packages.
7. Program to demonstrate Exception Handling.
8. Program to demonstrate Multithreading.
9. Program to demonstrate I/O operations.
10. Program to demonstrate Network Programming.
11. Program to demonstrate Applet structure and event handling.
12. Program to demonstrate Layout managers.

CS2108 OPERATING SYSTEMS LAB

Course Objectives:

- To learn about UNIX/LINUX operating system environment.
- To learn about system calls for UNIX/LINUX Operating System.
- To understand resource management policies and mechanisms and their performance evaluation.

Course Outcomes:

- The student learns about multiprogramming, and multitasking capabilities of UNIX/LINUX.
- The student develops skill in writing C programs using system calls for process management, inter process communication and other aspects.
- The student learns to simulate OS resource management aspects like process scheduling, page replacement, disk scheduling, free space management and others to evaluate performance.

Syllabus

Module I

1. OS lab familiarization, Home Assignment on Unix commands, Vi editor
2. Simple shell programming exercises
3. Shell programming using decision making constructs, loop constructs, file and directory manipulation
4. Simple C programs using command line arguments, system calls, library function calls, make utility
5. C programs using system call to create processes and study parent, child process mechanism
6. C programs to create process chaining, spawning
7. C programs to error handling using errno(), perror() function
8. C programs to use pipe system call for inter process communication

Module II

1. C programs to study process scheduling implementing FCFS, Shortest Job First, and Round Robin algorithms
2. C programs to study page replacement implementing FIFO, Optimal, and LRU page replacement algorithms
3. C programs to study deadlock avoidance and detection
4. C Programs to simulate free space management (first fit, best fit, worst fit).
5. C programs to study disk scheduling algorithms (i.e., SCAN, SSTF, LOOK, etc.,)

References:

1. Unix concepts and applications by Sumitabha Das, TMH Publications.
2. Unix programming by Stevens, Pearson Education.
3. Shell programming by Yashwanth Kanetkar.
4. Operating System Concepts by Silberschatz, and Peter Galvin.

CS2109 INTELLECTUAL PROPERTY RIGHTS

Course Objective:

- To introduce the students to Intellectual Property Rights (IPR) which is a key component in modern knowledge management processes
- To create consciousness on IPR in students at an early stage of their education so that they develop an appreciation for ethical and rightful use of existing knowledge
- To make them understand how to take ownership of knowledge they may develop as a result of their creative innovations, take ownership and either drive themselves in becoming entrepreneurs or become responsible knowledge users in society
- To expose students some of the recent debates on the societal implications of IPR and its role in national/international trade and socio-economic development.

Course outcome:

Learners will be able to

- identify the types of intellectual property protection available for their research outcome
- conduct patent search and analyse patentability of the invention
- understand the basic structure of Patent document
- understand the registration and prosecution of different IPs
- understand the basics of IP commercialization and techno/commercial/legal issues in IPR commercialization

SYLLABUS

Introduction: Concept of property, Intellectual Property (IP) and Intellectual Property Rights (IPR), Importance of IP, Value creation through IP, Advantages of IP protection, Competitive advantage, Promotion of social good, Prevention of duplicates, counterfeit products and IP.

Evolution of IP system: Historical view of IP system in India and abroad, Legal basis and rationale behind development of IP system, WTO and TRIPS agreement, Role of WIPO.

Types of IPR: Major forms of IP in India and globally, Acts enacted in India related to IP.

Patent: Concept, Life of patent, Rights of Patentee, Criteria of patentability- novelty, non-obviousness, and utility, Non-patentable inventions.

Patent filing and prosecution: Prior art search, Process of obtaining a patent in India, Provisional and complete specification, Convention application, Patent Cooperation Treaty (PCT), Patent Infringement and Enforcement.

Trademark: Types of trademarks, Trademark and Brand, Trademark Registration, Trademark Infringement.

Copyright: Copyrights and related rights, Copyright registration, Copyright infringement, Section 52 of Indian Copyright Act.

Industrial Design: What is Industrial design, Design registration, Design infringement.

Trade Secret: What are Trade Secrets, How trade secrets are maintained in trade and business.

Other forms of IP: Semiconductor Integrated Circuits Layout Design, Geographical Indications, Protection of Plant Varieties & Farmers' right, Traditional knowledge.

IP commercialization: Licensing & Royalty; Technology Transfer; IP assignment, Compulsory License.

Emerging areas: Pat informatics, IP and bank loan, IP insurance, IP audit, IP valuation, IP management, Use of artificial intelligence in IP enforcement, Open innovation.

Text Books

1. Ganguli Prabuddha, Gearing up for Patents The Indian Scenario", Universities Press (1998)
2. Ganguli Prahuddha "Intellectual Property Rights-Unleashing the Knowledge Economy". Tata McGraw Hill (2001)
3. Geographical Indications of Goods Act 1990 Ganguli Piabaddha "Geographical Indications-its evolving contours accessible in http ips. nminsoda/files/2012/05/main book pdf (2009)

Reference Books

1. Ganguli Prabuddha and Jahade Siddharth, "Nanotechnology Intellectual Property Rights Research, Design, and Commercialisation", CRC Press, Taylor and Francis Group, USA (2012)
2. Beyond Intellectual Property: Toward Traditional Resource Rights for Indigenous Peoples and Local Communities [Paperback J,Darrell A. Posey and Graham Dotfield, IDRC Books; annotated edition (June (1996)
3. Netancl Neil Weinstock, Copyright's Paradox, Oxford University Press (2010)
4. The Indian Patents Act 1970 (as amended in 2005)
5. The Indian Copyright Act 1950 as amended in 2017)
6. Indian Trademarks Act 1999
7. The Indian Industrial Designs Act 2000
8. The Protection of Plant Varieties and Farmers' Right Act 2001
9. Inventing the Future: An Introduction to Patents for small and medium sized enterprises, WIPO publication No 917 www.wipo.int/ebookshop
10. Looking Good: An Introduction to Industrial Designs for Small and Medium sized Enterprises; WIPO publication No.498 www.wipo.int/ebookshop

CS2110 ENVIRONMENTAL SCIENCE

Course Objectives

The objectives of the Environmental Science course are to

- Familiarize the fundamental aspects of environment and the environmental management'
- Provide information of some of the important international conventions which will be useful during the future endeavours after graduation.
- Make realize the importance of natural resources management for the sustenance of the life and the society.
- Apprise the impact of pollution getting generated through the anthropogenic activities on the environment
- Provide the concept of Sustainable Development, energy and environmental management
- Impart knowledge on the new generation waste like e-waste and plastic waste.

Course Outcomes

After completion of the course the students will have

- Knowledge on the fundamental aspects of environment and the environmental management
- The knowledge on the salient features of the important international conventions
- Understanding of the importance of natural resources management for the sustenance of the life and the society.
- Familiarity on various forms of pollution and its impact on the environment.
- Understand the elements of Sustainable Development, energy and environmental management
- Knowledge on the new generation waste like e-waste and plastic waste.

SYLLABUS

Introduction: Structure and functions of Ecosystems-Ecosystems and its Dynamics-Value of Biodiversity-impact of loss of biodiversity, Conservation of bio-diversity. Environmental indicators - Global environmental issues and their impact on the ecosystems. Salient features of international conventions on Environment: Montreal Protocol, Kyoto protocol, Ramsar

Convention on Wetlands, Stockholm Convention on Persistent Organic Pollutants, United Nations Framework Convention on Climate Change (UNFCCC),

Natural Resources Management: Importance of natural resources management-Land as resource, Land degradation, Soil erosion and desertification, Effects of usage of fertilizer, herbicides and pesticide- watershed management.

Forest resources: Use and over-exploitation, Mining and dams – their effects on forest ecosystems and the living beings.

Water resources: Exploitation of surface and groundwater, Floods, droughts, Dams: benefits and costs.

Mineral Resources: Impact of mining on the environment and possible environmental management options in mining and processing of the minerals.

Sustainable resource management (land, water, and energy), and resilient design under the changing environment.

Environmental Pollution: Local and Global Issues. Causes, effects and control measures. Engineering aspects of environmental pollution control systems.

Air pollution: impacts of ambient and indoor air pollution on human health. Water pollution: impacts water pollution on human health and loss of fresh water resources. Soil pollution and its impact on environment. Marine pollution and its impact on blue economy. Noise pollution.

Solid waste management: Important elements in solid waste management- Waste to energy concepts. Air (prevention and control of pollution) Act, Water (prevention and control of pollution) Act and their amendments. Salient features of Environmental protection Act, 1986.

Sustainable Development: Fundamentals of Sustainable Development– Sustainability Strategies and Barriers – Industrialization and sustainable development. Circular economy concepts in waste (solid and fluid) management.

Energy and Environment: Environmental Benefits and challenges, Availability and need of conventional energy resources, major environmental problems related to the conventional energy resources, future possibilities of energy need and availability. Solar Energy: process of photovoltaic energy conversion, solar energy conversion technologies and devices, their principles, working and applications, disposal of solar panel after their usage. Biomass energy:

Concept of biomass energy utilization, types of biomass energy, conversion processes, Wind Energy, energy conversion technologies, their principles, equipment and suitability in context of India.

Management of plastic waste and E-waste: Sources, generation and characteristics of various e- and plastic wastes generated from various industrial and commercial activities; Waste management practices including onsite handling, storage, collection and transfer. E-waste and plastic waste processing alternatives. E-Waste management rules and Plastic waste management rules, 2016 and their subsequent amendments.

Text Books:

1. Bharucha,Erach (2004). Textbook for Environmental Studies for Undergraduate Courses of all Branches of Higher Education, University Grants Commission, New Delhi.
2. Basu, M., Xavier, S. (2016). Fundamentals of Environmental Studies, Cambridge University Press, India
3. Masters, G. M., &Ela, W. P. (1991). Introduction to environmental engineering and science. Englewood Cliffs, NJ: Prentice Hall.
4. Enger, E. and Smith, B., Environmental Science: A Study of Interrelationships, Publisher: McGraw-Hill Higher Education; 12th edition, 2010.

Reference Books:

1. Sharma, P. D., & Sharma, P. D. (2005). Ecology and environment. Rastogi Publications
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Clark R.S. (2001). Marine Pollution, Clanderson Press Oxford (TB)
4. Jadhav, H & Bhosale, V.M. (1995). Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
5. MoEF&CC, Govt. of India, CPCB: E-waste management rules, 2016 and its amendments 2018.
6. MoEF&CC, Govt. of India, CPCB: Plastic waste management rules, 2016.

B.Tech & B.Tech + M.Tech
(Computer Science & Engineering)
II Year - II Semester

Course code	Category	Course Title	Hours per week		Internal Marks	External Marks	Total Marks	Credits
			L	P				
CS2201	ES	Microprocessors	4	0	30	70	100	3
CS2202	PC	Design and Analysis of Algorithms	4	0	30	70	100	3
CS2203	PC	Database Management Systems	4	0	30	70	100	3
CS2204	PC	Formal Languages & Automata Theory	4	0	30	70	100	3
CS2205	HSS	Managerial Economics	4	0	30	70	100	3
CS2206	PC	Algorithms Lab through CPP.	0	3	50	50	100	1.5
CS2207	PC	Database Management Systems Lab	0	3	50	50	100	1.5
CS2208	SC	Web Technologies	1	2	50	50	100	2
CS2209	MC	Professional Ethics& Universal Human Values	0	0	0	100	100	0
CS2210	MC	NCC/NSS	0	2	-	-	-	0
							Total credits	**20**
Internship-I								

CS2201 MICROPROCESSORS

Course Objectives:

- To discuss the architectures of 8085, 8086 microprocessors, their instruction sets and related ALP programs.
- To discuss interfacing semiconductor memories, interfacing peripheral to Intel 8086.
- To study interfacing data converters to 8086 and discuss about micro controller 8051 architecture.

Course Outcomes:

- Understand the basic architectures of 8085 and 8086 microprocessors.
- Ability to write ALP programs using instruction sets.
- Understand the various interfacing concepts and micro controllers.

SYLLABUS

Introduction to Microprocessors and Microcomputers: A Brief Architecture and Programming of 8085Microprocessor.

Architecture: Instruction Set and Programming of 8086Microprocessor

Interfacing Semiconductor Memories and I/O Devices: Semiconductor Memories: Classification Internal Organization& Functional Description, Interfacing SRAMs and EPROMs to8086, Interfacing Characteristics of I/Devices, I/O Device addressing methods, I/O Device Programming Methods.

Interfacing Peripherals to Intel8086 -1: Parallel I/O Interface- 8255, Serial I/O Interface – 8251, Timer Interface -8253/8254

Interfacing Peripheral to Intel 8086 - 2: Keyboard / Display Interface – 8279, Interrupt Controller Interface – 8259

Interfacing Data Converters to 8086: D/A Conversion Methods, A/D Conversion methods, Interfacing DAC, Interfacing ADC.

Introduction to Micro controllers: Intel 8051Architecture and Programming

Text Books:

1. Microprocessor Architecture, Programming, and Applications with the 8085 Ramesh S.Gaonkar, 4thEdition, PenramInternational,1999
2. The 80x86 Family, Design, Programming and Interfacing, John E.Uffenbeck, 3rdEdition,Pearson Education Inc.,2002
3. KennethJ.Ayala, 8051 Microcontroller Architecture, Programming And Applications, 2ndEdition, Penram InternationalPublications,1999

Reference Books:

1. BARRYB.BREY, The Intel Microprocessors 8086 / 8088, 80186 / 80188, 80286, 80386 and 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium4, Architecture, Programming and Interfacing, 8th Edition, Pearson Education Inc.,2009
2. Walter A. Tribeland, Avtar Singh, The 8088 and 8086 Microprocessors, Programming, interfacing, Software, Hardware, and Applications, 4thEdition, Pearson Education Inc.,20033. Microprocessors and Interfacing, Programming and Hardware, 2ndEdition, Douglass V. Hall, TMH Edition,1999
3. Sanjay K Bose, Hardware and Software of Personal Computers, New Age International (P)Ltd.,1991 Myke Predko, Programming and Customizing the 8051 Microcontroller, TMH,1999

CS2202 DESIGN AND ANALYSIS OF ALGORITHMS

Course Objectives:

Upon completion of this course, students will be able to do the following:

- Analyse the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations

Course Outcomes:

Students who complete the course will have demonstrated the ability to do the following:

- Argue the correctness of algorithms using inductive proofs and invariants.
- Analysis worst-case running times of algorithms using asymptotic analysis.
- Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and conquer algorithms. Derive and solve recurrences describing the performance of divide and-conquer algorithms.
- Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms, and analysis them.
- Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analysis them.

SYLLABUS

Introduction: What is an Algorithm, Algorithm Specification, Pseudocode Conventions Recursive Algorithm, Performance Analysis, Space Complexity, Time Complexity, Amortized Complexity, Amortized Complexity, Asymptotic Notation, Practical Complexities, Performance Measurement.

Divide and Conquer: General Method, Defective Chessboard, Binary Search, Finding the Maximum and Minimum, Merge Sort, Quick Sort, Performance Measurement, Randomized Sorting Algorithms.

The Greedy Method: The General Method, Knapsack Problem, Job Sequencing with Deadlines, Minimum-cost Spanning Trees, Prim's Algorithm, Kruskal's Algorithms, An Optimal Randomized Algorithm, Optimal Merge Patterns, Single Source Shortest Paths.

Dynamic Programming: All - Pairs Shortest Paths, Multistage graphs, optimal binary search tree, String editing, 0/1 Knapsack, Reliability Design.

Backtracking: The General Method, The 8-Queens Problem, Sum of Subsets, Graph Colouring, Hamiltonian Cycles, Knapsack problem

Branch and Bound: Least cost (LC) Search, The 15-Puzzle, Control Abstraction for LC-Search, Bounding, FIFO Branch-and-Bound, LC Branch and Bound, 0/1 Knapsack Problem, LC Branch-and Bound Solution, FIFO Branch-and-Bound Solution, Traveling Salesperson problem.

Limitations of Algorithm Power: Lower-Bound Arguments, Decision Trees, P, NP and NP – complete problems – Challenges of Numerical Algorithms. Limitations of Algorithms Power: Backtracking – Branch-and Bound– Approximation Algorithms for NP-hard Problems – Algorithms for solving Nonlinear Equations.

Text Books:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, Sanguthevar Rajasekaran, University Press.
2. Introduction to Algorithms by Thomas H. Corman, Charles E. Leiserson, Ronald R. Rivest & Clifford Stein, Prentice Hall of India, New Delhi, New Delhi.

Reference Books:

1. Data structures and algorithm analysis in C++ / Mark Allen Weiss, Florida International University. — Fourth edition.
2. Introduction to Design & Analysis of Algorithms by Anany Levitin, Pearson Education, New Delhi, 2003
3. Introduction to Algorithms by Thomas H. Corman, Charles E. Leiserson, Ronald R. Rivest & Clifford Stein, Prentice Hall of India, New Delhi, New Delhi.
4. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman

CS2203 DATABASE MANAGEMENT SYSTEMS

Course Objectives:

- To learn the evolution of DBMS Versus File systems, data models, and layers of abstraction.
- To understand conceptual and physical aspects of database design.
- To learn formal and commercial query language specifications.
- To understand concurrency control, recovery management, and other related issues.

Course Outcomes:

- The student will understand ER-modelling for conceptual database design and relational model.
- The student is introduced to formal and commercial query languages: Relational Algebra, calculus and SQL.
- The student will learn schema refinement and normalization.
- The student understands locking protocols concurrency control, and crash recovery methods.

SYLLABUS

Introduction: File system versus a DBMS, Advantages of a DBMS, Describing and Storing Data in a DBMS, The Relational model, Levels of abstraction, Data Independence, Transaction management, Structure of a DBMS.

Introduction to Database Design and The Relational Model: Database Design and ER Diagrams, Entities, Attributes and Entity Sets, Relationships & Relationship Sets, Additional Features of the ER Model, Conceptual Design with ER Model, Introduction to the Relational Model, Integrity Constraints over Relations, Enforcing Integrity Constraints, Querying Relational Data, Logical Database Design: ER to Relational, Introduction to Views, Destroying/ Altering Tables and Views.

Relational Algebra and SQL: Preliminaries, Relational Algebra, The form of a Basic SQL Query, UNION, INTERSECT and EXCEPT, Nested Queries, Aggregate Operators, Null Values, Complex Integrity Constraints in SQL, Triggers and Active Databases, Embedded SQL, Dynamic SQL, JDBC.

Database Design: Schema Refinement and Normal Forms, Introduction to Schema Refinement, Functional Dependencies, Reasoning about FD's, Normal Forms, Properties of Decomposition, Normalization, Other kinds of Dependencies.

Transaction Management: The ACID Properties, Transactions & Schedules, Concurrent Execution of Transactions, Lock-Based Concurrency Control.

Concurrency Control: 2PL, Serializability and Recoverability, Introduction to Lock Management, Lock Conversions, Dealing with Deadlocks, Specialized Locking Techniques, Concurrency Control without Locking.

Crash Recovery: Introduction to ARIES, The Log, Other Recovery-Related Structures, The Write-Ahead Log Protocol, Check pointing, Recovering from a System Crash, Media Recovery.

Text Books:

1. Database Management Systems; Raghu Ramakrishnan, Johannes Gehrke 4th Edition, McGraw-Hill.

Reference:

1. Database System Concepts; A. Silberschatz, H. Korth 5th Edition, McGraw-Hill

CS2204 FORMAL LANGUAGES AND AUTOMATA THEORY

Course objectives:

- To introduce the concepts in automata theory and theory of computation to design grammars and recognizers for different formal languages.
- To employ finite state machines to solve problems in computing.
- To introduce finite state machines, context free grammars and Turing Machines and their properties as the basis for the formal expressivity of computer languages for solving linguistic decision problems.
- To understand the concepts of tractability and decidability, the concepts of NP-completeness and NP-hard problem and also the challenges for Theoretical Computer Science and its contribution to other sciences.

Course outcomes:

- Ability to think analytically and intuitively for problem-solving situations in related areas of theory in computer science
- Ability to describe the language accepted by an automata or generated by a regular expression or a context-free grammar;
- Ability to Understand the functioning of Finite-State Machines, Deterministic Finite-State Automata, Nondeterministic Finite-State Automata and Pushdown Automata and Turing Machines.

SYLLABUS

Introduction to Grammars and Languages: Definitions of alphabet, strings, language, grammar, types of grammar, types of machines, generation of languages from grammar, construction of grammar from the given description of languages, Chomsky Hierarchy of languages.

Finite State Machine (FSM): Definition of finite state machine, Representation of FSMs. Classification of FSM's and their construction, Conversion from NFA to DFA, Elimination of ε – transitions from NFA, Equivalence of two FSM's, optimization of finite state machine (Equivalence theorem method and Table filling method), Finite state machine with output: Moore and Mealy machines. Applications of FSM.

Regular Expression and Languages: Regular Expression, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Properties of Regular Languages: Pumping Lemma for regular Languages, Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, Equivalence and Minimization of Automata.

Context Free Grammars and Languages: Context Free Grammars, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages, Normal Forms, Pumping Lemma for CFL, Closure properties of CFL, Decision properties for CFL.

Push down Automata: Definition of push down automata, The Languages of a PDA, push down automata, Equivalence of PDA's and CFG's, push down automata to context free grammar, context free grammar to push down automata, Deterministic Pushdown Automata.

Turing Machines: The Definition of Turing Machine, Turing Machine Model, Representation of Turing Machines, Language Acceptability by Turing Machines, Design of Turing Machines, Description of Turing Machines, Techniques for TM Construction, Variants of Turing Machines, Turing Machines and Type 0 Grammars.

Undecidability: A Language That Is Not Recursively Enumerable, An Undecidable Problem That Is RE, Undecidable Problems About Turing Machines, Decidable & Undecidable Problems, Post Correspondence Problem.

Text books:

1. Introduction to automata theory, languages and computation, John.E.H.P croft/ Rajeev Motwani & JD Ullman—pearson education- III edition
2. Theory of computation, K.L.P.Mishra and N.Chandrasekhar, PHI

Reference Books:

1. Theory of computation, formal languages and automata theory, G P Saradhi Varma, B.Thirupathi Rao –Sci Tech publications.

CS2205 MANAGERIAL ECONOMICS

Course Objectives:

- To bring about an awareness about the nature of Managerial Economics and its linkages with other disciplines.
- To understand the Micro and Macro Environment of Business.
- To familiarize the prospective engineers with the concepts and tools of Managerial Economics with an objective to understand the real world of business.

Course Outcomes:

After completion of the course, student will be able to:

- Understand the various economic activities in business and industry.
- Analyse the real-world business problems.
- Make optimal business decisions for the effective and efficient management of Organisations.

SYLLABUS

Significance of Economics and Managerial Economics:

Economics: Definitions of Economics- Wealth, Welfare and Scarcity definitions Classification of Economics- Micro and Micro Economics.

Managerial Economics: Definition, Nature and Scope of Managerial Economics, Differences between Economics and Managerial Economics, Main areas of Managerial Economics, Managerial Economics with other disciplines.

Demand and Utility Analysis:

Demand - Definition, Meaning, Nature and types of demand, Demand function, Law of demand - Assumptions and limitations. Exceptional demand curve.

Elasticity of demand - Definition, Measurement of elasticity, Types of Elasticity

(Price, Income, Cross and Advertisement), Practical importance of Price elasticity of demand, Role of income elasticity in business decisions, Factors governing Price Elasticity of demand.

Utility Analysis: Utility- Meaning, Types of Economic Utilities, Cardinal and Ordinal Utility, Total Utility, Marginal Utility, The law of Diminishing Marginal Utility and its Limitations.

Theory of Production and Cost analysis:

Production - Meaning, Production function and its assumptions, use of production function in decision making; **Cost analysis** - Nature of cost, Classification of costs - Fixed vs. Variable costs, Marginal cost, Controllable vs. Non - Controllable costs, Opportunity cost, Incremental vs. Sunk costs, Explicit vs. Implicit costs, Replacement costs, Historical costs, Urgent vs. Postponable costs, Escapable vs. Unavoidable costs, Economies and Diseconomies of scale.

Market Structures: Definition of Market, Classification of markets; Salient features or conditions of different markets - Perfect Competition, Monopoly, Duopoly , Oligopoly, Importance of kinked demand curve ;Monopolistic Competition.

Pricing and Business Cycles:

Pricing Analysis: Pricing – Significance; Different Pricing methods- Cost plus pricing, Target pricing, Marginal cost pricing, Going -rate pricing, Average cost pricing, Peak load pricing , Pricing of joint Products, Pricing over the life cycle of a Product, Skimming pricing Penetration pricing, Mark- up and Mark- down pricing of retailers.

Business cycles - Definition, Characteristics, Phases, Causes and Consequences; Measures to solve problems arising from Business cycles.

Text Books:

1. Sankaran,S., Managerial Economics, Marghan Publications, 2015, Chennai.
2. Aryasri, A.R., Managerial Economics and Financial Analysis, MC Graw Hill Education, New Delhi,2015.

Reference Books:

1. Dwivedi, D.N., Managerial Economics, Vikhas Publishing House Pvt. Ltd. 6th Edition, New Delhi,2004.
2. Dewett, K.K., Modern Economic Theory, S.Chand & Company Ltd., New Delhi, 2005.

CS2206 ALGORITHMS LAB Through C++

Course objectives:

- The laboratory component will emphasize two areas:
- Implementation of algorithms covered in class: This will involve running the algorithms under varying input sets and measuring running times, use of different data structures for the same algorithm (wherever applicable) to see its effect on time and space, comparison of different algorithms for the same problem etc.
- Design of Algorithms: This will involve design and implementation of algorithms for problems not covered in class but related to topics covered in class.
- The exact set of algorithms to design and implement is to be decided by the instructor. In addition, there will be at least one significantly large design project involving some real world application. An efficient design of the project should require the use of multiple data structures and a combination of different algorithms/techniques.

Course Outcomes:

The student should be able to:

- Design algorithms using appropriate design techniques (brute-force, greedy, dynamic programming, etc.)
- Implement a variety of algorithms such assorting, graph related, combinatorial, etc., in a high level language.
- Analyze and compare the performance of algorithms using language features.
- Apply and implement learned algorithm design techniques and data structures to solve real-world problems.

Programs List:

1. a) Create a CPP class called Student with the following details as variables within it.

   (i) Register_number

   (ii) Student_name

   (iii) Programme_name

   (iv) Phone _number

   Write a program to create nStudent objects and print the Register_number, Student_name, Programme_name, and Phone_number of these objects with suitable headings.

   b). Write a program to implement the Stack using arrays. Write Push (), Pop(), and Display() methods to demonstrate its working.

2. a). Design a superclass called Staff with details as StaffId, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a CPP program to read and display at least 3 staff objects of all three categories.

b). Write a class called Customer to store their name and date_of_birth. The date_of_birth format should be dd/mm/yyyy. Write methods to read customer data as and display as using StringTokenizer class considering the delimiter character as "/".

3. a). Write a program to read two integers a andb. Compute a/b and print, when b is not zero. Raise an exception when b is equal to zero.

b). Write a program that implements a multi-thread application that has three threads. First thread generates a random integer for every 1 second; second thread computes the square of the number and prints; third thread will print the value of cube of the number.

4. Sort a given set of n integer elements using Quick Sort method and compute its time complexity. Run the program for varied values of n> 5000 and record the time taken to sort. Plot a graph of the time taken versus non graph sheet. The elements can be read from a file or can be generated using the random number generator. Demonstrate using CPP how the divide-and-conquer method works along with its time complexity analysis: worst case, average case and best case.

5. Sort a given set of n integer elements using Merge Sort method and compute its time complexity. Run the program for varied values of n> 5000, and record the time taken to sort. Plot a graph of the time taken versus non graph sheet. The elements can be read from a file or can be generated using the random number generator. Demonstrate using CPP how the divide-and-conquer method works along with its time complexity analysis: worst case, average case and best case.

6. Implement the Knapsack problem using (a) Dynamic Programming method (b) Greedy method.

7. Write a program-from a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm..

8. Find Minimum Cost Spanning Tree of a given connected undirected graph using Kruskal's algorithm. Use Union-Find algorithms in your program.

9. Find Minimum Cost Spanning Tree of a given connected undirected graph using Prim's algorithm.

10. Write programs to

(a) Implement All-Pairs Shortest Paths problem using Floyd's algorithm.

(b) Implement Travelling Sales Person problem using Dynamic programming.

11. Design and implement in CPP, to find a subset of a given set S = {Sl, S2,.....,Sn} of n positive integers whose SUM is equal to a given positive integer d. For example, if S ={1, 2, 5, 6, 8} and d= 9, there are two solutions {1,2,6}and {1,8}. Display a suitable message, if the given problem instance doesn't have a solution.

12. Design and implement in CPP to find all Hamiltonian Cycles in a connected undirected Graph G of n vertices using backtracking principle.

REFERENCES:

1. T. H. Cormen, C. L. Leiserson, R. L. Rivest, and C. Stein, Introduction to Algorithms, MIT Press.
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3. Harry R. Lewis and Larry Denenberg, Data Structures and Their Algorithms, Harper Collins.
4. A. Gibbons, Algorithmic Graph Theory, Cambridge University Press.
5. Michael T. Goodrich and Roberto Tamassia, Algorithm Design: Foundations, Analysis, and Internet Examples, John Wiley.
6. R. Sedgewick, Algorithms in C (Parts 1-5), Addison Wesley.
7. M. H. Alsuwaiyel, Algorithm Design Techniques and Analysis, World Scientific.
8. Gilles Brassard and Paul Bratley, Algorithmics: theory and practice, Prentice-Hall.
9. Udi Manber, Introduction to Algorithms: A Creative Approach, Addison-Wesley.
10. Sara Baase and Allen Van Gelder, Computer Algorithms: Introduction to Design and Analysis, Addison-Wesley.

CS2207 DATABASE MANAGEMENT SYSTEMS LAB

Course Objectives

- To introduce to a commercial DBMS such as ORACLE.
- To learn and practice SQL commands for schema creation, data manipulation.
- To learn conceptual and physical database design based on a case study.
- To apply database design stages by studying a case study.

Course Outcomes

By the end of the course, the student should be able to:

- The student is exposed to a commercial RDBMS environment such as ORACLE.
- The student will learn SQL commands for data definition and manipulation.
- The student understands conceptual through physical data base design.
- The student takes up a case study and applies the design steps.

SYLLABUS

Features of a commercial RDBMS package such as ORACLE/DB2, MS Access, MYSQL & Structured Query Language (SQL) used with the RDBMS.

I. Laboratory Exercises Should Include:

a. Defining Schemas for Applications,
b. Creation of Database,
c. Writing SQL Queries,
d. Retrieve Information from Database,
e. Creating Views
f. Creating Triggers
g. Normalization up to Third Normal Form
h. Use of Host Languages,
i. Interface with Embedded SQL,
j. Use of Forms
k. Report Writing

II. Some sample applications are given below:

1. Accounting Package for Shops,

2. Database Manager for Magazine Agency or Newspaper Agency,
3. Ticket Booking for Performances,
4. Preparing Greeting Cards & Birthday Cards
5. Personal Accounts - Insurance, Loans, Mortgage Payments, Etc.,
6. Doctor's Diary & Billing System
7. Personal Bank Account
8. Class Marks Management
9. Hostel Accounting
10. Video Tape Library,
11. History of Cricket Scores,
12. Cable TV Transmission Program Manager,
13. Personal Library.
14. Sailors Database
15. Suppliers and Parts Database

Reference Books

1. Database Management Systems; Raghu Ramakrishnan, Johannes Gehrke 4th Edition, McGraw Hill
2. Database System Concepts; A. Silberschatz, H. Korth 5th Edition, McGraw-Hill

CS2208 ` WEB TECHONOLOGIES

Course objectives

- To facilitate the graduates with the ability to visualize, gather information, articulate, analyze, solve complex problems, and make decisions. These are essential to address the challenges of complex and computation intensive problems increasing their productivity.
- To facilitate the graduates with the technical skills that prepare them for immediate employment and pursue certification providing a deeper understanding of the technology in advanced areas of computer science and related fields, thus encouraging to pursue higher education and research based on their interest.
- To facilitate the graduates with the soft skills that include fulfilling the mission, setting goals, showing self-confidence by communicating effectively, having a positive attitude, get involved in team-work, being a leader, managing their career and their life.

Course outcomes

- Able to understand the working principles of the computer system and its components, apply the knowledge to build, asses, and analyze the software and hardware aspects of it.
- Develops comprehensive skills of Programming Languages, Software process models, methodologies, and able to plan, develop, test, analyze, and manage the software and hardware intensive systems in heterogeneous platforms individually or working in teams.
- Able to use the professional, managerial, interdisciplinary skill set, and domain specific tools in development processes, identify the research gaps, and provide innovative solutions to them.

Syllabus

1. Design the following static web pages required for an online book store web site.
   a) HOME PAGE: The static home page must contain three frames.
   b) LOGIN PAGE
   c) CATOLOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.
   d) REGISTRATION PAGE
2. Write JavaScript to validate the following fields of the Registration page.
   a) First Name (Name should contains alphabets and the length should not be less than 6 characters).
   b) Password (Password should not be less than 6 characters length).
   c) E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)

d) Mobile Number (Phone number should contain 10 digits only).
e) Last Name and Address (should not be Empty).

3. Develop and demonstrate the usage of inline, internal and external style sheet using CSS
4. Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

   a) Input: Click on Display Date button using onclick( ) function

   Output: Display date in the textbox

   b) Input: A number n obtained using prompt

   Output: Factorial of n number using alert

   c) Input: A number n obtained using prompt

   Output: A multiplication table of numbers from 1 to 10 of n using alert

   d) Input: A number n obtained using prompt and add another number using confirm

   Output: Sum of the entire n numbers using alert

5. Write an 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 in the list. Add CSS to customize the properties of the font of the capital (colour, bold and font size).
6. Write an HTML page including any required JavaScript that takes a number from text field in the range of 0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.
7. Develop and demonstrate PHP Script for the following problems:
   a) Write a PHP Script to find out the Sum of the Individual Digits.
   b) Write a PHP Script to check whether the given number is Palindrome or not
8. 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 XML document using DOM parser or SAX parser.
9. Implement the following web applications using (a) PHP (b) Servlets (c) JSP
   a) A web application that takes a name as input and on submit it shows a hello page where name is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You message with the duration of usage (hint: Use session to store name and time).
   b) Write a PHP Program to display current Date, Time and Day.
   c) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with “Hello, you are not authorized to visit the site” message, where should be replaced with the entered name. Otherwise, it should send “Welcome to this site” message.
   d) A web application that lists all cookies stored in the browser on clicking “List Cookies” button. Add cookies if necessary.
10. Implement the web applications with Database using (a) PHP, (b) Servlets and (c) JSP.
11. Modify the above PHP program to use an xml instead of database

12. Write a program to design a simple calculator using
    (a) JavaScript
    (b) PHP
    (c) Servlet and
    (d) JSP.

References:

1. Internet and Web Technologies by Raj Kamal, Tata McGraw-Hill.

2. Programming the World Wide Web by Robert W. Sebesta, Pearson Education.

CS2209 PROFESSIONAL ETHICS AND UNIVERSAL HUMAN VALUES

Course Objectives:

- To recognize the moral values that should guide the Engineering profession.
- To resolve moral issues concerning one's profession.
- To develop and exhibit a set of moral beliefs and attitudes that engineers should inculcate.
- To inculcate social values and morality in one's life.
- To develop awareness about Professional/Engineering Ethics and Human Values.

Learning Outcomes:

Students will be able to:

- Apply the conceptual understanding of ethics and values into everyday practice.
- Understand the importance of moral awareness and reasoning in life.
- Acquire professional and moral etiquette that an engineer requires.
- Develop the acumen for self-awareness and self-development.
- Develop cultural tolerance and integrity.
- Tackle real-life challenges with empathy.

SYLLABUS

HUMAN VALUES
Values - Respect - Caring - Sharing - Honesty- Courage - Self confidence - Communal Harmony
Morals - Virtues

PROFESSIONAL VALUES
Integrity - Discipline - Valuing time - Cooperation - Commitment - Code of conduct - Challenges in the workplace

PROFESSIONAL ETHICS
Overview - Engineering ethics - Moral issues - Profession - Models of professional roles - Responsibility

RESPONSIBILITIES AND RIGHTS
Safety and risk - Collegiality and loyalty - Confidentiality - Occupational crime - Human rights - Employee rights - Intellectual property rights

GLOBAL ISSUES
Globalization - Environmental ethics - Computer ethics - Code of ethics - Multinational corporations - Engineers as advisors in Planning and Policy making

Textbook:
1. R.S. Nagarazan. *A Textbook on Professional Ethics and Human Values.* New Age International Publishers. 2006.

Reference Books:

1. Premvir Kapoor. *Professional Ethics and Human Values.* Khanna Publishing House. 2019.
2. B.S. Raghavan. *Human Values and Professional Ethics*. S.Chand Publications. 2012.
3. R.R. Gaur & Others. *A Foundation Course in Human Values and Proff. Ethics*. Excel Books. 2009.
4. A. N. Tripathi. *Human Values*. New Age International (P) Limited. 2009
5. R. Subramanian. *Professional Ethics*. OUP India. 2013.