

Solapur University, Solapur



B.Sc. (Entire Computer Science)

Syllabus (Semester – I and II)

(Choice Based Credit System)

With Effect from June 2016

B.Sc. (Entire Computer Science) Part – I Semester-I

Sr. No	Paper Code	Title of the Paper	Contact hours/ Week		Distribution of Marks for Examination			Credits
			Lect	Pract	Internal	University	Total	
I	ECS101	Communication Skill-I	04	--	30	70	100	04
II	ECS102	Fundamental of Computer	2.5	--	30	70	100	2.5
III		Programming using C	2.5	--	30	70	100	2.5
IV	ECS103	Linear Electronics-I	2.5	--	30	70	100	2.5
V		Digital Electronics-I	2.5	--	30	70	100	2.5
VI	ECS104	Discrete Structure	2.5	--	30	70	100	2.5
VII		Numerical Methods	2.5	--	30	70	100	2.5
VII I	ECS105	Descriptive Statistics-I	2.5	--	30	70	100	2.5
IX		Probability Theory-I	2.5	--	30	70	100	2.5
	Total		24	--	270	630	900	24

B.Sc. (Entire Computer Science) Part – I Semester-II

Sr. No	Paper Code	Title of the Paper	Contact hours/ Week		Distribution of Marks for Examination			Credits
			Lect	Pract	Internal	University	Total	
I	ECS201	Communication Skill-II	04	--	30	70	100	04
II	ECS202	Introduction to Web Designing	2.5	--	30	70	100	2.5
III		Introduction to Programming Using C-II	2.5	--	30	70	100	2.5
IV	ECS203	Linear Electronics-II	2.5	--	30	70	100	2.5
V		Digital Electronics and Microprocessor -II	2.5	--	30	70	100	2.5
VI	ECS204	Mathematical Algebra	2.5	--	30	70	100	2.5
VII		Operation Research	2.5	--	30	70	100	2.5
VIII	ECS205	Descriptive Statistics-II	2.5	--	30	70	100	2.5
IX		Probability Theory-II	2.5	--	30	70	100	2.5
Total (Theory)			24		270	630	900	24
X	PRACT- I	LAB – I: Laboratory Course in Computer Science	---	04	30	70	100	4
XI	PRACT- II	LAB – II: Laboratory Course in Electronics	--	04	30	70	100	4
XII	PRACT- III	LAB – III: Laboratory Course in Mathematics	--	04	30	70	100	4
XIII	PRACT- IV	LAB – IV: Laboratory Course in Statistics	--	04	30	70	100	4
Total (Practical)				16	120	280	400	16
Grand Total (Theory + Practical)			24	16	390	910	1300	40

Internal- College Assessment, University- University Assessment, Lect- Theory Lecture, Pract- Practical

- LAB –I:Laboratory Course in Computer Science is based on papers ECS102 and ECS202
- LAB – II: Laboratory Course in Electronics is based on papers ECS103 and ECS203
- LAB – III: Laboratory Course in Mathematics is based on papers ECS104 and ECS204
- LAB – IV: Laboratory Course in Statistics is based on papers ECS105 and ECS205

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-I

Subject: Computer Science

Fundamental of Computers

Unit I:-Introduction to Computer [10]

Introduction to computers, Evolution of personal computers; Generation of computers; Elements of a computer processing system- Hardware & Software, various categories of software; Computer Organization Overview-CPU, I/O devices, storage devices and media; Various type of displays and other peripherals used in PCs.

Unit II:-Operating System Concept [10]

Introduction to Operating system, Purpose of Operating Systems, services and features of OS, Types of Operating System, Components of OS.

Introduction to PC Operating Systems:- DOS, Windows operating System, Linux operating system, Concept and working with files and folders.

Introduction to Mobile Operating System: -Android, Windows, IOS, Symbian

Unit III:-Microsoft Office [20]

Microsoft Word:-Introduction to MS Word, opening, creating, saving, deleting document, page setting, formatting page, formatting text, adding images, Header footers, border and shading, bullets, mail merge, Table, graphics, label, Templates, Wizards and Printing Techniques.

Microsoft Excel:- Introduction to excel, File management in excel, operations related to workbook, Formatting sheet, adding formulate and functions, charts and maps, data menu, view menu, work with multiple worksheets, importing and exporting of data.

Microsoft PowerPoint: Introduction and Applications of Power Point, Create a New Presentation, Adding Slides, Clip Arts, Smart art, Charts, Text , images and other objects, Templates and Master Slides, Giving Animation effects, Links and Action buttons

Reference Books

1. Computer Fundaments - P.K. Sinha.
2. Fundamental of computers - V. Raja Raman.
3. Computer Fundamentals- Anita Goel
4. Fundamentals of Information Technology - Chetan Srivastava.
5. Computer Fundamental -B. Ram

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-I

Subject: Computer Science

Programming Using C

Unit I:-Introduction to Programming [8]

Programming languages (Machine Languages, Assembly Languages, High level languages), Compiler, Assembler, Interpreter.

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation., Concept of Algorithm, Characteristics, Notation of Algorithm, Designing Algorithms Writing step by step procedure, Flowcharts- Definition, Symbol, features, representation in terms of Flow chart, Advantages and Limitations of Flow Charts, Pseudo code generation, Tracing, Testing,

Unit II:-Introduction to ‘C’ [16]

History , Features of C, Structure of ‘C’ programming , C-Tokens , Data types , Operators, Control Statements-Conditional control statements, Looping, Unconditional control statements

Unit III:-Arrays and String [16]

Array definition and declaration, Types of array, Accessing Array, array manipulation, searching, insertion, deletion of an element from an array, basic matrix operations, dynamic array, String-Declaration and Initialization of String, operation on string, inbuilt String handling functions, arithmetic operation on string, table of string.

References

1. Let us C- Y. C. Kanetkar
2. C programming- Dennis Ritchie
3. Programming in C- Goterfried
4. Programming in C – E. Balagurusamy

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-I

Subject: Computer Science

Linear Electronics-I

Unit I: - Introduction to Components: [13]

Resistors: Classification, Types (construction of Carbon composition resistor, Potentiometer, rheostat) color code of resistor, specification of resistor

Capacitors: Classification, Type construction of electrolyte & non-electrolyte (mica, ceramic & paper), air gang capacitor specification of capacitor

Inductors: type of inductor in detail Transformers (basic principle & step down, step up transformer), charging and discharging of Condensers, Ohm's law, Kirchhoff's law.

Semiconductors: -Classification on the basis of band theory, intrinsic & extrinsic semiconductors, construction of P-N junction, biasing & characteristics p-n junction

Types of diode (LED, Zenar diode) Specification of diode 1N4007

Unit II:- Power Supply and bipolar Junction Transistor [12]

Power Supplies: definition of rectifier, Half wave rectifier, full wave rectifier, bridge rectifier, filter circuits(C, L-C, CLC), load regulation, line regulation, Zener as a voltage regulator, SMPS, UPS online & off line (block diagram)

BJT: Types, symbols & identifications, Biasing methods & characteristics configuration (CE, CB, CC), a.c. & d.c. load line concepts for ((Q-point concept stability)

Unit III:- Amplifier s& Operational Amplifier [15]

Amplifiers: -Classification of amplifies depending on coupling (R-C, Transformer, Direct coupled), Mode of operation (class -A, class-B, Class-AB) ,frequency range, frequency response curve in CE amplifier, gain(voltage, current, power)

Operational Amplifier: Symbol & Block diagram of op-amp, feedback concept, parameters (I/P & O/P impedance, I/P bias current, I/P offset voltage, CMRR, PSRR, thermal drift),

Application:- Inverting & Non inverting amplifier ,Adder, Subtractor, comparator

Recommended Books:

1. Principle of Electronics-V.K.Mehta (new e/d)
2. Electronics Principle-Malvino
3. Basic Solid State Electronic-B.L.Theraja
4. Electronic Components-Madhuri Joshi
5. Principle of Electronics-P.C.Narayan Rao (Vol.I, II, III) New Age International

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-I

Subject: Computer Science

Digital Electronics-I

Unit I:-Number Systems and Arithmetic: [15]

Decimal Number System & Binary Number System Decimal to Binary conversion (Double-dabble method only), Binary to Decimal Conversion, excess-3 code, gray code, Binary Arithmetic : Binary addition, subtraction, multiplication & division Hexadecimal number system , Hexadecimal to binary, binary to Hexadecimal, Hexadecimal to decimal conversion Hexadecimal arithmetic: Addition, subtraction, multiplication & division Binary subtraction using 1' complement, 2's complement method.

Boolean Algebra and Logic Gates:- Logic Gates : AND, OR, NOT, Ex-OR, Ex-NOR NAND as Universal building block, Logic diagrams of Boolean expressions

Postulates of Boolean Algebra Theorems of Boolean Algebra, De Morgan's theorems Reducing Boolean expressions

Unit II:-Minimization Techniques [10]

Introduction, Minterms and Maxterms, K-Map, K-map for 2 variables K-map for 3 variables K-map for 4 variables, error detection & correction tech. (parity check, hamming code)

Combinational and Arithmetic Logic Circuits, Half Adder & Full Adder , Binary parallel Adder, Half Subtractor, Full Subtractor , universal Adder/Subtractor, Multiplexer and Demultiplexer, different types of Multiplexer and Demultiplexer, encoder and decoder, pin function of IC 74150,74154, 74138,74148

Unit III:-Flip Flops [15]

Concept of flip-flop, types of F/F, RS F/F, Clocked RS F/F, D F/F Triggering (positive , negative), preset and clear F/F, JK F/F , T F/F , Race around condition of JK F/F, Master slave JK F/F

Counters:- Introduction to counter, types of counters-synchronous, Asynchronous, Synchronous counter : 3-bit up counter, down counter , up-down counter ,Synchronous serial & synchronous parallel counter, BCD counter, Ring counter, Johnson counter ,pin configuration of IC 7490

Asynchronous counter / ripple counter: Modulus Counter , MOD-2, 5, 10 counter Shift Registers Introduction register, types of shift register: Serial- in serial -out(left shift register, right shift register, combined left & right), Serial-in parallel-out ,

Parallel-in serial-out, parallel-in parallel-out, pin configuration of IC 7495, shift counter, Ring counter

Reference Books

- 1) Digital principle & applications – Malvino Leech
- 2) Digital principle – Floyed
- 3) Digital electronics – C.F.Strangio
- 4) Modern Digital electronics – R.P.Jain
- 5) Principle of electronics – B.V. Narayan Rao (3rd edition)

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-I

Subject: Computer Science

Discrete Structures

Unit I:-

[12]

Introduction: Introduction to Sets, Finite and Infinite Sets, Unaccountably Infinite Sets, Pigeonhole Principle, Permutation and Combinations, Principle of Inclusion and Exclusion.

Recurrence Relations: Introduction, Generating Functions, Linear Recurrence Relations with constant coefficients and their solution.

Unit-II:-

[14]

Graphs: Definition and elementary results, types of graphs, isomorphism, adjacency and incidence matrix.

Derived graphs: Sub graphs, induced sub graphs, complement of a graph, self complementary graphs, union, intersection, ring sum, product of two graphs.

Connected graphs: Definition of connected and disconnected graphs, edge sequence, trail, path, circuit, definitions and elementary results, Isthmus and cut vertex, Vertex and edge connectivity, Dijkstra's shortest path algorithm and examples.

Unit III:-

[14]

Eulerian and Hamiltonian Graphs : Definition of Eulerian trail, Eulerian circuit and Eulerian graph, Koningsbergs seven bridge problem, Fleury's algorithm, Definition of Hamiltonian path , Hamiltonian circuit and Hamiltonian graph, Chinese Postman Problem, Travelling salesman problem and examples.

Tree : Definition and elementary results, centre of a tree, radius of a tree, diameter of a tree, Spanning tree, Shortest Spanning tree, Kruskal's algorithm to find shortest spanning tree, fundamental circuits and fundamental cut sets and examples.

Binary Tree: Definition of binary tree, internal vertices, intermediate vertices, elementary results and examples.

References

1. Elements of Discrete Mathematics – C.L. Liu
2. Discrete Mathematics and Its Applications - K. Rosen
3. Discrete Mathematical Structures with Application- J.P. Trembley, R. Manohar
4. Elements of graph theory – Bhave and Raghunathan
5. A Logical Approach to Discrete Math - David Gries,

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-I

Subject: Computer Science

Numerical Methods

Unit I:-

[10]

System of linear equations and matrices: Introduction to system of linear equations, Gauss elimination, Gauss – Jordan method, homogeneous system of linear equations, matrices, elementary matrices and method of finding A^{-1} , Results on systems of linear equations and invertibility.

Unit II:-

[15]

Errors in numerical calculations: Floating point representation of real numbers, rounding off errors, absolute, relative and percentage errors, Arithmetic operation on normalized floating point numbers.

Solution of non linear equations: Location of roots, bisection, regula-falsi and Newton Raphson method, Comparison of these methods. Acceleration of convergence: Aitken's process.

Polynomial interpolation and approximation: finite difference: forward, backward, Newton's formula for both forward and backward interpolation, Lagrange's interpolation.

Unit III:-

[15]

Numerical differentiation and integration: Numerical differentiation formula using interpolating polynomials, general quadrature formula. Trapezoidal formula, Simpson's (1/3) rule and (3/8) rule for integration.

Solution of ordinary differential equation: Numerical solution by Taylor's Series. Euler's method, Runge - Kuta method: Second and fourth order.

Reference Books

1. Elements of Discrete Mathematics – C.L. Liu
2. First step in graph theory – Raghunathan, Nimkar and Solapurkar.
4. Combinatorics – V. Krishnamurthy
5. Discrete Mathematical Structure for Comp. Science – Alan Doerr
6. Combinatorics Theory and Applications- V.Krishnamurthy
7. Introductory Methods of Numerical Analysis – S.S. Sastry (Prentice Hall)
8. Computer Oriented Numerical Methods – Rajaraman
9. Introduction to applied Numerical Analysis – C. Richard, W. Hamming.
10. Numerical Methods for Science and Engineering – R. G. Stanton

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-I

Subject: Computer Science

Descriptive Statistics-I

Unit I: -

[15]

Population and Sample: Concept of Statistical population with illustration, Concept of Sample with illustration, Methods of sampling - SRSWR, SRSWOR, Stratified, Systematic (description only)

Data condensation and Graphical methods: Raw data, Attribute, Variables, Discrete and Continuous Variable, General principles of classification of raw data, Construction of frequency dist, Cumulative frequency dist, Relative frequency dist, Graphical representation of frequency dist- Histogram, frequency polygon, frequency curve, Ogives, Diagrammatic representation- simple bar, sub-divided bar, Pie diagram, Numerical problems.

Unit II: -

[8]

Measures of Central Tendency: Concept of Central Tendency, Objects of Central Tendency, Criteria for good Measures of Central Tendency, A.M. – def., formula for computation for ungrouped & grouped data, combined A.M., effect of change of origin & scale, weighted A.M., merits & demerits, Median- def., formula for computation for ungrouped & grouped data, graphical methods, merits & demerits, Mode- def., formula for computation for ungrouped & grouped data, graphical methods, merits & demerits, Use of appropriate average, Quartiles- def., formula for computation for ungrouped & grouped data, graphical methods merits & demerits, Numerical Problems.

Unit III: -

[17]

Measures of dispersion: Concept of dispersion, Absolute & Relative measures of dispersion, Range- def., formula for computation for ungrouped & grouped data, coeff. of range, merits & demerits, Q.D.- def., formula for computation for ungrouped & grouped data, coeff. of Q.D., merits & demerits, Variance & S.D.- def., formula for computation for ungrouped & grouped data, combined variance, C.V., effect of change of origin & scale, merits & demerits, Numerical problems.

Moments, Measures of skewness & kurtosis: Raw & central moments- def., formula for computation for ungrouped & grouped data (up to first four moments), Relation between central & raw moments, Idea of symmetric frequency distribution, skewness

of frequency distribution, positive & negative skewness, empirical relation between mean, median & mode, Measures of skewness- Pearson's measure, Bowley's Measure, β_1 , γ_1 , Idea of kurtosis of a frequency distribution, types of kurtosis- Leptokurtic, Mesokurtic, Platykurtic, Measures of kurtosis based on moments β_2 , γ_2 , Numerical problems.

References

1. Fundamentals of Mathematical Statistics- Kapoor & Gupta.
2. Modern elementary Statistics – J.E.Freund
3. Statistical Methods – J.Medhi.
4. Fundamentals of Statistics-S.C.Gupta.

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-I

Subject: Computer Science

Probability Theory-I

Unit I:-

[08]

Permutations & Combinations: Principles of counting, Permutations of n dissimilar objects taken r at a time (with without repetitions), Permutations of n objects not all of which r different, Combinations of n objects taken r at a time, Combinations with restriction on selection (excluding or including a particular object in the group), Numerical problems.

Unit II:-

[07]

Probability: Idea of deterministic & nondeterministic models, Random expt. – Sample space (finite, infinite, countable), Events-Types of events, Probability – Classical def., relative frequency approach, probability models, axioms of probability, probability of an event, Theorems of probability (with proof) - i) $0 \leq P(A) \leq 1$, ii) $P(A) + P(A^c) = 1$, iii) $P(\Phi) = 0$ iv) $P(A) \leq P(B)$ when A is subset of B v) Addition law of probability.

Concept & def. of conditional probability, multiplication theorem: Concept & def. of conditional probability, multiplication theorem, Concept & def. of independence of two events, pair wise & complete independence with resp. to three events, Numerical problems.

Unit III:-

[15]

Discrete random variable: Def. of r.v., discrete r.v., Def. of p.m.f., c.d.f. & properties of c.d.f., Def. of expectation & variance, theorems on expectation, Determination of median & mode using p.m.f., Numerical problems.

Standard Discrete Distribution: Uniform Distribution- Def., mean, variance, illustration of real life situations, Binomial distribution- Def., mean, variance, illustration of real life situations, additive property (statement only). Poisson distribution-mean, variance, illustration of real life situation, additive property (Statement only), Limiting case of binomial distribution (Statement only), Hypergeometric distribution – mean, variance, illustration of real life situation, Numerical problems.

References

1. Fundamentals of Mathematical Statistics- Kapoor & Gupta.
2. Modern elementary Statistics – J.E.Freund
3. Statistical Methods – J.Medhi.
4. Fundamentals of Statistics-S.C.Gupta.
5. Fundamentals of applied Statistics-Gupta & Kapoor.
6. Business Statistics – S. Shah
7. Programmed Statistics - B.L.Agarwal.

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-II

Subject: Computer Science

Introduction to Web Designing

Unit I:- Overview of HTML & HTML5

[12]

Introduction to Networking, Network topology, LAN,MAN, WAN, Introduction to Internet, Requirement for Internet.

Introduction to HTML, Overview of basic HTML , Structure of HTML, Creating and opening HTML file, Singular and paired tags, Text formatting tag, Anchor tag, Lists, Image, Image Map, Table, Frames and Frameset,

HTML5: Introduction to HTML5, Need of HTML5, DOCTYPE Element, Tags-Section, Article, aside, header, footer, nav, dialog, figure etc. Events in HTML5, Input tag (Type, Auto focus, placeholder, required etc. attributes.) in HTML5, Graphics in HTML5, Media tags in HTML5

Unit II:- Introduction to CSS

[8]

Introduction to CSS, Use of CSS, Types of CSS, Selectors, Properties, Values.

CSS Properties :- Background, Text, Fonts, Link, List, Table, Box Model, Border, Margin, Padding, Display, Positioning, Floating, Opacity, Media type, Backgrounds and Borders Image, Values and Replaced Content, Text Effects,2D/3D Transformations ,Animations, Multiple Column Layout ,User Interface, CSS interact with JavaScript.

Unit III:- JavaScript

[20]

Introduction to JavaScript , JavaScript Variables & Data types, Operators, Built in functions in JavaScript ,Control structure in JavaScript ,DOM, Math, Array, History, Navigator, Location, Windows, String, Date, Document objects, user defined function, Validation in JavaScript, event & event handling in JavaScript.

Reference Books:-

1. HTML5 Black Book Kogent Learning Solutions Inc Dream-tech.
2. Beginning JavaScript and CSS Development with jQuery Richard York.
3. Beginning HTML and CSS Rob Larsen.
4. HTML_&_CSS_The_Complete_Reference Thomas A. Powell.(Fifth Edition).

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-II

Subject: Computer Science

Introduction to Programming Using C-II

Unit I:-Function and Pointer [16]

Definition, declaration, function prototypes, Local and global variables, User defined functions, recursion, passing array and string to function, Storage classes

Pointers-Definition and declaration, Operation on pointer, Pointer initialization, Pointer and function, Pointer and array, Pointer of pointer, Call by value and Call by reference, Dynamic memory allocation

Unit II:-Structures and Union [10]

Definition and declaration, copying and comparing of structure, Array of structures , Passing structure to function, Pointer to structure , Nested structure, self referential structure, Size of and type def, Definition and declaration of union, difference between structure, union and array.

Unit III:-File Handling [14]

Defining, opening and closing of file, operations on file, Standard input and output functions, Formatted input and output functions, File opening modes, Error handling, Random access of file, command line argument.

Macros and Preprocessing-Features of C preprocessor, Macro – Declaration, Expansion, File Inclusion

Graphics using C - VDU Basics, Simple library functions-getpixel, putpixel, line, rectangle, circle, ellipse, arc etc.

Reference Books:-

1. Let us C- Y. C. Kanetkar
2. C programming- Dennis Ritchie
3. Programming in C- Goterfried
4. Programming in C – E. Balagurusamy

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-II
Subject: Computer Science

Linear Electronics-II

Unit-1: Field Effect Transistor & Oscillators [12]

FET: Introduction of FET, construction of FET, types of FET, working & characteristics of FET

MOSFET: construction of MOSFET, types, working modes- depletion & enhancement, characteristics

DEMOSFET: construction of DEMOSFET, types, working & characteristics, application -FET, MOSFET, DEMOSFET

Oscillator: Introduction, feedback concept-positive, negative, barkhousen criteria, types of oscillator- RC, types of RC oscillators , LC , types of LC oscillators , crystal oscillator- working of circuits and equation for O/P frequency, application list of oscillator.

Multivibrator: Types of multivibrator -astable, monostable, bistable, multivibrator using IC 741 & IC 555, Application of multivibrator

Unit-2: Sensors and Motors [14]

Measurement of physical parameter, measurement system block diagram, measurement characteristics like accuracy, precision, sensitivity, linearity, resolution, reliability, repeatability, error

Sensors: Definition of sensor & transducer, types of sensor , features & application of sensor, Temperature sensor-RTD, Thermister, thermocouple, Humidity sensor, pH sensor, IR sensors, proximity sensors, pressure sensor, accelerometer

Motors: types of motor (ac & dc), stepper motors, features & application of motors

Unit-3: Hard-Ware components [14]

Signal levels of TTL family, TTL sub-families , MOS family, characteristics of IC families- propagation delay, power dissipation, fan-out concept, noise margin , Basic concepts of semi custom IC - PLA,PAL,FPLA, PLD,CPLD and F PGAs, SMC, SMT and SMDs, Multilayer PCB technology.

References:

1. B Govindrajalu-IBM PC and clones Hard-Ware,Troubleshooting,and Maintainance (second edition)pub-TMH
2. Student should search for technical and commercial information on internet.
3. Mechatronics: Bradley, Dawson, Burd, Loader.
4. Robotic Engineering: R.D. Klafter, M.Negin,T.A.Chmielewski.
5. Basic Solid State Electronic-B.L.Theraja
6. Modern electronic instrument & measurement tech.-Helfrik A. & Copper W.

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-II

Subject: Computer Science

Digital Electronics and Microprocessor -II

Unit-1: Data Converters: [10]

Basic concepts of DAC and ADC, specifications Digital to analog conversion: Binary weighted and R - 2 R ladder networks Analog to digital conversion: Successive approximation method, Dual slope

Unit-2: Semiconductor Memories: [10]

Memory cell, Memory organization, operation and parameters. types of memory, RAM (Static, Dynamic), pin connection of RAM chip, Classification of ROM (PROM, EPROM), dot matrix PROM, read-write operation of memory, memory parameter, Flash memory

Unit-3 Fundamentals of Microprocessor: [20]

Introduction to microprocessor, Basic system with Bus Architecture Intel 8085 Microprocessor: Features, Architecture, Pin Description. Clock & reset circuit, Concepts of T-state, Machine cycle, Instruction cycle. Concept of I/O mapped I/O and Memory mapped I/O techniques.

Programming with Microprocessor: Instruction set of 8085, Instruction format, Addressing modes, Classification of instructions, Assembly language programming of Data transfer, Arithmetic, logical & Branch operations. (8-bit only).

Reference Books

- 1) Digital principle & applications – Malvino Leech
- 2) Digital principle – Floyed
- 3) Digital electronics – C.F.Strangio
- 4) Modern Digital electronics – R.P.Jain
- 5) Principle of electronics – B.V. Narayan Rao (3rd edition)

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-II

Subject: Computer Science

Mathematical Algebra

Unit I:-

[10]

Finite Induction-Revision of first principle, Generalized first principle of finite induction. Ordered Pairs, Cartesian product of sets.

Relation : Definition, types of relation, equivalence, partial orderings, Diagraph of relations, Matrix representation of relation, composition of relations, transitive closure, Warshall's algorithm, equivalence class, properties of equivalence class, partition of set.

Unit II:-

[12]

Functions- Definition of function as relation, injective, surjective and bijective, functions, inverse function, composition of functions.

Complex Numbers- Addition, subtraction, multiplication, conjugate, division, modulus, argument of a complex number, Geometric representation, polar form and its properties.

Unit III:-

[18]

Logic and Binary Operations- Proposition and predicate logic, logical connectives, truth tables, logical equivalence, tautology, contradiction and neither, valid arguments and proofs, Quantifiers.

Binary Operations- Definition and examples, Residue classes modulo n , Additive and multiplicative modulo and their properties.

Reference Books:

- 1]Combinatorics - V.Krishnamurthy
- 2] Discrete Mathematical structure for Computer Science - Alan Doerr and K Levassuer
- 3] Elements of Discrete Mathematics - C.L.Liu

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-II

Subject: Computer Science

Operations Research

Unit I:- Introduction to Operations Research [5]

History, Evolution, Scope and Limitations.

Linear Programming Problem(LPP) [15]

Statement of LPP, formulation of problems as LPP, Definitions of Slack variables, surplus variables and artificial variable, standard form of LPP, Definitions of a solution, feasible solution, basic feasible solution and an optimum solution.

Solution of LPP by graphical method, simplex method, Big-M method Duality Theory- Writing dual of primal problem

Unit II:- Transportation Problem (TP) [15]

Statement of TP, balanced and unbalanced TP, methods of obtaining initial basic feasible solution of TP- North-West Corner method, method of matrix minima and Vogel's approximation method. MODI Method of obtaining an optimal solution of TP.

Unit III:- Assignment Problem(AP) [5]

Statement of AP, balanced and unbalanced AP, relation with TP, Optimal solution of AP.

Reference Books

- 1) Operations Research - H.A.Taha
- 2) Operations Research - Kantiswarup Gupta
- 3) Linear Programming - S. Vajda

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-II

Subject: Computer Science

Descriptive Statistics – II

Unit I:- Correlation.

[8]

Bivariate data, scattered diagram. Concept of correlation, types of correlation, cause & effect Relation. Karl Pearson's coeff. of correlation (r), limit of r ($-1 \leq r \leq 1$) Interpretation of r , basic assumptions on which r is based. Spearman's rank correlation coeff. (R) Numerical problems.

Unit II:- Regression for ungrouped data.

[16]

Concept of regression, Derivation of lines of regression by least square principle. Properties of regression coeff. Non-linear regression- fitting of second degree & exponential curves. Numerical problems.

Multiple regression, multiple & partial correlation-(for trivariate data)

Yule's notations & concept of multiple regression. Fitting of multiple regression plane. Partial regression coeff., interpretation. Multiple correlation coeff.-Concept, definition, computation & interpretation. Partial correlation coeff.-Concept, definition, computation & interpretation. Numerical problems

Unit III:- Time Series

[16]

Meaning & utility. Components of time series. Additive & multiplicative models. Methods of estimating trend-moving average method, least square method, merits & demerits. Numerical problems

Index No.-Need & meaning of index no's, Problems in construction of index no.

Construction of price & quantity index no.-Unweighted & weighted I.No., Laspeyre's, Paasche's, Fisher's I.No. Uses of index no. , Numerical problems

Reference Books

1. Fundamentals of Mathematical Statistics- Kapoor & Gupta.
2. Modern elementary Statistics – J.E.Freund
3. Statistical Methods –J.Medhi.
4. Fundamentals of Statistics-S.C.Gupta.
5. Fundamentals of applied Statistics-Gupta & Kapoor.
6. Business Statistics – S. Shah
7. Programmed Statistics-B.L.Agarwal.

Title of the Course: B.Sc. – I (Entire Computer Science) SEM-II

Subject: Computer Science

Probability Theory – II

Unit I:- Two dimensional discrete r.v. [15]

Def. of two dimensional discrete r.v., joint p.m.f., marginal p.m.f., conditional p.m.f. Independence of two discrete r.v. Expectation- $E(X+Y)$, $E(X*Y)$, $cov(X,Y)$ Numerical problems

Continuous r.v.- Def.-continuous r.v., p.d.f., c.d.f., statement of properties of c.d.f.

Def. of mean & variance, Numerical problems.

Unit II:-Uniform and Exponential distributions. [15]

Uniform distribution- Def., mean, variance, nature of probability curve

Exponential distribution- Def. with mean, mean, variance, lack of memory property (with proof) & its interpretation, nature of probability curve.

Normal Distribution- Definition, identification of parameters, nature of probability curve, s.n.v., properties of normal distribution, distribution of $aX+b$, $aX+bY+c$ when X & Y are independent, approximation to Binomial & Poisson distribution.

Unit III:-Testing of Hypothesis [10]

Population, sample, random sample from distribution, parameter, statistic, standard error of estimator.

Concept of null hypothesis, alternative hypothesis, critical Region, level of significance, type I & type II error, one sided & two sided tests.

Large sample test –

$H_0:\mu = \mu_0$ against $H_1, \mu \neq \mu_0$ $H_0:\mu_1 = \mu_2$ against $H_1, \mu_1 \neq \mu_2$ $H_0:P = P_0$ against $H_1, P \neq P_0$ $H_0:P_1 = P_2$ against $H_1, P_1 \neq P_2$ Numerical problems

Reference Books -

1. Fundamentals of Mathematical Statistics- Kapoor & Gupta.
2. Modern elementary Statistics – J.E.Freund
3. Statistical Methods –J.Medhi.
4. Fundamentals of Statistics-S.C.Gupta.
5. Fundamentals of applied Statistics-Gupta & Kapoor.
6. Business Statistics – S. Shah
7. Programmed Statistics-B.L.Agarwal.

Laboratory course in Computer Science

- 1) Demonstration of peripherals
- 2) DOS – external and internal commands, batch files commands
- 3) Windows Operating System –
- 4) Windows explorer, program manager, control panel, print manager, Creating folders, files, icons, shortcuts
- 5) MS – WORD – Creating new documents, typing, deleting, selecting text, undo, Redo, formatting text – auto format, formatting characters, drop caps, Paragraphs, line spacing, margins, page setup, headers and footers
Writer’s tools – spelling checker, auto format, auto correct, find and replace
Mail merge – Data source, Main document, creating mail merge document.
- 6) MS – EXCEL - Creating worksheet, Graphs, resizing graphs, formulas, if Statement, types of functions
- 7) MS-Powerpoint-Creating presentation, slideshow, adding slides, inserting clip arts, smart art, images, sound files, linking etc.
- 8) Internet – creating e – mail accounts, browsing.
- 9) Design HTML page to display student Information
- 10) Design HTML page for all lists.
- 11) Design HTML page for Image map, table, frameset tags.
- 12) Create a web page using the Internal/Linked/External style sheet using
Text formatting properties, CSS Borders, Margin Properties, Color properties, Use DIV and SPAN tag properties.
- 13) Write a JavaScript code working with functions: the alert Box, the confirm Box, the prompt Box etc.
- 14) Solve Following program using JAVA Script to check given number is
 - i) even or odd
 - ii) Prime or not
 - iii) Palindrome or not.
 - iv) perfect or not
- 15) Write a JavaScript code block using objects: String Object, Boolean Object, Number Object, Date Object, Math Object, Window Object, Navigator Object, History Object, Screen Object, Location Object etc.

- 16) Write a Program to convert the Temperature in centigrade degree to the Fahrenheit degree.
- 17) Check whether given number is even or odd.
- 18) Write a program to find out First Fifty Prime numbers.
- 19) Write a program to find GCD & LCM of given number.
- 20) Write a program to convert given Binary number into its Octal/Decimal, Hexadecimal Equivalent.
- 21) Write a program to display Fibonacci series.
- 22) Write a Recursive function to find out the Factorial of Given Number.
- 23) Write a program to remove blank lines from a file.
- 24) Write a program to count the no. of words in a given text file.
- 25) Write a program to reverse the given number.
- 26) Write a program to calculate Matrix Addition, Multiplication using Functions as well as without Functioning.
- 27) Write a program to find given string is Palindrome or not using function.
- 28) Write a program that accepts the Roll No, Name, Marks obtained in three tests of 'N' students & display the total and Average in tabular format.
- 29) Write a program to accepts two alphabets and pass them to the Function via Pointers which checks for type of these alphabets. If both alphabets are Vowels then function should return to the calling function, their previous alphabets. If both alphabets are Constant then function should return their successor alphabets.
- 30) Write a program which uses simple graphics functions.
- 31) Write a program to add two Matrices; Use two Dimensional arrays as Pointer & Dynamic Memory allocation.
- 32) Write a program to input 10 names each of the length at least 8 characters sort them in a alphabetical order.
- 33) Write a program to demonstrate macro substitution.
- 34) Write a program to demonstrate file inclusion mechanism.

Laboratory Course in Electronics

GROUP - A

1. Study of electronic components
2. Study of instruments & measurement techniques
3. Study of Kirchoff's laws
4. Zener diode as a voltage regulator
5. Use of CRO
6. Half wave rectifier
7. Full wave rectifier
8. Voltage regulator by using three pin ICs
9. Phase Shift Oscillator
10. Op-amp as adder
11. Op-amp as subtractor
12. CE amplifier

GROUP - B

1. Transistor as a switch
2. AMVT by using IC 555
3. Study of basic gates
4. Study of Flip-flop (RS, D)
5. Study of binary counter
6. Study of DeMorgan's theorems
7. Adder using gates
8. Interconversion of gates using Universal Gates (NOR/NAND)
9. Assembly Language program for Arithmetic operations using 8085 Microprocessor
10. Assembly Language program for Ascending and descending numbers using 8085 Microprocessor
11. Assembly Language program for addressing modes in 8085 Microprocessor
12. Assembly Language program for Block Transfer using 8085 Microprocessor
13. Assembly Language program for Stack using 8085 Microprocessor

Note: - Assembly Language program in 8085 must be implemented using 8085 Microprocessor Kit

Laboratory Course in Mathematics

- 1) Relations- Diagraph of relations, matrix representation, transitive closure and Warshall's algorithm.
- 2) Adjacency and incidence matrix.
- 3) Union, intersection, ring sum, product of two graphs, fusion of vertices.
- 4) Dijkstra's shortest path algorithm.
- 5) Fleury's algorithm.
- 6) Kruskal's algorithm for weighted spanning tree
- 7) Fundamental circuits and fundamental cut sets.
- 8) Solution of system of linear equations by Gauss elimination method, Gauss-Jordan method.
- 9) Inverse of a matrix: row reduction method, adjoint method. Solution of system of linear equations by matrix inversion method.
- 10) Determinant of a matrix by row reduction method, cofactor expansion method.
- 11) Eigen values and eigen vectors of a matrix: Find Eigen values and eigen vectors of a matrix, find matrix P that diagonalizes the given matrix, if it exist.
- 12) Solution of non linear equations, bisection method, regula-falsi method, Newton Raphson method.
- 13) Interpolation: Newton's interpolation formula for both forward and backward interpolation, Lagrange's interpolation formula.
- 14) Numerical integration: Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule.
- 15) Problems on LPP by Graphical method, Simplex method, Big-M method.
- 16) Problems on TP.
- 17) Problems on AP.

Laboratory course in statistics

1. Construction of frequency dist. & graphical representation
2. Diagrammatic representation
3. Measures of central tendency(ungrouped data)
4. Measures of central tendency(grouped data)
5. Measures of dispersion
6. Computation of raw & central moments, measures of skewness & kurtosis.
7. Computation of correlation coeff.
8. Fitting of lines of regression.
9. Fitting of second degree & exponential curve.
10. Fitting of multiple regression plane & computation of multiple partial correlation coeff.
11. Fitting of Binomial distribution.
12. Fitting of Poission distribution.
13. Fitting of Normal distribution.
14. Model sampling from uniform & exponential distribution.
15. Time series
16. Index no.
17. Large sample tests.