

Subject	L	T	P	Credit
Introduction to engineering mathematics with applications– II	4	0	0	4

Matrices

Rank of a Matrix (by reducing it to elementary transformation, Echelon & normal forms), solution of simultaneous equations by elementary transformation methods, consistency & inconsistency of equations, Eigen values & Eigen vectors, Cayley- Hamilton theorem.

Second-Order Linear Differential Equations with Variable Coefficients solution by method of undetermined coefficients, removal of first derivative, change of independent variable and variation of parameters, solution by series method.

Partial Derivatives

Definition, Euler's Theorem for homogeneous functions, differentiation of implicit functions, total differential coefficient, transformations of independent variables, Jacobians, approximation of errors, maxima and minima of functions of two variables.

Partial Differential Equations

Definition, formulation, solution of PDE (By Direct Integration Method & Lagrange's Method), non-linear partial differential equation of first order (Standard I, II, III & IV), Charpit's general method of solution for partial differential equations.

Partial Differential Equations with Constant Coefficients

second and higher orders homogeneous and non- homogeneous equations, partial differential equations reducible to equations with constant coefficients, the method of separation of variables, one dimensional heat and wave equation and its solution

Text Books

1. Dean G. Duffy: Advanced Engineering Mathematics with MATLAB, CRC Press.
2. Potter, Goldberg & Edward : Advanced Engineering Mathematics, Oxford University Press.

References Books

1. Probability and Statistics by Ravichandran, Wiley.
2. Fundamental of Mathematical Statistics: S. Chand & Co.

Subject Name	L	T	P	Credit
Environmental Sciences	4	0	0	4

Unit I

Introduction: Domestic and global environmental concerns, principles of sustainable development, sustainable agriculture, organic farming, bio-fuels, threats for sustainability

Unit II

Environmental Ethics & Legislations: Enforcement of environment laws in india – the water act, the air (prevention and control of pollution) act, 1981, the environment (protection) act, 1986, environmental auditing, value education – HIV/AIDS- women and child welfare.

Unit III

Environmental Pollution: Air pollution – sources, types of air pollutants, national ambient air quality standards, controlling air pollution. water pollution – sources, types of water pollutants, water quality indicators, water quality standards. soil pollution - types of soil pollutants: industrial wastes, pesticides, fertilizers and manures, salination of soil, controlling soil pollution. noise: sources of noise pollution measurements of noise and indices, effect of metrological parameters on noise propagation, noise exposure levels and standards. noise control and battement measures. impact of noise on human health

Unit IV

Environmental Challenges: local challenges - solid waste – impact of solid waste on natural resources, deforestation; global challenges - climate change and global warming, kyoto protocol, greenhouse gases, ways to reduce greenhouse gases emissions, carbon footprint, ways to reduce carbon footprint, carbon trading.

Unit V

Sustainable habitat, industrialization and urbanization: concept of green building, volatile organic compounds (VOC), GRIHA Rating, LEED rating, HVAC, hybrid car technology, industrial ecology, India's renewable energy capacity. green technology & green business: green business, green computing, E-waste management.

Text Books :

R. Rajagopalan, Environmental Studies, Oxford IBH Pub, 2011.

Reference Books :

Kogent Learning Solutions Inc., Energy, Environment, Ecology and Society, Dreamtech, 2012.

Rag, R. L, Ramesh, Lekshmi Dinachandran, Introduction to sustainable engineering

Subject	L	T	P	Credit
Electronic circuits and applications	2	1	2	4

Unit I

Semiconductors and diodes :- introduction to semiconductor theory, classification of materials- insulators, conductors and semiconductors and their energy bands, types of semiconductors- intrinsic, extrinsic. PN Junction Diode: biasing and operation of PN Diode, V-I characteristics, limiting Values of PN Diode, breakdown in PN Diode, applications of PN Diode. Zener Diode: V-I Characteristics, applications of Zener Diode. rectifier Circuits: PN diode as a rectifier, half wave rectifier, full wave rectifier, full wave bridge rectifier, clipping circuits, clamper circuits..

Unit II

Bipolar Junction Transistor :- Introduction: simplified structure and modes of operation. V-I characteristics, BJT as an amplifier and switch, Biasing in BJT amplifier circuits, small signal operation and models, BJT Circuits, BJT as a digital logic inverter.

Unit III

MOS Field Effect Transistor :- Introduction, simplified structure and modes of operation. V-I Characteristics, MOSFET as an amplifier and switch, biasing in MOS amplifier circuits, single stage MOS amplifier, CMOS digital logic inverter.

Unit IV

Operational Amplifier:- Ideal op-amp: Introduction, Block diagram, characteristics and equivalent circuits of an ideal op-amp, various types of Operational Amplifiers and their applications, Power supply configurations for OPAMP applications, inverting and non-inverting amplifier configurations.

The Practical op-amp: Introduction, input offset voltage, offset current, thermal drift, Effect of variation in power supply voltage, common-mode rejection ratio, slew rate and its Effect, PSRR and gain –bandwidth product, frequency limitations and compensations.

Unit V

Application of OP-AMP:- Amplifiers and Oscillators: Summing amplifier, Integrators and differentiators, Instrumentation amplifier, Differential input and differential output amplifier, Log/ Antilog amplifier, isolation amplifiers, Triangular/rectangular wave generator, phase-shift oscillators, Wein bridge oscillator.

Comparators and Converters: Comparator, Zero Crossing Detector, Monostable and Astable Multivibrator, Schmitt Trigger, Voltage limiters, Clipper and clampers, Absolute value output circuit, Peak detector, Sample and hold Circuit, Voltage-to-current converter, Current-to-voltage converter.

Text Books

1. Boylestad and Nashelsky: Electronic Devices and Circuit Theory, Pearson Education
2. Anant Agrawal and Jeffrey H. Lang: Foundations of AD Circuits

Reference Books:

1. S. Sedra and K. C. Smith: Microelectronic circuits, Oxford University Press
2. Donald A Neamen: Electronic Circuits Analysis and Design, TMH

Practical List

1. To Study V-I characteristics of PN junction diode in forward and reverse bias. Plot the graph.
2. To Study V-I characteristics of Zener diode in reverse bias. Plot the graph.
3. To study BJT and its characteristics.
4. Design a circuit using BJT as inverter logic.
5. To study MOS and its characteristics.
6. Design a circuit using MOS as a switch.
7. Design and verify Voltage follower using Op-Amp.
8. Design summing amplifier circuit using Op-Amp.

Subject Name	L	T	P	Credit
Digital circuit & systems	2	1	2	4

Unit I

Introduction to digital circuits: number systems binary, octal and hexadecimal numbers, codes: weighted and un weighted codes, hamming code , error detection & correcting code , binary arithmetic, subtraction using 2's complement, 8-bit addition using 2's complement, quinc & McCluskey's method, basic of information : information, entropy, encoding, Huffman encoding ,data compression ,channel capacity.

Unit II

Introduction to logic gates: AND, OR, NOT, Universal gates: NAND ,NOR, exclusive gates: XOR, XNOR, Boolean algebra, Boolean Laws, simplification of function, Demorgan's theorem, Canonical SOP & POS, Karnaugh map method: SOP & POS , Minterm, Maxterm, cases with don't care terms, multiple output switch function.

Unit III

Combinational circuits : half adder, half subtractor, full adder, full subtractor circuits, serial & parallel adder , BCD adders , look ahead carry generator, decoders, encoders, multiplexers, demultiplexers and their types, designing of combinational circuits, introduction to various semiconductors memories: RAM,SRAM,DRAM, ROM,PROM,EPROM.

Unit IV

Sequential circuits: Flip-flops, classification of flip flop and its types like RS, D, JK flip flops, master slave JK flip flop, introduction to shift registers: SISO, SIPO, PIPO, PISO, Counters, synchronous & asynchronous counters, ring counter, designing of counter: MOD 10, BCD counter, finite state machine and its properties.

Unit V

associative memory, memory hierarchy, cache memory, virtual memory, model of computation, instruction set, ALU instructions, memory access , assembly language, program control, instruction sequencing, idea about arithmetic circuits,

Text Books

1. M. Mano; Digital Logic & Computer Design; PHI.
2. Jain RP; Modern digital Electronics; TMH

Reference books

1. Millman & Taub; Pulse, Digital & Switching Waveforms; TMH
2. W.H. Gothman; Digital Electronics; PHI.

Suggested list of experiments.

1. Study and Verify Basic Gates.
2. Study and Verify Universal Gates.
3. Implementation & Verification of Half Adder & Full Adder using basic gates.
4. Implementation & Verification of Half Subtractor & Full Subtractor using basic gates.
5. Study & Verification of Multiplexer using IC74LS157.
6. Study & Verification of D-flip flop using IC74LS74
7. Study & Verification of Shift register using IC74LS164.
8. Implementation of the gates AND gate, OR gate & NOT gate by using "NAND" gate using IC 74LS00.
9. Implementation of the gates AND gate, OR gate & NOT gate by using "NOR" gate using IC 74LS02.
10. Study & Verification of J-K flip flop using IC74LS76.

Subject Name	L	T	P	Credit
Foundation of data structure with C++	2	1	2	4

Unit 1 :

Introduction to OOP : Procedure oriented programming Vs object oriented programming (OOP), object oriented methodology, characteristics and concepts of OOP, benefits of OOP.

Classes and Objects : Abstract data types, defining a class, defining member functions, objects as software units, encapsulation and information hiding, access specifiers, memory allocation for objects, object lifetime, static and dynamic objects, static data members, static member functions, arrays of objects, objects as function arguments, friend function.

Constructors and Destructors : Constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy constructor, destructors.

Unit 2 :

Inheritance and Polymorphism : Introduction to inheritance, access control in derived classes, inherited methods, redefined methods, constructors in derived classes, multiple inheritance, virtual base classes, introduction to polymorphism, pointer to objects, pointers to derived classes, static and dynamic polymorphism, virtual functions, pure virtual function, abstract class, operator overloading.

Manipulators : C++ streams, C++ stream Classes, unformatted I/O operations, Formatted console I/O Operations, managing Output with manipulators, standard template library STL

Unit 3 :

Basic Concept: Concept of data structure and its importance, basic terminology, data types and its classification, relationship with algorithm, algorithm complexity notations like big O, Omega.

Evaluation of polynomial, polynomial representation, polynomial addition, structures: internal representation of structure, referential structure, array: definitions of arrays and lists, strings, row/column major representation of arrays, sparse matrices, recursion-definition and processes, simulating recursion, backtracking, recursive algorithms, tail recursion, removal of recursion. tower of Hanoi problem.

Unit 4 :

LIST : Introduction to linked list: singly linked list, circular linked list, doubly linked list, different operation on list, applications of linked list : polynomial manipulation

Stack and Queue : Introduction, stack as adt, realization of stacks, applications of stack, introduction to queue, queue as adt, queue applications, representation : static & dynamic, circular queue, deque, priority queues

Unit 5 :

TREE : Introduction to tree, definition, terminology, generalized tree representation, binary tree, full and complete binary tree, binary search tree. operations : create, insert, delete, traversals (preorder, inorder, postorder), counting leaf, nonleaf & total nodes

Sorting and Searching : Internal and external sorting, selection sort, insertion sort, quick sort, merge sort, heap sort, linear search, binary search, depth first search, breadth first search.

Text Books :

1. E Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill Education.
2. Tanenbaum A.S, Langram Y, Augestien M.J., Data Structures using C & C++, Prentice Hall of India

Reference Books :

1. Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, Pearson Education
2. Aho Hopcroft Ullman, Data Structures and Algorithms, Pearson Education
3. Horowitz and Sahani, Fundamentals of data Structures, Galgotia Publication Pvt. Ltd.,

Suggested List of Experiment

1. Program to show different type of constructors
2. Program to derive a class as protected
3. Program to implement static variable and static member function
4. Program to access Private member using friend function
5. Program to show call by value and call by reference
6. Program to implement multiple inheritance
7. Program to implement virtual base class
8. Program to show the working of destructor
9. Program to Show the concept of virtual function
10. Program in C++ to concat two string using operator overloading.
11. Program to implement an array.
12. Program to reverse a given string.
13. Write a C++ program to implement the following using an array
 - a. Stack ADT
 - b. Queue ADT
14. Write a C++ program to implement the following using a singly linked list
 - a. Stack ADT
 - b. Queue ADT
15. Write C++ program to implement DEQUE (double ended queue) ADT using Array.
16. Write C++ program for implementation of BFS and DFS.
17. Program to perform the following operation in Matrix
 1. Addition
 2. Subtraction
 3. Multiplication
 4. Transpose
18. Program to implement doubly linked list
19. Program to implement Selection Sort.
20. Program to perform quick sort.
21. Program to perform merge sort.
22. Program to search given target number using linear search from the list of numbers.
23. W.A.P. to perform binary search.
24. Write a program in C++ for balanced parenthesis.

Note: Number of experiments may be extended to make the better understanding of subject.

Subject Name	L	T	P	Credit
Web development laboratory	0	2	4	4

UNIT-I

History of the Internet, internetworking concepts, architecture and protocol: switch, router, internet address and domains. Introduction to World Wide Web (WWW), working of web browser and web server, web server and its deployment, N-tier architecture, services of web server, common gateway interface (CGI), uniform Resource Locator (URL), format of the URL, hyper Text Transfer Protocol (HTTP), feature of HTTP protocol HTTP request-response model, hyper text transfer protocol secure (HTTPS).

UNIT-II

HTML: Introduction to HTML, types of WebPages, document structure and layout, parts in HTML document, editors, basic elements, attributes, headings, basics paragraphs, hyperlinks, formatting links, head, images, tables, HTML5 new elements, HTML5 canvas, HTML5 drag/drop, HTML5 input types and form elements.

UNIT-III

CSS: Introduction to CSS , CSS properties, types of style sheets, style (border, merging, padding....), style inheritance, box model, syntax and anatomy of CSS, internal style sheet, CSS overflow, CSS pseudo- elements, introduction to CSS3, CSS3 pagination, modules, backgrounds and borders, text layout, user interface, CSS 3 border, background, font and text effects, transitions and animation.

UNIT-IV

JavaScript : Introduction to JavaScript, JS types, JS Syntax, JS operators, JS array, type conversion, JS callback, JS forms, JS objects, JS functions, JS HTML DOM, introduction to DOM, DOM Document, DOM HTML, DOM animations, DOM navigations, DOM node list.

UNIT -V

Search engines, Working of the search engines, design strategy for website. case study of Apache web server. A website development project.

Text Books :

1. HTML & CSS: The Complete reference by Thomas A. Powell.
2. HTML 5 Black Book: Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP and jQuery

References :

1. Web technologies A computer science perspective, Jeffrey C. Jackson, Pearson Education .
2. Web Technologies, Achyut S Godbole and Atul Kahate Tata McGraw Hill
3. JavaScript: The Complete Reference, Thomas A. Powell, Fritz Schneider.

Practical will be project based. Students will make a website and host on a web server.

1. Create a webpage with HTML describing your department. Use paragraph and list tags.
2. Create links on the words e.g. "Wi-Fi" and "LAN" to link them to Wikipedia pages.
3. Insert an image and create a link such that clicking on image takes user to other page.
4. Change the background color of the page. At the bottom create a link to take user to the top of the page.
5. Create a table to show your class time-table.
6. Use tables to provide layout to your HTML page describing your university infrastructure.
7. Use `` and `<div>` tags to provide a layout to the above page instead of a table layout.
8. Use frames such that page is divided into 3 frames 20% on left to show contents of pages, 60% in center to show body of page, remaining on right to show remarks.
9. Embed Audio and Video into your HTML web page.
10. Apply in-line CSS to change colors of certain text portion, bold, underline and italics certain words in your HTML web page. Also change background color of each paragraph using in-line CSS.
11. Write all the above styling in CSS in different file (.css) and link it to your webpage such that changes made in CSS file are immediately reflected on the page. Group paragraphs into single class and add styling information to the class in CSS.
12. Create a simple form to submit user input like his name, age, address and favorite subject, movie and singer.
13. Add form elements such as radio buttons, check boxes and password field. Add a submit button.
14. Create a form similar to the one in previous experiment. Put validation checks on values entered by the user using JavaScript (such as age should be a value between 1 and 150).
15. Write a JavaScript program to display information box as soon as page loads.
16. Write a JavaScript program to change background color after 5 seconds of page load.
17. Write a JavaScript program to dynamically bold, italic and underline words and phrases based on user actions.
18. Write a JavaScript program to display a hidden div (e.g. showing stats of a player when user clicks on his name).
19. Using ideas from the above experiments, try to create a website for your department.
20. Create an e-book having left side of the page name of the chapters and right side of the page the contents of the chapters clicked on left side.