Solapur University, Solapur

Semester Pattern R e v i s e d Syllabus of

B.Sc.-I Entire Computer Science

w.e.f. June-2014

Semester - I

Paper Code	Paper Name	Theory / Practical	Marks
ECS101	Computer Fundamentals – I	Theory	50
ECS102	Programming using 'C' – I	Theory	50
ECS103	Linear Electronics – I	Theory	50
ECS104	Digital Electronics – I	Theory	50
ECS105	Graph Theory	Theory	50
ECS106	Numerical Methods	Theory	50
ECS107	Descriptive Statistics - I	Theory	50
ECS108	Probability Theory – I	Theory	50
LAB-I	Laboratory Course in Computer Science	Practical	---
LAB-II	Laboratory Course in Electronics	Practical	---
LAB-III	Laboratory Course in Mathematics	Practical	---
LAB-IV	Laboratory Course in Statistics	Practical	----
Total Marks			**400**

Semester – II

Paper Code	Paper Name	Theory / Practical	Marks
ECS201	Computer Fundamentals – II	Theory	50
ECS202	Programming using 'C' – II	Theory	50
ECS203	Linear Electronics – II	Theory	50
ECS204	Digital Electronics – II	Theory	50
ECS205	Algebra	Theory	50
ECS206	Operations Research	Theory	50
ECS207	Descriptive Statistics - II	Theory	50
ECS208	Probability Theory – II	Theory	50
LAB-I	Laboratory Course in Computer Science	Practical	100
LAB-II	Laboratory Course in Electronics	Practical	100
LAB-III	Laboratory Course in Mathematics	Practical	100
LAB-IV	Laboratory Course in Statistics	Practical	100
Total Marks			**800**

- LAB-I : Laboratory Course in Computer Science is based on papers ECS101, ECS102, ECS201 and ECS202

- LAB-II : Laboratory Course in Electronics is based on papers ECS103, ECS104, ECS203 and ECS204

- LAB-III : Laboratory Course in Mathematics is based on papers ECS105, ECS106, ECS205 and ECS206

- LAB-IV : Laboratory Course in Statistics is based on papers ECS107, ECS108, ECS207 and ECS208

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

Paper – I : COMPUTER FUNDAMENTALS-I

Unit 1:- Introduction to computer - [6]

Definition of computer, characteristics, limitations, concepts of h/w and s/w, capabilities of computers, evaluation , generation , classification based on size and purpose, applications of computers in various fields, computer language – high level, low level, assembly level , compiler, interpreter.

Unit 2:- Structure of computer:- [7]

Block diagram, ALU, Memory Unit, Control Unit, Introduction to motherboard, SMPS, Expansion Slots, Serial and Parallel ports

Unit 3:- Computer codes and Number System:- [10]

BCD, EBCDIC, ASCII, Bit, Byte, Word.

Number System – Binary, Octal, Decimal, Hexadecimal , Conversion of Number System, Binary Arithmetic – addition, subtraction, multiplication, division, ones and two's compliment.

Unit 4: Input and Output Devices, Concept of Memory:- [8]

Input devices: - Keyboard, Mouse, Light pen, Joystick, Touch screen, Digitizer, Scanner, MICR, OMR, Barcode reader.

Out put devices: - VDU, Printers – Dot-matrix, Inkjet, Laser, Line, Plotters

Memory :- ROM, EPROM, PROM.

Secondary Storage devices: - Magnetic disk, Magnetic tape, Floppy disk, CD ROM

Chapter 5 :- Overview of Operating System [8]

Definition and Functions of O.S. Features of O.S.

Disk Operating System (DOS), Dos internal and external commands, Batch files commands, concept of directory and file,

Types of O.S. –Single user, Multi-user.

Reference Books:-

1) Computer Today --Basandra

2) Fundamental of computers --V. Raja Raman.

3) Computer Fundaments --P.K. Sinha.

PROGRAMMING USING 'C' - I

Unit –1. Programming Methodology   **[09]**
- Step involving in problem solving.
- Problem definition
- Algorithm, Characteristics, Notation of Algorithm
- Flowcharts- Definition, Symbol, features
- Running and debugging the program.

Unit -2. Introduction to 'C'   **[3]**
- History
- Character set and keywords
- Structure of 'C' programming
- Constant and its type
- Variable and its type(Data types)

Unit – 3 Operators   **[3]**
- Arithmetic, logical, relational, bitwise, increment, decrement, Conditional

Unit -4. Control Statements   **[15]**
- Conditional control statements- if, if else, nested if, switch
- Looping – for statements, nested for, while, do-while statements
- Unconditional control statements- break, continue, goto

Chapter-5. Arrays   **[15]**
- Array definition and declaration
- Single and multidimensional array, basic matrix operations
- Character array(string)- Declaration, operation on string and inbuilt String functions

Reference Books:

1) Let us C- Y. C. Kanetkar

2) 'C' programming- Dennis Ritchie

3) Programming in C- Gottfried

4) Programming in ANSII-C - Balgurusamy

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ECS103 – Linear Electronics – I

Unit-1. Introduction to Components: [12]

Resistors, capacitors, transformers, inductors charging and discharging of condensers, decay & growth in L-C & R-C ckt.s, LCR series & parallel circuits.

Unit -2. Network Theorems: [9]

Ohm's law, Kirchoff's law, Thevenin's theorem, Norton's theorem, Superposition theorem, maximum power transfer theorem, Substitution theorem (only statements & applications to problems, no proof)(applications to d.c. only).

Unit -3. Semiconductors: [8]

Classification on the basis of band theory, intrinsic & extrinsic semiconductors, p-n junction (basic principle of operation), p-n junction diode, types of p-n diode (zener diode, LED & 7-segment display, photodiodes, photo resistors)

Unit -4. D.C. Power Supplies: [8]

Half wave rectifier, full wave rectifier ,bridge rectifier, filter circuits, load regulation, line regulation, Zener as a voltage regulator.

Unit -5. Bipolar Junction Transistors: [8]

Types (power & RF type), symbols & identifications, configuration(C-B,C-C,C-E),biasing methods(potential divider type for C-E only),load line concepts for a.c. & d.c.(Q-point concept & stability)

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
   6. Text book of F.Y.B.C.S. (Electronics)-Deuskar, Shaligram, Lele & others

ECS104 – Digital Electronics – I

Unit-1: Number System [11]

Binary, decimal, BCD, hexadecimal and octal. Conversion from one to another, character code, Excess three codes, gray code, error detection and correcting code (Parity bits and Hamming code)

Unit-2: Logic Gates [10]

Introduction to gates Demorgan's theorems, conversion of one gate to another, Boolean, algebra, identities, Karnaugh map (Three and four variable) simplification and logic diagram.

Unit-3 Application of logic gates [8]

Half adder, Full adder, half subtractor, parallel adder, Universal adder/subtractor, introduction to logic families and comparative study (TTL & MOS).

Unit-4: Combinational Circuits [8]

Multiplexers, Principles, tree multiplexing, Nibble multiplexing, IC 74150

Unit-5: Demultiplexers, principles, tree Demultiplexing, IC 74154 , encoders, IC74148, decoders, IC 74138, seven segment display IC7447/7446. [8]

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)

ECS105 - Graph Theory.

Unit -1: Graphs [6]

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

Unit -2: Derived graphs. [7]

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

Unit -3: Connected graphs. [12]

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

Unit -4: Eulerian and Hamiltonian graphs. [8]

Eulerian graphs: Definition and examples. Koningsberg's 7-bridge problem. Fleury,s algorithm. Introduction to Hamiltonian graph.

Unit -5: Trees [12]

Definition and elementary results, equivalent characterizations. Centre of a tree, spanning tree, fundamental circuits and fundamental cut sets, Kruskal's algorithm for weighted spanning tree. Binary tree and elementary results.

Reference Books:

i) Elements of Discrete Mathematics – C.L. Liu
ii) First step in graph theory – Raghunathan, Nimkar and Solapurkar.
iii) Elements of graph theory – Bhave and Raghunathan.
iv) Combinatrics – V. Krishnamurthy
v) Discrete Mathematical Structure for Computer Science – Alan Doerr and K. Levassuer.

ECS106-Numerical Methods

Unit.1 System of linear equations and matrices.   [8]

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.2 Errors in numerical calculations.   [5]

Floating point representation of real numbers, Rounding off errors, absolute, relative and percentage errors. Arithmetic operation on normalized floating point numbers.

Unit.3: Solution of non linear equations.   [6]

Location of roots, bisection, regula-falsi and Newton Raphson merthod, Comparison of these methods. Acceleration of convergence: Aitken's process.

Unit.4: Polynomial interpolation and approximation,   [10]

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

Unit.5: Numerical differentiation and integration.   [16]

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:

i) Introductory Methods of Numerical Analysis

-- S.S. Sastry(Prentice Hall)

ii) Computer Oriented Numerical Methods.

-- Rajaraman

iii) Introduction to applied Numerical Analysis.

-- C. Richard, W. Hamming.

iv) Numerical Methods for Science and Engineering

-- R. G. Stanton (Prentice Hall)

ECS107 - Descriptive Statistics -I

Unit.1. Population and Sample   **[5]**
    1.1   Concept of Statistical population with illustration.
    1.2   Concept of Sample with illustration.
    1.3   Methods of sampling- SRSWR, SRSWOR, Stratified, Systematic (description only)

Unit.2. Data condensation and Graphical methods.   **[12]**
    2.1   Raw data, Attribute, Variables, Discrete and Continuous Variable.
    2.2   General principles of classification of raw data.
    2.3   Construction of frequency dist. Cumulative frequency dist Relative frequency dist
    2.4   Graphical representation of frequency dist- Histogram, frequency polygon, frequency curve, Ogives.
    2.5   Diagrammatic representation- simple bar, sub-divided bar, Pie diagram.
    2.6   Numerical problems.

Unit. 3. Measures of Central Tendency.   `   **[8]**
    3.1 Concept of Central Tendency
    3.2 Objects of Central Tendency
    3.3 Criteria for good Measures of Central Tendency
    3.4 A.M. – def., formula for computation for ungrouped & grouped data, combined A.M., effect of change of origin & scale, weighted A.M., merits & demerits.
    3.5 Median- def., formula for computation for ungrouped & grouped data, graphical methods, merits & demerits.
    3.6 Mode- def., formula for computation for ungrouped & grouped data, graphical methods, merits & demerits.
    3.7 Use of appropriate average.
    3.8 Quartiles- def., formula for computation for ungrouped & grouped data, graphical methods merits & demerits.
    3.9 Numerical Problems.

Unit. 4. Measures of dispersion.   **[8]**
    4.1 Concept of dispersion.
    4.2 Absolute & Relative measures of dispersion.
    4.3 Range- def., formula for computation for ungrouped & grouped data, coeff. of range, merits & demerits.
    4.4 Q.D.- def., formula for computation for ungrouped & grouped data, coeff. of Q.D., merits & demerits.
    4.5 Variance & S.D.- def., formula for computation for ungrouped & grouped data, combined variance, C.V., effect of change of origin & scale, merits & demerits.
    4.6 Numerical problems.

Unit. 5. Moments, Measures of skewness & kurtosis.   [12]

     5.1 Raw & central moments- def., formula for computation for ungrouped & grouped data (up to first four moments).

     5.2 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, Platykutic.

     Measures of kurtosis based on moments β_2, γ_2

     Numerical problems.

     5.3 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.

ECS108 – Probability Theory – I

Unit-1. Permutations & Combinations [7]

    1.1   Principles of counting.

    1.2   Permutations of n dissimilar objects taken r at a time (with & without repetitions)

    1.3   Permutations of n objects not all of which r different.

    1.4   Combinations of n objects taken r at a time.

    1.5   Combinations with restriction on selection (excluding or including a particular object in the group)

    1.6   Numerical problems.

Unit-2. Probability [12]

    2.1   Idea of deterministic & nondeterministic models

    2.2   Random expt. – Sample space (finite,infinite,countable)

    2.3   Events-Types of events.

    2.4   Probability – Classical def., relative frequency approach, probability models, axioms of probability, probability of an event.

    2.5   Theorems of probability (with proof)-
        i) $0 \leq P(A) \leq 1$, ii) $P(A) + P(A') = 1$, iii) $P(\Phi) = 0$
        iv) $P(A) \leq P(B)$ when A is subset of B
        v) Addition law of probability.

Unit-3. Concept & def. of conditional probability, multiplication theorem. [8]

    3.1 Concept & def. of conditional probability, multiplication theorem.

    3.2 Concept & def. of independence of two events, pair wise & complete independence with resp. to three events.

    3.3   Numerical problems.

Unit-4. Discrete random variable [8]

    4.1 Def. of r.v., discrete r.v.

    4.2 Def. of p.m.f., c.d.f. & properties of c.d.f.

    4.3 Def. of expectation & variance, theorems on expectation.

    4.4 Determination of median & mode using p.m.f.

    4.5 Numerical problems.

Unit-5. Standard Discrete Distribution [10]

    4.1 Uniform Distribution- Def., mean, variance, illustration of real life situations.

    4.2 Binomial distribution- Def., mean, variance, illustration of real life situations, additive property(statement only).

    4.3 Hypergeometric distribution- Def., mean, variance, illustration of real life situations.

    4.4 Poisson distribution- Def., mean, variance, illustration of real life situations, additive property(statement only), limiting case of B (n,p)(statement only)

    4.5 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.

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

ECS201- Computer Fundamentals – II

Unit-1:- Windows Operating System [7]
  Features of Windows O.S., GUI
  Modules of Windows – Windows Explorer, Program manager, Control
  panel, Printer Manger.
  Elements of windows – Desktop, Application, icons etc.
  Windows accessories – Paintbrush, Notepad.

Unit-2:- Process Management [4]

  Multiprogramming, Multitasking, Multiprocessing, Time sharing

Unit-3:- Networking Environment [4]

  Definition of networking, Types of networking – LAN, MAN, WAN

  Introduction to Internet, Uses and benefits

Unit-4 :- Editors and Word Processors [15]

Definition of Word Processor, Detail study of features of MS- WORD and MS
– EXCEL.

Unit-5:- We b Technology [15]

Evaluation of internet, HTML, History, Structure of HTML, Tags, Formatting,
Text, Adding images, Hyper link, Image Map, Tables, Frames, Sending
Email, Introduction to JavaScript, Data types and variables, Operators,
control statements, built in functions.

Reference Books:-

1) Computer Today --Basundra

2) Fundamental of computers --V. Raja Raman.

3) Computer Fundaments --P.K. Sinha.

4) HTML, DHTML, JAVA Script, CGI, Perl – Ivan Bayross

ECS202-Programming Using 'C' - II

Unit-1. Functions [14]
- Definition, declaration, function prototypes
- Local and global variables
- User defined functions
- Storage classes

Unit--2. Pointers [9]
- 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--3. Structures and Union [9]

- Definition and declaration

- Array of structures

- Passing structure to function

- Pointer to structure

- Nested structure, self referential structure

- Size of and type def

Unit--4. File Handling [9]

- Standard input- get char (), getch(), getche ().
- Standard output- put char (), putch (), putche ()
- Formatted input- scanf (), sscanf (), fsclose ()
- File opening mode- open, modify, write, append
- Text and binary mode.

Unit--5 Macros and Preprocessing [4]

Feactures of C preprocessor, Macro – Declaration, Expansion.
File Inclusion

Reference Books:

1) Let us C- Y. C. Kanetkar
2) 'C' programming- Dennis Ritchie
3) Programming in C- Gottfried
4) Programming in ANSII-C – Balgurusamy

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ECS203 – Linear Electronics – II

Unit-1. Field Effect Transistor: [8]

FET, MOSFET, types, working principles, characteristics, applications.

Unit -2. Amplifiers: [10]

Classification of amplifies depending on coupling, frequency range, mode of operation & frequency response, CE amplifier, gain(voltage, current, power, frequency response, types of amplifiers(concepts only).

Unit -3. Operational Amplifiers: [15]

Symbols, block diagram, negative feedback, virtual ground concept, parameters, general applications, inverting amplifier, non-inverting amplifier, adder, subtactor, integrator, differentiator, comparator, Parameters of Operational Amplifier (CMRR,Ad,Ac,I/P bias current, offset current ,I/P & O/Pimpedance).

Unit -4. Oscillators: [12]

Feedback concept(positive & negative),basic principle, Barkhausen criteria, types of oscillators(RC,LC),Wien bridge, phase shift,Hartley,Collpitt's & crystal oscillator, multivibrators (using741,555),applications of oscillators & multivibarators.

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
6. Text book of F.Y.B.C.S. (Electronics)-Deuskar, Shaligram, Lele & others.

ECS204 – Digital Electronics-II

Unit-1: Sequential Circuits   **[10]**
Introduction to sequential circuits, Flip-flop, principle of operation, type, IC7474, IC7475, counters concept only (Synchronous and asynchronous),

Unit-2: IC 7490, modular counter, shift resistor, IC7495, ring counter, shift counter.   [10]

Unit-3: Data Converter.   **[15]**
D To A converter, (R2 R and binary weighted), A to D converter (All types)

Unit-4: Memory Devices   **[10]**
RAM, ROM, EPROM, PROM, Diode matrix ROM, Principle of static and dynamic methods.

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)

ECS205- Algebra

Unit-1: Finite Induction. [4]

Revision of first principle, Generalized first principle of finite induction.

Unit-2: Relations [12]

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-3: Functions [5]

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

Unit 4: Complex Numbers [6]

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

Unit 5: Logic and Binary Operations [18]

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

ECS206- Operations Research

Unit-1: Introduction to **Operations Research**   **[4]**

       History, Evolution, scope and Limitations.

Unit -2: Linear Programming Problem(LPP)   **[8]**

       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.

Unit – 3: Solution of LPP by graphical method, simplex method,   Big-M method

       Duality Theory- Writing dual of primal problem   **[8]**

Unit-4: 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 -5 : Assignment Problem(AP)   **[10]**

       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

ECS207 – Descriptive Statistics – II

Unit-1. Correlation.   [8]
1.1 Bivariate data, scattered diagram.
1.2 Concept of correlation, types of correlation, cause & effect Relation.
1.3 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.
1.4 Spearman's rank correlation coeff.(R)
1.5 Numerical problems.

Unit-2. Regression for ungrouped data.   [8]
2.1 Concept of regression.
2.2 Derivation of lines of regression by least square principle.
2.3 Properties of regression coeff.
2.4 Non-linear regression- fitting of second degree & exponential curves.
2.5 Numerical problems.

Unit-3.Multiple regression, multiple & partial correlation   [12]
(for trivariate data)
3.1 Yule's notations & concept of multiple regression.
3.2 Fitting of multiple regression plane.
3.3 Partial regression coeff., interpretation.
3.4 Multiple correlation coeff.-Concept, definition, computation & interpretation.
3.5 Partial correlation coeff.-Concept, definition, computation & interpretation.
3.6 Numerical problems

Unit-4. Time Series   [8]
4.1 Meaning & utility.
4.2 Components of time series.
4.3 Additive & multiplicative models.
4.4 Methods of estimating trend-moving average method, least square method , merits & demerits.
4.5 Numerical problems

Unit-5. Index No.   [9]

5.1 Need & meaning of index no's

5.2 Problems in construction of index no.

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

5.4 Uses of index no.

5.5 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.

ECS208-Probability Theory – II

Unit-1. Two dimensional discrete r.v. [12]

1.1 Def. of two dimensional discrete r.v., joint p.m.f., marginal
   p.m.f., conditional p.m.f.

1.2 Independence of two discrete r.v.

1.3 Expectation- E(X+Y), E(X*Y), cov(X,Y)

1.4 Numerical problems

Unit-2. Continuous r.v. [6]

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

2.2 Def. of mean & variance.

2.3 Numerical problems.

Unit-3. Uniform and Exponential distributions. [8]

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

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

Unit-4. Normal Distribution [7]

4.1 Normal distribution – Def., 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-5. Testing of Hypothesis [12]

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

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

4.3 Large sample test –

   Ho:$\mu = \mu_o$ aginst H_1, $\mu \neq \mu_o$

   Ho:$\mu_1 = \mu_2$ aginst H_1, $\mu_1 \neq \mu_2$

   Ho:$P = Po$ aginst H_1, $P \neq Po$

   Ho:$P_1 = P_2$ aginst H_1, $P_1 \neq P_2$

4.4 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.

LAB - I : Laboratory course in Computer Science

Laboratory course on paper ECS101 AND CS201
–
1) Demonstration of peripherals
2) Linking of various peripherals
3) Operation of all keys of keyboard
4) DOS – external and internal commands, batch files commands
5) Windows Operating System –
   Windows explorer, program manger, control panel, print manager,
   Creating folders, files, icons, shortcuts
6) 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.
7) MS – EXCEL - Creating worksheet, Graphs, resizing graphs, formulas, if
   Statement, types of functions
8) Internet – creating e – mail accounts, browsing.
9) Design HTML page to display student Information
10) Solve Following program using JAVA Script
    a) check whether given number is even or odd
    b) check whether given number is Prime or not
    c) check whether given number is palindrome or not.
    d) check whether given number is perfect or not

Laboratory course on paper ECS102 and CS202

1) Write a Program to convert the Temperature in centigrade degree to the
   Fahrenheit degree.
2) check whether given number is even or odd.
3) Write a program to find out First Fifty Prime numbers.
4) Write a program to find GCD & LCM of given number.
5) Write a program to convert given Binary number into its Octal / Decimal,
   Hexadecimal Equivalent.
6) Write a program to display Fibonacci series.
7) Write a Recursive function to find out the Factorial of Given Number.
8) Write a program to remove blank lines from a file.
9) Write a program to count the no. of words in a given text file.
10) Write a program to reverse the given number.
11) write a program to calculate Matrix Addition, Multiplication using Functions as
well as without Functioning.
12) Write a program to find given string is Palindrome or not using function.
13) 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.
14) 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.

15) Write a program to add two Matrices; Use two Dimensional array as Pointer & Dynamic Memory allocation.

16) Write a program to input 10 names each of the length at least 8 characters sort them in a alphabetical order.

17) Write a program to demonstrate macro substitution.

18) Write a program to demonstrate file inclusion mechanism.

LAB-II : Laboratory Course in Electronics

GROUP - A

1. Study of electronic components

2. Study of instruments & measurement techniques Part I

3. Study of instruments & measurement techniques Part II

4. Study of Kirchoff's laws

5. Zener diode as a voltage regulator

6. Common Emitter Amplifier

7. Use of CRO

8. Full wave rectifier

9. Voltage regulator by using three pin ICs

10. Phase Shift Oscillator

11. Op-amp as adder

12. Op-amp sub tractor

GROUP - B

1. Transistor as a switch

2. Study of basic gates

3. Study of Flip-flop

4. Study of binary counter

5. Study of DeMorgan's theorems

6. Astable Multivibrator using IC 555

7. Half adder

8. Full adder

9. Interconversion of gates using NOR gate

10. Interconversion of gates using NAND gate

LAB-III : 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 $1/3^{rd}$ and

   $3/8^{th}$ rule.

15) Problems on LPP by Graphical method, Simplex method, Big-M

   method.

16) Problems on TP.

17) Problems on AP.

LAB-IV : Laboratory course in statistics

1. Construction of frequency dist. & graphical representation

2. Diagrammatic representation

3. Measures o f central tendency(ungrouped data)

4. Measures o f central tendency(grouped data)

5. Measures o f 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.

Solapur University, Solapur
Nature of Question Paper For Semester Pattern
• Faculty of Science
(w.e.f. June 2014)

Time :- 2 hrs.   **Total Marks-50**

Q. No.1)   **Multiple choice questions.**   **(10)**
　　　　1)   ---
　　　　　　a)　　　　b)　　　　c)　　　　d)
　　　　2)
　　　　3)
　　　　4)
　　　　5)
　　　　6)
　　　　7)
　　　　8)
　　　　9)
　　　　10)

Q.No.2)   **Answer any Five of the following**   **(10)**
　　　　i)
　　　　ii)
　　　　iii)
　　　　iv)
　　　　v)
　　　　vi)

Q.No.3)   **A) Answer any Two of the following**   **(06)**
　　　　i)
　　　　ii)
　　　　iii)
　　　　B) Write the Answer/Solve/Problem/Note   **(04)**

Q.No.4)   **Answer any Two of the following**   **(10)**
　　　　i)
　　　　ii)
　　　　iii)

Q.No.5)   **Answer any Two of the following**   **(10)**
　　　　i)
　　　　ii)
　　　　iii)

1. **Structure of the courses :-**

A) Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as3 resolved by the respective faculties and Academic Council.
B) For Science Faculty subjects each paper shall be of 50 marks and practical for every subject shall be of 50 Marks as resolved in the faculty and Academic Council.
C) For B. Pharmacy also the paper shall be of 50 marks for University examination. Internal marks will be given in the form of grades.
D) For courses which were in semester pattern will have their original distribution already of marks for each paper.
E) For the faculties of Education, Law, Engineering the course structure shall be as per the resolutions of the respective faculties and Academic Council.

2. **Nature of question paper:**
A) **Nature of questions.**

"20% Marks - objectives question" **(One mark each and multiple choice questions)**
"40% Marks - Short notes / Short answer type questions / Short Mathematical type questions/ Problems. (2 to 5 Marks each)**
"40% Marks - Descriptive type questions / Long Mathematical type questions / Problems. **(6 to 10 Marks each)**

B) Objective type question will be of multiple choice (MCQ) with four alternatives. This answer book will be collected in first 15 minutes for 10   marks and in first 30 minutes for 20 marks. Each objective question will carry one mark **each.**
C) Questions on any topic may be set in any type of question. All questions should be set in such a way that there should be permutation and combination of questions on all topics from the syllabus. As far as possible it should cover entire syllabus.
D) There will be only five questions in the question paper. All questions will be compulsory. There will be internal option **(30%)** and not overall option.
   for questions 2 to 5.
3. Practical Examination for B. Sc. I. will be conducted at the end of second semester.
4. Examination fees for semester Examination will be decided in the Board of Examinations.

The structures of all courses in all Faculties were approved and placed before the Academic Council. After considered deliberations and discussion it was decided not to convene a meeting of the Academic Council for the same matter as there is no deviation from any decision taken by Faculties and Academic Council. Nature of Question Paper approved by Hon. Vice Chancellor on behalf of the Academic Council.