

# **Maharishi Mahesh Yogi Vedic Vishwavidyalaya**

DIRECTORATE OF DISTANCE EDUCATION

**Syllabus**

**Bachelor of Computer Science  
B.Sc. (CS)**

w. e. f. July 2012

**B.Sc. (CS) SEMESTER – I**

S. No.	Paper Code	Paper No.	Paper Name	Marks
1.	1DBCS1	I	Fundamentals of Maharishi Vedic Science (Maharishi Vedic Science – I)	100
2.	1DBCS2	II	Hindi Language	100
3.	1DBCS3	III	Development of Entrepreneurship – I	100
4.	1DBCS4	IV	Discrete Mathematics	100
5.	1DBCS5	V	Statistical Methods and Probability Theory	100
6.	1DBCS6	VI	Fundamentals of Computer and Information Technology	100
7.	1DBCS7	VII	Practical – 1DBCS5 and 1DBCS6	100

**B.Sc. (CS) SEMESTER – II**

S. No.	Paper Code	Paper No.	Paper Name	Marks
1.	2DBCS1	I	Advanced Concept of Maharishi Vedic Science (Maharishi Vedic Science – II)	100
2.	2DBCS2	II	English Language	100
3.	2DBCS3	III	Development of Entrepreneurship - II	100
4.	2DBCS4	IV	Advance Calculus and Matrices	100
5.	2DBCS5	V	Statistical Methods & Probability Distribution	100
6.	2DBCS6	VI	Programming Methodology and C Programming	100
7.	2DBCS7	VII	Practical - 2DBCS5 and 2DBCS6	100

**B.Sc. (CS) SEMESTER – III**

S. No.	Paper Code	Paper No.	Paper Name	Max. Marks
1.	3DSBCS1	I	Hindi Language and Samvedna*	100
2.	3DSBCS2	II	Environmental Studies - I	100
3.	3DSBCS3	III	Calculus, Differential Equation and Mechanics	100
4.	3DSBCS4	IV	Statistical Inference and Design of Experiments	100
5.	3DSBCS5	V	Data Structure Using C and Operating System	100
6.	3DSBCS6	VI	Practical – 3DSBCS4 and 3DSBCS5	100

**B.Sc. (CS) SEMESTER – IV**

S. No.	Paper Code	Paper No.	Paper Name	Max. Marks
1.	4DSBCS1	I	English Language and Scientific Temper	100
2.	4DSBCS2	II	Environmental Studies - II	100
3.	4DSBCS3	III	Advanced Calculus, Partial Differential Equations, Complex Analysis and Abstract Algebra.	100
4.	4DSBCS4	IV	Sampling Theory and Sampling Distribution	100
5.	4DSBCS5	V	Software Engineering and DBMS	100
6.	4DSBCS6	VI	Practical - 4DSBCS4 and 4DSBCS5	100

**B.Sc. (CS) SEMESTER – V**

S. No.	Paper Code	Paper No.	Paper Name	Max. Marks
1.	5DSBCS1	I	Language Skills and Communication Media*	100
2.	5DSBCS2	II	Basic Computer Information Technology –I	100
3.	5DSBCS3	III	Real Analysis, Linear Algebra and Discrete Mathematics	100
4.	5DSBCS4	IV	Applied Statistics	100
5.	5DSBCS5	V	Programming in Visual Basic and Introduction to Web Design	100
6.	5DSBCS6	VI	Practical – 5DSBCS4 and 1DSBCS5	100

**B.Sc. (CS) SEMESTER – VI**

S. No.	Paper Code	Paper No.	Paper Name	Max. Marks
1.	6DSBCS1	I	English Language and Aspects of Development	100
2.	6DSBCS2	II	Basic Computer Information Technology –I	100
3.	6DSBCS3	III	Metric Spaces, Numerical Analysis and Elementary Statistics	100
4.	6DSBCS4	IV	SQC and Numerical Methods	100
5.	6DSBCS5	V	Fundamentals of Computer Network and Java Programming	100
6.	6DSBCS6	VI	Practical - 6DSBCS4 and 6DSBCS5	100

# FUNDAMENTALS OF MAHARISHI VEDIC SCIENCE

## (MAHARISHI VEDIC SCIENCE – I)

### UNIT - 1

Meaning & importance of Guru Pujan.

Meaning of meditation, Mann, Intelligence, Chita, Ego, Thought .

### UNIT - II

Name of forty areas of Vedic Science and their expression in Human Physiology and characteristics of consciousness.

Consciousness, types of consciousness, characteristics of higher stages of consciousness.

### UNIT - III

Maharishi's Yoga, Transcendental Meditation- a general Introduction, Types of Speech, TM Sidhi Programme, Principle of Yoga Asanas and their Concept.

### UNIT - IV

Introduction: Maharishi Vedic Management.

Fundamental elements of Vedic Management –Totality

Management of Science and Art .

### UNIT - V

Vedic Management and Leadership.

The Idea Leadership is based upon the Totality of Employee's Style

### Suggested Readings:

- Chetna –His Holiness Maharishi Mahesh Yogi Jee
- Maharishi Sandesh - 1 and 2 , II-His Holiness Maharishi Mahesh Yogijee
- Scientific Yoga Ashanas –Dr. SatPal.
- Dhyani Shailly by Brahmchari Dr. Girish Ji

# हिन्दी भाषा

## इकाई 1

मानक हिन्दी भाषा – मानक का अर्थ, मानक भाषा के विभिन्न नाम, मानक हिन्दी के लक्षण, आवश्यकता आधुनिकीकरण की प्रक्रिया और मानक भाषा पर पड़ने वाले विभिन्न प्रभाव, मानक हिन्दी का स्वरूप, मानकीकृत भाषा के प्रमुख लक्षणों का सार। मानक हिन्दी के प्रकार – हिन्दी के रूप, व्याकाणिक, ढांचा, मानक हिन्दी की शैलियां (1) संस्कृत निष्ठ हिन्दी(2) उर्दू(3) हिन्दुस्तानी।

## इकाई 2

अशुद्धियां और उनका संशोधन – अशुद्धियां के प्रकार (1) उच्चारण तथा वर्तनीगत अशुद्धियां (2) शब्दगत अशुद्धियां (3) शब्दार्थगत अशुद्धियां (4) वाक्यगत अशुद्धियां।

(1) विभक्ति संबंधी अशुद्धियां – (क) कर्तारक (ख) कर्मकारक (2) लिंग संबंधी अशुद्धियां (3) वचन संबंधी अशुद्धियां (4) विशेषण संबंधी अशुद्धियां (5) विपरीत शब्दों के प्रयोग संबंधी अशुद्धियां।

हिन्दी का शब्द भंडार – (क) शब्दों को प्रकार, तत्सम, तद्भव, अर्ध तत्सम, देशी, विदेशी, धार्मिक और सांस्कृतिक, शासन संबंधी, शिक्षा संबंधी, कामधंधे संबंधी, खानपान संबंधी, पहनावा संबंधी, फल-फूल संबंधी।

## इकाई 3

हिन्दी की वाक्य रचना और विराम चिन्ह – (1) वाक्य और प्रकार, वाक्य के लक्षण, वाक्य की उपादेयता, समर्थ और असमर्थ वाक्य।

वाक्य परिवर्तन, विधानवाचक से निषेध वाचक, निश्चय वाचक, प्रश्नवाचक, विस्मयादिक बोधक, वाक्य परिवर्तन विशेषण की तुलनावस्था में परिवर्तन, शब्दों का परिवर्तन, सरल से मिश्र वाक्य, संयुक्त वाक्य तुलनात्मक अध्ययन, वाक्य बदलना, वाक्य परिवर्तन, वाक्य के भेद, विधिवाचक, निषेध वाचक, आज्ञावाचक, प्रश्नवाचक, विस्मयवाचक, इच्छावाचक, संदेहवाचक, संकेतवाचक।

## इकाई 4

उपवाक्यों के भेद – संज्ञा उपवाचक, विशेषक उपवाचक, क्रिया विशेषक, कालवाचक, स्थानावाचक, परिमाण वाचक, रीतिवाचक, कार्यकरण वाचक, हिन्दी में प्रयुक्त विराम चिन्ह-पूर्ण विराम, अल्पविराम। पत्रलेखन, सारलेखन, पल्लवन।

पत्र लेखन- पत्र लेखन के प्रकार, पत्रों के उदाहरण एवं पत्र लेखन की विशेषताएं (1) निजी पत्र, निमंत्रण पत्र (2) व्यावसायिक पत्र, व्यावसायिक पत्रों के प्रकार (3) शासकीय एवं अर्द्धशासकीय पत्र (4) आवेदन पत्र, समस्या प्रधान, आलोचनात्मक शिकायती सुझाव संबंधी स्पष्टीकरण पत्र (ख) सार लेखन (ग) पल्लवन।

## इकाई 5

भारतीय संस्कृति – भारत देश और उसके निवासी – रामधारी सिंह 'दिनकर'। भारतीय समाज की संरचना, सामाजिक गतिशीलता (प्राचीन से लेकर आधुनिक काल तक), धर्म और दर्शन।

भारतीय संस्कृति का विश्व पर प्रभाव, मध्यप्रदेश का सांस्कृतिक वैभव।

## उद्यमिता विकास – 1

### इकाई – 1

उद्यमिता – परिभाषा, विशेषताएँ एवं महत्व, एक उद्यमी के प्रकार एवं कार्य, एक अच्छे उद्यमती के गुण, उद्यमिता अभिप्रेरणा घटक।

### इकाई – 2

लक्ष्य प्राप्ति की प्रेरणा एवं विचारों की स्थापना। लक्ष्य निर्धारण एवं चुनौती का सामना। समस्या समाधान एवं सृजनात्मकता। क्रमबद्ध योजना एवं क्षमता की दिशाबद्धता। आत्मविश्वास का विकास। सम्प्रेषण कला। प्रभावित करने की क्षमता। नेतृत्व।

### इकाई – 3

परियोजना प्रतिवेदन। चुनी हुई प्रक्रिया का मूल्यांकन। विस्तृत परियोजना प्रतिवेदन-आवश्यकता एवं प्रासंगिकता परियोजना प्रपत्र के प्रमुख भाग परियोजना प्रतिवेदन तैयार करना।

संगठन के प्रकार का चयन-एकाकी व्यवसाय, साझेदारी एवं सहकारी समिति का अर्थ एवं विशेषताएँ संगठन के चयन को प्रभावित करने वाले घटक।

आर्थिक प्रबंधन। वित्तीय संस्थान एवं बैंको की भूमिका, बैंकिंग, वित्तीय योजना, कार्यकारी पूँजी-मूल्यांकन तथा प्रबन्धन, लागत व मूल्य निर्धारण तथा लाभ का मूल्यांकन आर्थिक लेखा-जोखा रखना।

### इकाई – 4

उत्पादन का प्रबन्धन। खरीदने के तरीके, चल सम्पत्ति/माल का प्रबन्धन, गुणवत्ता प्रबन्धन, पैकिंग, विपणन प्रबन्धन, बिक्री एवं बेचने की कला, बाजार की समझ एवं विपणन नीति, उपभोक्ता प्रबंधन, समय प्रबन्धन

नियामक संस्थाओं की भूमिका-जिला उद्योग केन्द्र, प्रदूषण निवारण मंडल, खाद्य एवं औषधि प्रशासन, विद्युत विभाग तथा नगर निगम का विशेष अध्ययन।

विकासात्मक संस्थाओं की भूमिका, खादी एवं ग्रामीण आयोग/बोर्ड, मध्यप्रदेश वित्त निगम, अनुसूचित बैंक, मध्य प्रदेश का महिला आर्थिक विकास निगम।

### इकाई – 5

स्वरोजगार मूलक योजनाएँ – प्रधानमंत्री रोजगार योजना, स्वर्ण जयंती शहरी रोजगार योजना, रानी दुर्गावती स्वरोजगार योजना, दीनदयाल स्वरोजगार योजना।

विभिन्न अनुदान योजनाएँ – लागत पूँजी अनुदान, ब्याज अनुदान, प्रवेश कर से छूट, परियोजना प्रतिवेदन, प्रतिपूर्ति अनुदान आदि।

महिला उद्यमियों हेतु विशेष प्रेरणाएँ, संभावनाएँ एवं समस्याएँ।

मध्यप्रदेश आदिवासी वित्त विकास निगम की योजनाएँ, म.प्र. अन्त्यावसायी निगम की योजना, म. प्र. पिछड़ा वर्ग एवं अल्पसंख्यक वित्त विकास निगम की योजनाएँ।

# DISCRETE MATHEMATICS

## UNIT-I:

Sets & Preposition –Introduction, combinations of sets, finite and infinite set, unacceptable indefinite sets, principle of inclusion , preposition. Relation and function introduction , a relation models for database . Properties of binary relation .Equivalence relation and lattices , partial ordering relation and lattices . Chain and anti-chain, a job scheduling problem and the pigeonhole principle.

## UNIT-II:

Recurrence relation and recursive algorithm – Introduction, Recurrence, relation linear recurrence with coefficients solution, particular solutions, total solutions.

## UNIT-III:

Group and ring –group and subgroup , generator and Evaluation of power , Cosets and Lagrange theorem, Permutation , groups and codes , Isomorphism and automorphism , Homomorphism and Normal group , Rings , Integral Domains and Field , Polynomial ring and cyclic codes.

## UNIT-IV:

Boolean algebra lattices and algebraic system , principle of duality , basic properties of algebra's of system , defined by lattices , Distributive and complemented lattices , Boolean lattices and Boolean algebra's. Uniqueness finite Boolean algebra's. Boolean function and Boolean Expression, Propositional Calculus.

## UNIT-V:

Finite state machine –introduction, finite state machines, finite state machine as model of physical system, Equivalent machine, finite state Machine as language Recognizer.

**Books :** Discrete Mathematics By Pragya Publication



# STATISTICAL METHODS & PROBABILITY THEORY

## Unit – I Statistics-meaning, definition and scope

Definition of statistics, importance, scope and limitations. Primary and secondary data. Classification and tabulation. Understanding Graphical presentation-Histogram, Frequency polygon, frequency curve, cumulative frequency curve (ogive) .Diagrammatic presentation-Bar diagram, duo-directional bar diagram, two dimensional diagram, Pie-diagram. Measure of central tendency – requisites of ideal measure, arithmetic means, geometric mean and harmonic mean and their merits, demerits. Median, Mode and their merits, demerits. Other partition values.Determination of median and mode by graphical method.

## Unit- II Measure of dispersion, Skewness and kurtosis

Requisites of ideal measure, Range, quartile deviation, mean deviation, standard deviation and their merits, demerits. Root mean square deviations and relation with standard deviation. Various formulae for calculating variance, variance of composite series, coefficient of variation, moment , moments about mean in terms of moments about any point and vice-versa. Properties of moment pearson's Beta and Gamma coefficients, Sheppard's correction. Skewness, kurtosis and their measures.

**Unit – III** Bivariate distribution-Scatter diagram, Karl Pearsons' coefficient of correlation. Determination of correlation coefficient for grouped data. Spearman's rank correlation coefficient (Repeated rank also). Curve fitting-Legendre's principle of least squares, fitting of straight line, parabola, power curve and exponential curve. Regression, line of regression and their properties.

**Unit – IV** Probability-definitions: Trial, event and sample space. Exhaustive events, favourable events, equally likely events, Independent events and dependent events. Mathematical and statistical definition of probability with their limitations. Axiomatic definition of probability, addition law of probability, conditional probability, multiplication law of probability, Baye's theorem (with proof) .

**Unit - V** Random variable – Discrete and continuous random variable, probability mass function, probability density function and their properties. Distribution function and their properties. Joint, Marginal and Conditional probability function. Stochastic independence. Mathematical expectation and their properties, addition and multiplication theorem of expectation. Mean and Variance of linear combination of random variables.

## Books :

1. P. Mukhopadhaya - Mathematical statistics new central book agency, Calcutta.
2. A. K. Goon, M. K. Gupta and Das Gupta, Fundamentals of Statistics Vol-1.
3. J. N. Kupur and H. C. Saxena, Mathematical Statistics.
4. S. C. Gupta and V. K. Kapur, Fundamentals of Mathematical Statistics.
5. B. L. Agarwal, Basic Statistics, New Age.
6. बी एल अग्रवाल – सांख्यिकी विधि

# **FUNDAMENTALS OF COMPUTER AND INFORMATION TECHNOLOGY**

## **UNIT-1**

Introduction to computer and information technology : History of development of computers, computer system concept , characteristics, capabilities and limitation , types of computer – analog, digital, hybrid, general, special purpose, micro, mainframe, super, generation of computer, personal computer (PCs) –IBM PCs, characteristics, PC/PCXT/PCAT-configurations, Pentium and Newer PCs specification and main characteristics, types of PCs-Desktop, Laptop, Notebook, Palmtop, Workstation etc , their characteristics.

Computer Organizations and Working: Basic component of a computer system –control unit, ALU, INPUT /Output function and characteristics, memory –RAM, ROM, EPROM, PROM and other types of memory.

## **UNIT-II**

Input Devices: Keyboard, Mouse, Trackball, Joysticks, Digitizing tablet, Scanner, Digital Camera, MICR, OCR, OMR, BAR-CODE Reader, Voice Recognition, Light Pen, and Touch Screen.

Output Devices: Monitor –characteristics and types of monitor –digital, analog size, resolution, refresh rate, Interlaced /Non Interlaced, Dot Pitch, Video Standard –VGA,SVGA,XGA etc, Printer –Daisy wheel, Dot Matrix, Inkjet, Laser, line printer , plotter, sound card and speakers.

## **UNIT-III**

Storage Devices: Storage Fundamental –Primary VS Secondary, Data Storage and Retrieval method –Sequential, Direct and Index Sequential, Various Storage Devices –Magnetic Tape ,Magnetic disks, Cartridge Tape, data drives, hard disk drives, floppy (Winchester disks), Disks, Optical Disks, CD,VCD,CD-R,CD-RW, ZIP Drive.

Computer Software: Need, types of software –system software, application software, system software-operating system, utility program, programming Language, assemblers, compiler and interpreter.

## **UNIT-IV**

Operating System: Function, types –Batch, Single, Multiprogramming, Multiprocessing. Programming languages- Machine, Assembly, High Level and 4GL. Merit and Demerits of Programming Languages.

Disk Operating System (Dos) Introduction History & version of Dos basic –physics structure of disk drive name , Fat ,File & directory structure and naming rules , booting process , Dos system files. Dos command: Internal –DIR , MD , CD, RD, COPY, DEL, REN , VOL, DATE, TIME, CLS, PATH, TYPE etc. External – CHKDSK, XCOPY, PRINT, DISKCOPY, DISKCOMP, DOSKEY, TREE, MOVE, LABEL, APPEND, FORMAT, SORT, FDISK, BACKUP, EDIT, MODE, ATTRIB , HELP, SYS ,etc Executable V/s Non executable file in Dos.

Number System: Data representation in computer, number system of computer –Binary, Octal, Hexa-Representation & their conversion, coding system –ASCII, BCD, EBCDIC etc.

## **UNIT-V**

Data Communication and Networks: communication channels –twister, coaxial, fiber, optic. Types of Networks –LAN, WAN, MAN etc, Topologies of LAN –Ring, BUS, STAR, MESH and TREE topologies , components of LAN-media , NIC, NOS, Bridges, HUB, Routers Repeater and Gateway .

Computer virus: Virus working principles, types of viruses, virus detection and prevention, viruses on networks. Use of communication and IT in daily life.

An Introduction: Modern Science and Vedic Science, Unified field based computer Science.

### **Text & Reference Books:-**

1. Learning Window 98 step by step by Rajeev Mathur , BPB Publication.
2. Learning Word 97 for Window by Rajeev Mathur , BPB Publication,
3. Learning Excel 97 for Window by Rajeev Mathur , BPB Publication.
4. A First Course in Computer by Sanjay Saxena , Vikas Publishing House New Delhi.
5. Microsoft Office 2000 by A. Mansoor by Pragya Publications.
6. Office 97 Interactive Course by Greg Perry, Tec media.
7. Microsoft Office 2000 by A. Mansoor by Pragya Publications.

## **Maharishi Vedic Science - II**

### **UNIT – I**

Classical and Scientific introduction about forty areas of Vedic Science.

### **UNIT – II**

Third Law of Thermodynamics.

Miessener's effect.

Maharish's Effect-Society, Environment, Behavior and effect on moral value.

### **UNIT – III**

Pradhavansabhav, Atantabhav, Annyonabhav, Pragbhav.

Meaning of "Yogastha Kuru Karmani"

Meaning of "Gyanam Chetanayam Nihitam"

### **UNIT – IV**

Theory of Karma-Prarabadha, Kriyamana, Sanchieta.

Theory of Invincibility .

Introduction to Maharishi absolute theory of Government.

### **UNIT – V**

Theory of Ayurved.

Theory of Dincharya & Ritucharya.

### **Text and Reference Books :-**

Maharishi Sandesh Part – I, II

Chetna Vigyan- His Holiness Maharishi Mahesh Yogi Ji.

Dhyan Shailly by Brahmchari Dr. Girish Ji

## ENGLISH LANGUAGE

### **Unit I:**

Simple, Compound and Complex Sentences. Coordinate Clause (With, But, Either - Or Neither-Nor, Otherwise or Else).

### **Unit II:**

Subordinate clauses – noun clauses as subject, Object and complement: Relative clauses (restrictive and nonrestrictive clauses) Adverb clauses (open and hypothetical, conditional, with, because, though, here, so that, as long as, as soon as).

Comparative Clause (as + = adjective/adverb + as-no sooner than).

### **Unit III:**

Tenses: Simple present, progressive and present perfect. Simple past, progressive and past perfect. Indication of Futurity. The passive (Simple present and past, present and past perfect and to infinitive structure).

### **Unit IV:**

Reported Speech: (i) Declarative sentences, (ii) Imperatives (iii) Interrogatives , Exclamatory sentences. Modals (will, shall, should, would, ought to, have to/have got to, can, could, may-might and need).

### **Unit V:**

Verb Structures (Infinitives and gerundial), Linking devices. Letter (both formal and informal).

## Development of Entrepreneurship - II

### उद्यमिता विकास - II

इकाई – 1

उद्यमिता का आशय, विचारधारा, उद्यमी के लक्षण।

इकाई-2

उद्यमिता के प्रकार, महत्व और विभिन्न विद्वानों के मत। लक्ष्य निर्माण, लक्ष्य कैसे प्राप्त करें। लक्ष्य प्राप्ति में समस्याएँ, उनका समाधान। स्वप्रेरणा, स्वप्रेरणा के तत्व और विकास। विभिन्न विद्वानों के मत, आकलन, निष्कर्ष। नेतृत्व क्षमता, उसका विकास और परिणाम।

इकाई- 3

परियोजनाएँ तथा विभिन्न संगठन (शासकीय-अशासकीय) , शासकीय परियोजनाएँ, अशासकीय परियोजनाएँ, बैंकों का योग, उनकी सीमाएँ, क्षेत्र।

इकाई – 4

अच्छे उद्यमी के कौन-कौन से कार्य, गुण , प्रबंधन इत्यादि। अच्छे उद्यमी के गुण, आधुनिक और पूर्ववर्ती उद्यमी की प्रबंधन कला (कौशल), उद्यमी प्रेरक तत्व।

इकाई – 5

उद्यमी की समस्याएँ, क्षेत्र पूँजी की समस्या, शाक्तिकरण (ऊर्जा) की समस्या, पंजीयन की समस्या। प्रशासनिक समस्याएँ, स्वामित्व की समस्याएँ इत्यादि।

# ADVANCE CALCULUS & MATRICES

## UNIT-I

Derivative as Tangent to a curve , Continuity and differentiability , limit and derivative , derivative of products and composite function , Leibnitz rule and chain rule.

## UNIT-II

Expansion of function by Maclaurins's theorem, Taylor's theorem, partial differentiation, total differentiation coefficient, Homogeneous Function, Euler theorem.

## UNIT-III

Integral as anti- derivative , integration by part , change of variable , integration of rational and irrational function , definite integral , definite integral as a limit of a sum , application of definite integral to find sum of infinite series.

## UNIT-IV

Differential Equation : solution of ordinary differentiation equations ,solution of first order and first degree differential equation , first order and higher degree differential equation, linear differential equation of second order.

## UNIT-V

Matrix: Solution of system of linear equation using matrix method , rank of matrix , consistency of the linear system , Eigen value and Eigen vectors.

**Books:** Advance Calculus & Matrices By Pragya Publication

## Statistical methods & Probability Distribution

### UNIT- I

Plane of regression, Properties of residual, Yule's notation, Multiple and Partial regression, Multiple and partial correlation coefficient (For three variables) and their properties.

### UNIT – II

Theory of Attributes – Class, Class frequencies, order of classes, consistency of data, conditions for consistency of data. Independence of attributes, criterion for independence of attributes, Yule's coefficient of association, coefficient of colligation.

### UNIT – III

Theoretical Discrete Distributions – Binomial Distribution, Poisson Distribution (Limiting form of Binomial Distribution), Negative Binomial Distribution, Geometric Distribution, Hypergeometric Distribution and their properties.

### UNIT – IV

Theoretical continuous Distribution – Rectangular or Uniform Distribution, Normal Distribution, Gamma Distribution, Beta Distribution (Ist and IInd kind), Exponential Distribution, Cauchy Distribution and their properties.

### UNIT- V

Bivariate normal Distribution – Marginal and Conditional Distribution, moment generating function, their properties and limitations (without proof). Cumulants and their properties. Chebyshev's inequality, convergence in probability, Weak law of large numbers, Burnolli's law of large numbers. Central limit theorem – Lindeberg – Levy's and De-Moiver – Laplace theorem

### Suggested Readings :

1. P. Mukhopadhaya - Mathematical statistics new central book agency, Calcutta.
2. A. K. Goon, M. K. Gupta and Das Gupta, Fundamentals of Statistics Vol-1.
3. J. N. Kapoor and H. C. Saxena, Mathematical Statistics.
4. S. C. Gupta and V. K. Kapur, Fundamentals of Mathematical Statistics.
5. B. L. Agarwal, Basic Statistics, New Age.
6. बी एल अग्रवाल – सांख्यिकी विधिया



## **PROGRAMMING METHODOLOGY AND C PROGRAMMING**

### **UNIT - I**

Program Concept, Characteristics of Programming, Various Stages in Program Development, Algorithms, Flow Charts, Programming Techniques – Top Down, Bottom Up, Modular, Structured, Features, Merits, Demerits and Their Comparative Study. Programming Logic - Simple, Branching, Looping, Recursion, Programming Testing & Debugging.

### **UNIT- II**

Introduction to C Language, C Language Standards, Features of C, Structure of C Program, Introduction to C Compilers, Creating and Compiling C Programs, IDE, Features of Turbo C Compiler. Keywords, Identifiers, Variables, Constants, Scope and Life of Variables, Local and Global Variable, Data Types, Expressions. Operators - Arithmetic, Logical, Relational, Conditional and Bit Wise Operators, Precedence and Associativity of Operators, Type Conversion. Basic Input/Output Library Functions ,Character Input/Output getch(), getchar(). getche(), putchar(). Formatted Input/Output - printf() and scanf(), Mathematical & Character Functions.

### **UNIT- III**

Declaration Statement, Conditional Statement - if Statement, if else Statement, Nesting of if... else Statement, else if Ladder, The ?: Operator, switch Statement. Iteration Statements - for Loop, while Loop, do-while Loop. Jump Statements: break, continue, goto, exit(). Arrays - Concept of Single and Multi Dimensional Arrays Strings: Declaration, Initialization, Functions .

### **UNIT – IV**

The Need of C Functions, User Defined and Library Function, Prototype of Functions, Prototype of main() Function, Calling of Functions, Function Arguments, Argument Passing: Call By Value and Call By Reference, Return Values. Nesting of Function, Recursion, Array as Function Argument, Command Line Arguments, Storage Class Specifier - Auto, Extern, Static, Register.

### **UNIT - V**

Defining Structure, Declaration of Structure Variable, Type def, Accessing Structure Members, Nested Structures, Array of Structure, Structure Assignment, Structure as Function Argument, Function that Return Structure, Union.

### **TEXT & REFERENCE BOOKS:**

- *BALAGURUSWAMY, "PROGRAMMING IN C ", TMH PUBLICATIONS*
- *GOTTFRIED SCHAUMS OUTLINE SERIES, "PROGRAMMING WITH C ", TMH PUBLICATIONS*
- *MAHAPATRA, " THINKING IN C ", (PHI)PUBLICATIONS*
- *ANURAG SEETHA, "INTRODUCTION TO COMPUTERS AND INFORMATION TECHNOLOGY", RAIN PRASAD & SONS, BHOPAL*
- *S.K. BASANDRA, "COMPUTERS TODAY", GALGOTIA PUBLICATIONS.*
- *PETER JULIFF "PROGRAM DESIGN" PHI PUBLICATIONS*

## हिन्दी भाषा और संवेदना

### इकाई – 1

1. आचरण की सभ्यता : सरदार पूर्ण सिंह
2. जवानी (काव्य) : श्री माखनलाल चतुर्वेदी
3. विज्ञान – परिभाषा, शाखाएँ, संक्षिप्त इतिहास
4. सपनों की उड़ान : ए.पी.जे. अब्दुलकलाम
5. प्रमुख वैज्ञानिक आविष्कार और हमारा जीवन
6. त्रुटि संशोधन

### इकाई – 2

1. शिरीष के फूल (निबंध) : आचार्य हजारी प्रसाद द्विवेदी
2. विकास का भारतीय मॉडल : धर्मपाल
3. निबंध लेखन की कला
4. संधि-समास : संरचना और प्रकार
5. निराला (संस्मरण) : महादेवी वर्मा

### इकाई – 3

1. मांडव (यात्रा वृत्तांत) – पं. रामनारायण उपाध्याय
2. हिन्दी भाषा का मानकीकरण
3. भारतीय कृषि
4. जीवन : उद्भव और विकास
5. जनजातीय जीवन
6. उसने कहा था (कहानी) : श्री चन्द्रधर शर्मा 'गुलेरी'

### इकाई – 4

1. महाजनी सभ्यता (निबंध) : पेमचन्द्र
2. मुहावरे और लोकोक्तियाँ
3. सौर मण्डल
4. ब्रह्माण्ड और जीवन
5. शिकागो (व्याख्यान) : स्वामी विवेकानंद
6. संक्षिप्तियाँ

### इकाई – 5

1. मध्यप्रदेश के पर्यटन स्थल
2. फिल्टर तो चाहिए ही – डॉ. देवेन्द्र दीपक
3. भारतीय वनस्पतियाँ और जीव
4. पर्यावरण
5. भोलाराम का जीव (व्यंग्य) : हरिशंकर परसाई
6. आँगन का पंछी : विद्यानिवास मिश्र

### संदर्भ

मध्यप्रदेश हिन्दी गंथ अकादमी भोपाल द्वारा प्रकाशित पुस्तक

# Environmental Studies -I

## UNIT- I:

Study of Environmental and ecology:

- (a) Definition and Importance.
- (b) Environmental Pollution and problems.
- (c) Public participation and Public awareness.

## UNIT- II:

Environmental Pollution:

- (a) Air, water, noise, heat and nuclear pollution.
- (b) Causes, effect and prevention of pollution.
- (c) Disaster management – Flood, Earthquake, cyclones and landslides.

## UNIT- III:

Environment and social problems:

- (a) Development – non-sustainable to Sustainable.
- (b) Energy problems of cities.
- (c) Water preservation – rain-water collection.

## UNIT -IV:

Role of mankind in conserving natural resources :

- (a) Food resources – World food problem.
- (b) Energy resources – increasing demand for energy.
- (c) Land resources – Land as resources.

## UNIT -V:

Environment conservation laws:

- (a) Conservation laws for air and water pollution.
- (b) Wildlife conservation laws.
- (c) Role of information technology in protecting environment & health.

# Calculus, Differential Equation and Mechanics

## UNIT - I

Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion . Series of non-negative terms. Comparison test, Cauchy's integral test, Ratio test. Raabe's test ,logarithmic test. Leibnitz's theorem. Absolute and conditional convergence.

## UNIT – II

Continuity of functions of one variable , sequential continuity. Properties of continuous functions. Uniform continuity. Chain rule of differentiability. Mean value theorems and their geometrical interpretations. Darboux's intermediate value theorem for derivatives. Limit and continuity of functions of two variables.

## UNIT –III

Series Solution of Differential Equations-Power series Method, Bessel's Equation Bessel's function and its properties, recurrence and generating relations. Legendre's Equation, Legendre's function and its properties, recurrence and generating relations.

## UNIT – IV

Laplace transformations, Linearity of the Laplace transformation, Existence theorem of Laplace transforms, Laplace transforms of derivatives and integrals. Shifting theorem . Differentiation and integration of transforms. Inverse Laplace transforms, Convolution theorem. Applications of Laplace transformation in solving linear differential equations with constant coefficients.

## UNIT – V

Analytical conditions of equilibrium of Coplanar forces. Catenary. Forces in three dimensions. Velocities and accelerations along Radial and transverse direction

### Text Books:

1. R.R. Goldberg, Real Analysis, I.B.H. Publishing Co. New Delhi, 1970.
2. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd. Allahabad.
3. Erwin Kreyszig, Advanced Engineering Mathematics, John Wiley & sons, 1999.
4. R.V. Churchill, Fourier series and boundary value problem.
5. S.L. Loney, Statics, Macmillan & Co. London
6. S.L. Loney, An Elementary Treatise on the Dynamics of a Particle and of Rigid Bodies, Cambridge Uni. Press 1956.
- 7 म.प. . हिन्दी ग्रंथ अकादमी की पुस्तकें ।

### Reference Books:

1. T.M. Apostol Mathematical Analysis Narosa Publishing House New Delhi 1985.
2. Murray R.Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co. New York.
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd. New Delhi.
5. R.S. Verma, A Text Book on Statics, Pothishala Pvt. Ltd., Allahabad.

# Statistical Inference and Design of Experiments

## UNIT - I Theory of Estimation

Definition of a random Sample, Parameter and Statistic, Concepts of point and interval estimation, criterion of a good estimator. ( Unbiasedness, Consistency, efficiency and sufficiency), Mean square error of an estimate .Method of maximum likelihood estimation. Cramer – Rao inequality and its applications in confidence interval.

## UNIT - II Testing of Hypothesis

Test of Significance, Null and alternative hypothesis, Simple and composite hypothesis. Type I and II error, Critical region and level of significance. One and two taile test, Neymann Pearson lemma for construction of most powerful tests for simple null versus simple alternative for the parameters of Binomial Poisson and Normal distributions. Likelihood ratio test for single proportion. Test of significance for single mean.

## UNIT - III Non Parametric Tests

Definition of order statistics, distributions of single, joint and marginal density function. Advantages and disadvantage of non-parametric methods. Run test for randomness, sign test for univariate and bivariate distribution, Wilcoxon signed ranked test for univariate and bivariate distribution, Wilcoxon-Whitney test, WaldWolfwitz run test, Median test.

## UNIT - IV Analysis of Variance

Definition of different terms, one-way classification and two-way classification with one observation per cell and two-way classification with m observation per cell (for fixed effect model) Fundamental principle of design. Randomization, Replication and local control.

## UNIT - V Basic Designs

Layout and analysis of completely randomized design, randomized block design(R.B.D), estimation and analysis of one missing observation in R.B.D., efficiency of RBD relative of CRD, Latin Square design. Estimation and analysis of one missing observation in LSD. Factorial design 22 and 23 designs, main and interaction effects.

### Books :-

1. A.M. Goon, M.K. Gupta and B.D. Das Gupta : Fundamentals of Statistics Vol. II.
2. Goon, Gupta and Das Gupta : An outline of Statistics theory Vol. II.
3. S. C. Gupta & V K Kapoor Fundamentals of Mathematical Statistics Sultan Chand & Co.
4. Gupta and Kapoor : Fundamentals of Applied Statistics.
5. D.C. Montgomery : Design and Analysis of Experiments.

# Data Structure Using C and Operating System

## UNIT – I

**Introduction to Data Structures:** Information and Meaning, Binary and Decimal Integers, Real Numbers, Character Strings, Hardware and Software, Concept of Implementation, Example, Abstract Data Types, Sequences as Value Definitions, ADT for Varying-length Character Strings. Data Types in C, Pointers in C, Data Structures and C, Exercises, Arrays in C, The Array as an ADT, Using One-Dimensional Arrays, Implementing One-Dimensional Arrays, Arrays as Parameters, Character Strings in C, Character String Operations, Two-Dimensional Arrays, Multidimensional Arrays.

## UNIT – II

**The Stack :** Definition and Examples, Primitive Operations, Example, The Stack as an Abstract Data Type, Exercises, Representing Stacks in C, Implementing the pop Operation, Testing for Exceptional Conditions, Implementing the Push Operation, Infix, Postfix, and Prefix , Basic Definitions and Examples, Evaluating a Postfix Expression, Program to Evaluate a Postfix Expression, Limitations of the Program, **Queues and Lists**, The Queue and Its Sequential Representation, The Queue as an Abstract Data Type, C Implementation of Queues, insert Operation, Priority Queue, Array Implementation of a Priority Queue, Exercises, Linked Lists, Inserting and Removing Nodes from a List, Linked Implementation of Stacks, getnode and freenode Operations, Linked Implementation of Queues, Linked List as a Data Structure, Examples of List Operations, List Implementation of Priority Queues, Header Nodes, Exercises, Lists in C, Array Implementation of Lists, Limitations of the Array Implementation, Allocating and Freeing Dynamic Variables, Linked Lists Using Dynamic Variables, Queues as Lists in, Examples of List Operations in C, Noninteger and Nonhomogeneous Lists, Comparing the Dynamic and Array Implementations of Lists, Implementing Header Nodes, Exercises, Example: Simulation Using Linked Lists, Simulation Process, Data Structures, Simulation Program, Exercises, Other List Structures , Circular Lists, Stack as a Circular List, Queue as a Circular List, Primitive Operations on Circular Lists, The Josephus Problem, Header Nodes, Addition of Long Positive Integers Using Circular Lists, Doubly Linked Lists, Addition of Long Integers Using Doubly Linked Lists.

## UNIT – III

**Trees :** Binary Trees, Operations on Binary Trees, Applications of Binary Trees, Exercises, Binary Tree Representations, Node Representation of Binary Trees, Internal and External Nodes, Implicit Array Representation of Binary Trees, Choosing a Binary Tree Representation, Binary Tree Traversals in C, Threaded Binary Trees, Traversal Using a father Field, Heterogeneous Binary Trees, Exercises, Example: The Huffman Algorithm, The Huffman Algorithm, C Program, Exercises, Representing Lists as Binary Trees, Finding the kth Element, Deleting an Element, Implementing Tree-Represented Lists in C, Constructing a Tree-Represented List, The Josephus Problem Revisited, Exercises, Trees and Their Applications, C Representations of Trees, Tree Traversals, General Expressions as Trees, Evaluating an Expression Tree, Constructing a Tree, Exercises, Example: Game Trees.

**Sorting**, General Background, Efficiency Consideration, Notation, Efficiency of Sorting, Exercises, Exchange Sorts, Bubble Sort, Quick sort, Efficiency of Quick sort, Exercises, Selection and Tree Sorting, Straight Selection Sort, Binary Tree Sorts, Heap sort, Heap as a Priority Queue, Sorting Using a Heap, Heap sort Procedure, Exercises, Insertion Sorts, Simple Insertion, Shell Sort, Address Calculation Sort, Exercises, Merge and Radix Sorts, Merge Sorts, The Cook-Kim Algorithm, Radix Sort.

## UNIT – IV

**Graphs** and Their Applications, Applications of Graphs, C Representation of Graphs, Transitive Closure, Warshall's Algorithm, Shortest-Path Algorithm, Exercises, A Flow Problem, Improving a Flow Function, Example, Algorithm and Program, Exercises,

Linked Representation of Graphs, Dijkstra's Algorithm Revisited, Organizing the set of Graph Nodes, Application to Scheduling, C Program, Exercises, Graph Traversal and Spanning Forests, Traversal Methods for Graphs, Spanning Forests, Undirected Graphs and Their Traversals, Depth-First Traversal, Applications of Depth-First Traversal, Efficiency of Depth-First Traversal, Breadth-First Traversal, Minimum Spanning Trees.

**Introduction to Operating Systems:** What is an Operating System? Evolution of Operating Systems, Operating System Structure, Different Views of the Operating System, Design and Implementation of Operating Systems. **The Concept of Process** :Process, Implicit and Explicit Tasking, Process Relationship, Process State, Process. Control Block, Process Scheduling, Context Switch, Operations on Process, Operating-System Services for Process Management, Threads, Interprocess Communication.

## UNIT – V

**CPU Scheduling:** Basic Concepts, CPU-I/O Burst Cycle, Scheduling, Types of Schedulers, Dispatcher, Scheduling Criteria, Multiple -level Scheduling, Real-Time Scheduling, Algorithm Evaluation, **Process Synchronization:** The Critical-section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Region, Monitors, Atomic Transactions. **Deadlocks:** System Model, Deadlock Characterization, Methods For Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Dead lock Detection, Recovery from Deadlock, **Memory Management:** Background, Logical Versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, **Virtual Memory:** Background, Demand Paging, Performance of Demand Paging, Page Replacement, Page Replacement Algorithms.

**File Systems:** Files, Directories, File System Implementation, **Security and Protection:** Security Threats and Goals, Penetration Attempts, Security Policies and Mechanisms, Authentication, Protection and Access control, Cryptography. **Multiprocessor Systems:** Background, Motivation and Classification, Multiprocessor Interconnections, Types of Multiprocessor Operating Systems, Multiprocessor OS Functions and Requirements, Introduction to Parallel Programming, Multiprocessor Synchronization, **Network Structures:** Background, Motivation, Topology, Network Types.

**Distributed System Structure:** Background, Motivation, Topology, Network Types, Communication, Design Strategies, **Distributed File Systems:** Background, Naming and Transparency, Remote File Access, File Replication, **Distributed Coordination:** Event Ordering, Mutual Exclusion, Atomicity, Deadlock Handling, Performance Measurement, Monitoring and Evaluation, Background, Need for Performance Monitoring and Evaluation, Performance Measures, **Performance Evaluation Techniques:** Bottlenecks and Saturation

# English Language and Scientific Temper

## UNIT -1

1. Tina Morris: Tree
2. Nissim Ezekiel: Night of the Scorpion
3. C. P. Snow: Ramanujan
4. Roger Rosenblatt: The Power of WE
5. George Orwell: What is Science?
6. C. Rajagopalachari: Three Questions
7. Desmond Morris: A short extract from The Naked Ape
8. A. G. Gardiner: On The Rule of the Road

## UNIT- II

Comprehension of an unseen passage

## UNIT -III

Letter Writing: Formal Letters, Informal letters, Applications

## UNIT- IV

Report Writing

## UNIT -V

Language Skills:

Correction of common errors in sentence structure: usage of pronouns, subject/verb agreement, word order, gender; compound nouns, collective nouns, possessives, articles and prepositions (advanced)



## **Environmental Studies –II**

### **UNIT -I:**

Problem of natural resources

- (a) Problem of water resources – Utilization of surface and ground water, over utilization, flood, drought, conflicts over water, dams-benefits and problem.
- (b) Problems of forest resources – uses and over utilization, deforestation, utilization of timber, dams and its effect on forests and tribes.
- (c) Problems of land resources – Land as a source, erosion of land, maninduced landslides and desertification.

### **UNIT -II:**

Bio-diversity and its protection –

- (a) Value of bio-diversity – Consumable use: Productive use, Social, alternative, moral aesthetic and values.
- (b) India as a nation of bio-diversity and multi-diversity at global, national and local levels.
- (c) Threats to bio-diversity – Loss of habitat, poaching of wildlife, manwildlife conflicts.

### **UNIT- III:**

Human Population and Environment

- (a) Population growth, disparities between countries.
- (b) Population explosion, family welfare Programme.
- (c) Environment and human health.

### **UNIT -IV:**

Multidisciplinary nature of environmental studies:

- (a) Natural resources
- (b) Social problems and the environment
- (c) Eco system.

### **UNIT -V:**

Environmental Wealth:

- (a) Rivers, ponds, fields and hills.
- (b) Rural, Industrial, Agricultural fields.
- (c) Study of common plants, insects and birds.

## **Advanced Calculus, Partial Differential Equations, Complex Analysis and Abstract Algebra**

### **UNIT – I**

Partial differentiation. Change of variables. Euler's Theorem on homogeneous function, Taylor's theorem for functions of two variables. Jacobians, Envelopes, Evolutes.

### **UNIT – II**

Maxima, minima and saddle points of functions of two variables. Beta and Gamma functions. Double and triple integrals. Dirichlet's integrals.

### **UNIT – III**

Partial Differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than general methods. Charpit's general method of solution, Partial differential equations of second and higher orders. Homogeneous and non-Homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients.

### **UNIT – IV**

Complex numbers as ordered pairs. Geometric representation of Complex numbers, Continuity and differentiability of Complex functions. Analytical function, Cauchy Riemann equation, Harmonic function, Mobius transformations, fixed point, cross ratio.

### **UNIT – V**

Group-Automorphisms, inner automorphism. Group of Automorphism, Conjugacy relation and centraliser. Normaliser. Counting principle and the class equation of a finite group. Cauchy's theorem for finite abelian groups and non-abelian groups. Ring homomorphism. Ideals and Quotient Rings.

#### **Text Books :**

1. Gorakh Prasad, Differential Calculus, Pothishala Pvt. Ltd. Allahabad.
2. Gorakh Prasad, Integral Calculus, Pothishala Pvt. Ltd. Allahabad.
3. I.N. Sneddon, Elements of partial Differential equations Mc Graw Hill, Co. 1988
4. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.
5. I. N. Herstein Topics in Algebra, Wiley Eastern Ltd., New Delhi, 1975.
- 6 म.प. हिन्दी ग्रंथ अकादमी की पुस्तकें ।

#### **Reference Books:**

1. T.M. Apostol, Mathematical Analysis Narosa Publishing House, New Delhi 1985
2. Murray R. Spiegel, Theory and Problems of Advanced Calculus, Schaum Publishing Co., New York
3. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow.
4. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., New Delhi.
5. N. Jacobson, Basis Algebra, Vols, I & II. W.H. Freeman, 1980 (also published by Hindustan Publishing Company.)
6. Shanti Narayan, A Text Book of Modern Abstract Algebra, S. Chand & Co. New Delhi

# Sampling Theory and Sampling Distribution

## UNIT - I

Sample Survey: Concepts of population and sample, needs of sampling, steps in a sample survey, principles of sample survey, sampling and non-sampling errors, requirements of a good sample, complete census v/s sample survey. Limitations of sampling.

Simple Random Sampling : Simple random sampling with & without replacement. Definition of simple random sampling, Unbiasedness of the sample mean, mean square error of the sample mean, merits, demerits and limitations of simple random sampling, simple random sampling by attributes.

## UNIT - II

Stratified Random Sampling: Definition and advantages of stratified random sampling, proportional allocation, optimum allocation, cost function, comparison of stratified random sampling with simple random sampling without stratification, proportional allocation versus simple random sampling, Neyman allocation versus simple random sampling.

Systematic Sampling: Definition, circular systematic sampling, mean and variance of a systematic sample mean, comparison of systematic sampling to simple random sampling, systematic sampling versus stratified random sampling, stratified random sampling to simple random sampling for a population with linear trend, merits and demerit of systematic sampling.

## UNIT - III

Ratio Method of Estimation: Definition, expected value of ratio estimate for first approximation under simple random sampling without replacement, variance of ratio estimate for first approximation under simple random sampling without replacement.

Regression Method of Estimation: Definition, simple regression estimate expected value of regression estimate for first approximation under simple random sampling without replacement, variance of regression for first approximation under simple random sampling without replacement.

## UNIT - IV

Sampling Distribution : Sampling distribution of a statistic, definition of standard error and some examples. Sampling distribution of sum of binomial and Poisson variates. Sampling distribution of mean of normal distribution. Derivation of student's t, Fisher's t, F and Chi-Square distribution with their properties.

## UNIT - V

Large Sample Tests: Test of significance for single proportion, difference of proportion, test of significance for single mean and for differences of mean.

Small Sample Tests: t - test for single mean, t – test for difference of means, paired t test, F-test for equality of population variance. Conditions for the validity of chi-square test, test for goodness of fit, test for independence of attributes (2X2 Contingency table). Fisher's Z-transformation and their applications.

### Suggested Readings :

1. P.V. Sukhatme and B.V. Sukhatme : Sampling theory of survey with applications.
2. W.G. Cochran : Sampling Techniques.
3. Gupta and Kapoor : Fundamentals of Applied statistics.
4. Gupta and Kapoor : Fundamentals of Mathematical Statistics.
5. D. Singh and F.S. Choudhary : Theory and Analysis of sample survey and design.
6. A.M. Goon, M.K. Gupta and B.D. Das Gupta : Fundamentals of Statistics Vol. II.

# Software Engineering and DBMS

## UNIT - I

Introduction to Software and Software Engineering: The Origin of Software Engineering, Characteristics of Software Engineering, Software Crisis. Software Engineering: Models: Life Cycle Model, Spiral Model, Models of the Software Process.

Software Engineering Methodologies: Software Process, Software Metrics, Configuration Management Issues: Organizing the Process.

## UNIT- II

Software Requirement Analysis and Specification: Requirements Definition, Nonfunctional Requirements Definition, Formal Specification, Algebraic Specification, Model-based Specification, Z Schemas, Specification using Functions, Specification using Sequences, Validation, The Prototyping Process, Prototyping Techniques.

## UNIT- III

Principles of Software Project Management: Principles of Software Project Management, Principles or Laws of Project Management, Software Project and Personnel Planning, Cost Estimation of Building a System, Software Metrics, The Project Plan, Resource Tracking and Stimulation Example, Quality Assurance Planning, Risk Analysis

DBMS: An Introduction : Data Base Management System-Basic Concepts, Data and Database, Database System: Concept and Meaning, Disadvantages of File Systems, Advantage of Database Approach, Disadvantages of Using a DBMS, Database Languages, Database Administrator, Database Designers, Database Users. Database Manager, Data Base Management System-Architectures and Features, Data Abstraction, DBMS Architecture, Data Independence, System Architecture, Data Model.

## UNIT - IV

Entity Relationship Model : Entities and Relations: Entities and Entity Sets, Attributes, Relationships, Design Choice, Key, ER-diagram, The Entity Relationship Diagram, Types of Attributes, Role, Attribute of Relationships, Participation, Cardinality Constraints, Multiple Relationships, Keys, Weak Entity Sets, EER- model, Specialization and Generalization, Constraints on Specialization and Generalization, Aggregation, Simplification, Constraints beyond the ER Model.

Relational Data Model: Relations: What is Relation?, Different Features of a Relation, Relation Scheme, Constraints, Entity Integrity Constraints, Referential Integrity, Relational Algebra-I, Operands of Relational Algebra, The Selection Operator, The Projection Operator, Union, Intersection and Set- Difference, Cartesian Product, The Renaming Operator, Completeness of Relational Algebra, Relational Algebra-II, The Join Operator, Division Operator, Database /V10dification, Relational Operations are Closed, Outer Join, Generalized Projections, Aggregate Functions, Implementing Relational Algebra Operations.

## UNIT- V

Relational Database Design : Functional Dependencies, Anomalies in Databases, Functional Dependencies, Inference Rules for FDs, Attribute Closure, Normal Forms, First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Decomposition and Other Dependencies, Attribute Preservation, Loss-Less Join Decomposition, Dependency Preservation, Multi-Valued Dependency, Join Dependencies, The Process of Normalization.

SQL: A Query Language : Data Definition With SQL, SQL Schema Definition, Table Definition, Column Definition, Data Types in SQL, Domain Definition, Table Constraints, Modification, Catalog, Basic SQL Queries, Basic SQL Query, Union, Intersect, Nested Queries, Aggregate Operators, GROUP BY and HAVING Clause, Joined Relations, Joined Conditions

## भाषा कौशल एवं संचार साधन

### इकाई – 1

1. भारतीय संस्कृति
2. भारतीय समाज व्यवस्था
3. सभ्यता एवं संस्कार
4. वैश्विक चेतना
5. समन्वयीकरण (भारतीय एवं अंतर्राष्ट्रीय संदर्भ में)

### इकाई – 2

1. धर्म
2. न्याय
3. दर्शन
4. नीति
5. साहित्य

### इकाई – 3

1. संचार साधन : सम्पर्क के नए क्षितिज
2. समाचार पत्र
3. भारतीय प्रेस परिषद्
4. रेडियो
5. दूरदर्शन

### इकाई – 4

1. सिनेमा
2. रंगमंच
3. संगीत
4. चित्रमूर्ति, स्थापत्य कला
5. शिल्प कला

### इकाई – 5

1. कम्प्यूटर
2. दूरभाष : विज्ञान की सौगात
3. मंत्र (कहानी) : प्रेमचंद
4. मातृभूमि (कविता) : मैथिलीशरण गुप्त
6. साहित्यकार का दायित्व : डॉ. प्रेम भारती

### संदर्भ

मध्यप्रदेश हिन्दी गंथ अकादमी भोपाल द्वारा प्रकाशित पुस्तक

## **Basic Computer Information Technology –I**

### **UNIT -I :**

INTRODUCTION TO COMPUTER ORGANIZATION –I: History of development of Computer system concepts. Characteristics, Capability and limitations. Generation of computer. Types of PC's Desktop. Laptop, Notebook. Workstation & their Characteristics.

### **UNIT- II:**

INTRODUCTION TO COMPUTER ORGANIZATION –II : Basic components of a computer system Control Unit, ALU. Input/ Output function and Characteristics, memory RAM, ROM, EPROM, PROM.

### **UNIT -III :**

INPUT & OUTPUT DEVICES : Input Devices : Keyboard, Mouse, Trackball. Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen. Output Devices: Monitors Characteristics and types of monitor, Video Standard VGA, SVGA, XGA, LCD Screen etc. Printer, Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer. Plotter, Sound Card and Speakers.

### **UNIT- IV:**

STORAGE DEVICES : Storage fundamental primary Vs Secondary. Various Storage Devices magnetic Tape. Cartridge Tape, Data Drives, Hard Drives, Floppy Disks, CD, VCD, CD-R, CD-RW, Zip Drive, DVD, DVD-RW.

### **UNIT -V :**

INTRODUCTION TO OPERATING SYSTEM : Introduction to operating systems, its functioning and types. basic commands of dos & Windows operating System. Disk Operating System (DOS). Introduction, History and Versions of DOS. DOS Basics .Physical Structure of disk, Drive name, FAT, file & directory stucture and naming rules, booting process, DOS system files.

DOS Commands :

- Internal DIR, MD, CD, RD, Copy, DEL, REN, VOL, DATE, TIME, CLS, PATH, TYPE etc.
- External CHKDSK, SCOPE, PRINT DISKCOPY, DOSKEY, TREE, MOVE, LABEL, APPEND, FORMAT, SORT, FDISK, BACKUP, MODE, ATTRIB HELP, SYS etc.

### **Books Recommended-**

1. डॉ. एस. के. विजय, डॉ. पंकज सिंह : कम्प्यूटर विज्ञान एवं सूचना प्रौद्योगिकी, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल
2. डॉ. पंकज सिंह कम्प्यूटर अध्ययन, राम प्रसाद एंड संस

## **Practical (Basic Computer Information Technology –I)**

### **DOS:**

- DOS commands: Internal & External Commands.
- Special batch file: Autoexec, Batch Hard disk setup.

### **Windows 98:**

- Desktop setting : New folder, rename bin operation, briefcase, function. control panel utility.
- Display properties: Screen saver, background settings.

### **MS-Word:**

- Creating file: save, save as HTML, Save as Text, template, RTF Format.
- Page setup utility: Margin settings, paper size setting, paper source, layout.
- Editing: Cut, paste special, undo, redo, find, replace, goto etc.
- View file: page layout, Normal Outline, master document, ruler header, footer, footnote, full screen.
- Insert: break, page number, symbol, date & time, auto text, caption file, object, hyperlink, picture etc.
- Format: font, paragraph, bullets & numbering, border & shading, change case, columns.
- Table : Draw label, insert table, cell handling, table auto format, sort formula.

# Real Analysis, Linear Algebra and Discrete Mathematics

## UNIT – I

Riemann integral, Integrability of continuous and monotonic functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus, Partial derivatives and differentiability of real-valued functions of two variables.

## UNIT – II

Schwarz and Young's theorem, Implicit function theorem, Fourier series of half and full intervals, Improper integrals and their convergence, Comparison test, Abel's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter.

## UNIT – III

Definition and examples of vector spaces, subspaces, Sum and direct sum of subspaces. Linear span, Linear dependence, independence and their basic properties. Basis, Finite dimensional vector spaces, Existence theorem for basis, Invariance of the number of elements of a basis set, Dimension, Dimension of sums of vector subspaces.

## UNIT – IV

Linear transformations and their representation as matrices, The Algebra of linear transformations, The rank- nullity theorem, Eigen values and eigen vectors of a linear transformation, Diagonalisation. Quotient space and its dimension.

## UNIT – V

Binary Relations, Equivalence Relations, Partitions and Partial Order Relation . Graphs, Multigraphs, Weighted Graphs, Paths and Circuits, Shortest Paths. Trees and their properties.

### Text Books :

1. R.R Goldberg, Real Analysis, Oxford & IBH Publishing Co., New Delhi, 1970.
2. Shanti Narayan, Theory of Functions of a Complex Variable, S. Chand & Co., New Delhi.
3. K. Hoffman and R. Kunze, Linear Algebra, 2nd Edition. Prentice Hall Englewood Cliffs, New Jersey. 1971.
4. C.L. Liu, Elements of Discrete Mathematics, (Second Edition), McGraw Hill, International Edition, Computer Science series 1986.
6. Narsingh Deo : Graph Theory, McGraw Hill.
7. म.प. हिन्दी ग्रंथ अकादमी की पुस्तकें ।

### REFERENCE BOOK:-

1. T.M Apostol, Mathematical Analysis. Narosa Publishing House. New Delhi, 1
2. S. Lang. Undergraduate Analysis, Springer-Verlag, New York, 1983.
3. D. Somasundaram and B. Choudhary, A first Course in Mathematical Analysis. Narosa Publishing House, New Delhi 199 /.
5. Shanti Narayan, A Course of Mathematical Analysis. S. Chand & Co. Delhi.
6. R.K. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi. 2000.
7. R. V. Churchill & J.W. Brown, Complex Variables and Applications, 5th Edition, McGraw-Hill New. York. 1990
8. Mark; J. Ablowitz & A. S. Fokas. Complex Variables : Introduction and Applications, Cambridge University Press, South Asian Edition, 1998
9. Ponnuswamy : Complex Analysis, Narosa Publishing Co.
10. Babu Ram, Discrete Mathematics, Vinayak Publication.
11. K.B. Datta. Matrix and Linear Algebra, Prentice hall of India Pvt Ltd., New Delhi, 2000.
12. S.K. Jain, A. Gunawardena & P.B. Bhattacharya. Basic Linear Algebra with MATLAB Key college Publishing (Springer-Verlag) 2001
13. S. Kumarsaran, Linear Algebra, A Geometric Approach Prentice – Hall of India, 2000



# Applied Statistics

## UNIT- I:

Demographic Methods: Sources of demographic data, census, registration, adhoc surveys, hospital records, demographic profiles of the Indian census.

Measurement of Mortality: Crude death rate, Standardized death rates, Age specific death rates, Infant Mortality rate, Death rate by cause.

## UNIT- II:

Complete life table and its main component, Uses of life table, Measurement of Fertility: Crude birth rate, general fertility rate, age specific birth rate, total fertility rate, gross reproduction rate, (GRR) net reproduction rate.(NRR).

## UNIT -III:

Index Numbers: Price relatives and quantity or volume relatives, Problems in constructing Index numbers, Link and chain relatives composition of index numbers: Laspeyre's, Paasche's, Marshal Edgeworth's and Fisher's index numbers; chain base index number, tests for index number, cost of living index number.

## UNIT- IV:

Components of time series, mathematical models for time series, Uses of time series, measurement of trends – Graphical method, Method of semi average, Method of moving average, Methods of least squares.

## UNIT- V:

Growth curve and their fitting. Measurement of seasonal variation – method of simple average, ratio to trend method, link relative method, ratio to moving average method, Measurement of cyclic variations, Measurement of irregular variation – Variate difference method.

## Books for References

1. Mukhopadhyay, P. : Applied Statistics, new Central Book Agency Pvt. Ltd., Calcutta.
2. Srivastava O.S. : A Text Book of Demography, Vikas Publishing House, new Delhi.
3. Goon A.M., Gupta M.K. and Das Gupta B. : Fundamentals of Statistics, Vol. II, World Press, Calcutta.
4. Kapoor and Gupta: Fundamental of Applied Statistics.
5. Chatfield C. (1980): The Analysis of Time Series, IInd Edision Chapman and Hall.  
distribution.

# Programming in Visual Basic and Introduction to Web Design

## UNIT - I

**Visual Basic at a Glance:** Program Design and Implementation, Introduction to Visual Basic, Hardware and Software Requirements of Visual Basic, Terms Often used in Visual Basic, Programming in Visual Basic, Editing and Writing Code in the Code Window, Programming an Application, **The Integrated Development Environment:** The Visual Basic, ToolBars, Customizing a Toolbar, Menu Bars, The Project Explorer, The Properties Window, The Code Window, The Form Window, The Debug Windows, The Toolbox Window Adding/Removing Custom Controls to the Toolbox, Organizing the Toolbox, Using the Application Wizard, Resource Files, Projects, Form Files, Creating a New Project, Saving the Project, Creating a Project Group.

**The Language Reference:** Knowing Visual Basic, Summary of Data Types, Variables, Deftype Statements, User Defined Data Types, Constants, Operators, Control Flow Statements, With-End with Statements, Arrays, **Error Handling, Debugging and Sorting Techniques:** Possibilities of Errors, Using Coding Conventions and Putting Comments, Debugging, Handling Errors, Exit Statements, List of Some Trappable Errors, Sorting Techniques, Implementing Algorithms.

## UNIT - II

**Object Oriented & Event Driven Programming in Visual Basic:** Object Oriented Programming, Objects and Classes, Few Terms Used in OOP, Object Linking and Embedding (OLE), Component Object Model, Creating Object Variables, Creating Control Arrays, Detecting Controls **Forms and Menus:** Form's Basics, Important Properties of Forms, Forms Collection Controlling One Form Within Another - MDI, Using an MDI Form, Menus and the Menu Editor, Pop-Up Menus, Example on Using Pop-Up Menus.

**Dialog Boxes** Displaying, Dialogs Creating a Modal Dialog Box The Message Box, Common Dialog Boxes, The InputBox,

**Using Basic Controls:** Basic Controls, Introducing Label Control, The Text Box Control, The List Box and Combo Box Controls, Radio Buttons and Check Boxes, Scroll Bars, Example Using Option Buttons, Check Boxes and Scroll Bars, Timer Control Running Lights Application, Creating a Flying-Message Application, Image Control.

## UNIT- III

**Using Enhanced Controls:** The Directory List Box, The Drive List Box, The File List Box, Copying and Searching Files, The Rich Text Box Control, Creating a Preview Document Application, The Key State Control, The Status Bar Control, Progress Bar Control, Slider Control.

**New ActiveX Controls:** ActiveX Controls, Image List Control, The Toolbar Control, The Coolbar Control, ImageCombo Control, The MonthView Control, The ListView Control, Example Using a ListView Control, TreeView Control, Example Using TreeView Control, Microsoft Masked Edit Controls, \_tScrollBar Control, The DateTimePicker Control.

## **UNIT-IV**

Introduction to www, what is www, Introduction to website, website structure, Uniform resource locator, home page Browser, uses of web site, Web site hosting, Registration process of domain name languages of web.

HTML-Creating HTML Documents, Title and Headings, Paragraphs Linking to other Documents Relative Links versus Absolute Pathnames Links to Specific Sections in Documents Unnumbered Lists Numbered Lists Definition Lists Nested Lists Preformatted Text ,Text Tags Animated GIF Images Image Alignment Using an Image as Hypertext Link Embedding sound and video Frames.

## **UNIT - V**

JavaScript Introduction JavaScript Basics What We Can Do with JavaScript Embedding JavaScript in HTML Functions Using the JavaScript Console Using JavaScript Objects

Window Methods Handling Events Using the Status Bar Validating Form Input Using Windows and Frames Creating a Frame Using JavaScript URLs javascript examples(programs ).

Active Server Pages (ASP) Introduction to ASP technologies Asp objects ActiveX components Vbscript Vbscript functions Working with databases HTTP status codes error codes Example of asp programm.

## **English Language and Aspects of Development**

### **UNIT -1**

1. William Wordsworth : “The World is Too Much With Us”
2. K. Aludiapillai : “Communication Education and Information Technology”
3. “Democratic Decentralisation”
4. S. C. Dubey : “Basic Quality of Life”
5. Sister Nivedita : “The Judgment Seat of Vikramaditya”
6. Juliun Huxley : “War as a Biological Phenomenon”
7. Robert Frost : “Stopping by Woods on a Snowy Evening”
8. Ruskin Bond : “The Cherry Tree”

### **UNIT -II**

Short Essay Writing.

### **UNIT- III**

Translation of a short passage from Hindi to English

### **UNIT- IV**

Drafting CV, writing e-mail message for official purpose

### **UNIT V**

Language Skills

One-word substitution, homonyms, homophones, words that confuse, Punctuation, Idioms.

## Basic Computer Information Technology –II

### UNIT- I Word Processing : Word

- Introduction to word Processing.
- MS Word: features, Creating, Saving and Operating Multi document windows, Editing Text selecting, Inserting, deleting moving text.
- Previewing documents, Printing document to file page. Reduce the number of pages by one.
- Formatting Documents: paragraph formats, aligning Text and Paragraph, Borders and shading, Headers and Footers, Multiple Columns.

### UNIT- II Introduction to Excel

#### Excel & Worksheet :

- Worksheet basic.
- Creating worksheet, entering data into worksheet, heading information, data text, dates, alphanumeric, values, saving & quitting worksheet.
- Opening and moving around in an existing worksheet.
- Toolbars and Menus, keyboard shortcuts.
- Working with single and multiple workbook coping, renaming, moving, adding and deleting. coping entries and moving between workbooks.
- Working with formulas & cell referencing.
- Autosum.
- Coping formulas
- Absolute & Relative addressing.

### UNIT –III INTRODUCTION TO POWER POINT

- Features and various versions.
- Creating presentation using Slide master and template in various colour scheme.
- Working with slides make new slide move, copy, delete, duplicate, lay outing of slide, zoom in or out of a slide.
- Editing and formatting text: Alignment, editing, inserting, deleting, selecting, formatting of text, find and replace text.

### UNIT -IV POWER POINT – II

- Bullets , footer, paragraph formatting, spell checking.
- Printing presentation Print slides, notes, handouts and outlines.
- Inserting objects Drawing and Inserting objects using Clip Arts picture and charts.
- Slide sorter, slide transition effect and animation effects. Presenting the show making stand alone presentation, Pack and go wizards.

### UNIT -V

Evolution, Protocol, concept, Internet, Dial-up connectivity, leased line, VSAT, Broad band, URLs, Domain names, Portals. E-mail, Pop & web based Email. Basic of sending and receiving Emails, Email & Internet Ethics, Computer virus, Antivirus software wage, Web Browers.

#### Books Recommended-

1. डॉ. एस. के. विजय, डॉ. प्रकज सिंह : कम्प्यूटर विज्ञान एवं सूचना प्रौद्योगिकी, मध्यप्रदेश हिन्दी ग्रंथ अकादमी, भोपाल
2. डॉ. पंकज सिंह कम्प्यूटर अध्ययन, राम प्रसाद एंड संस

## **Practical (Basic Computer Information Technology –II)**

MS-Power Point:

Creating new slide, formatting slide layout, slide show & sorter, Inserting new slide, slide no., date, time, chart, formatting slide, tool operation.

List of suggested practical work:

- Under standing of a dial up connection through modern.
- Configuring a computer for an e-mail and using outlook Express or Netscape Messenger.
- Registration an e-mail address.
- Understanding of e-mail drafting.
- Understanding of address book maintenance for e-mail.
- Understanding of different mail program tools.
- Send and receive functions of e-mail.

# Metric Spaces, Numerical Analysis and Elementary Statistics

## UNIT-I

Definition and examples of metric spaces. Neighbourhoods. Limit points. Interior points. Open and closed sets. Closure and interior. Boundary points. Subspace of a metric space. Cauchy sequences. Completeness, Cantor's intersection theorem, Contraction principle. Real numbers as a complete ordered field. Dense subsets. Baire Category theorem. Separable, first and second countable spaces.

## UNIT – II

Continuous functions. Extension theorem. Uniform continuity. Compactness, Sequential compactness. Totally bounded spaces, Finite intersection property. Continuous functions and compact sets. Connectedness

## UNIT – III

Solution of Equations: Bisection. Secant, Regula Falsi. Newton, Method. Roots of second degree Polynomials, Interpolation, Lagrange interpolation, Divided Differences, Interpolation formulae using Differences, Numerical Quadrature, Newton-Cote's Formulae, Gauss Quadrature Formulae.

## UNIT – IV

Linear Equations: Direct Methods for Solving Systems of Linear Equations (Gauss elimination, LU Decomposition, Cholesky Decomposition), Iterative methods (Jacobi. Gauss - Seidel Reduction Methods). Ordinary Differential Equations: Euler Method, Singlestep Methods, Runge-Kutta's Method, Multi-step Methods, Milne-Simpson Method. Methods Based on Numerical Integration, Methods Based on numerical Differentiation.

## UNIT – V

Measures of dispersion-range, inter quartile range, Mean deviation, Standard deviation, moments, skewness and kurtosis. Probability, Continuous probability, probability density function and its applications (for finding the mean, mode, median and standard deviation of various continuous probability distributions) Mathematical expectation, expectation of sum and product of random variables. Theoretical distribution- binomial, Poisson distributions and their properties and use, Moment generating functions.

### Text Books :

1. R.R Goldberg, Real Analysis, Oxford & IBH Publishing Co., New Delhi, 1970.
2. G.F. Simmons. Introduction to Topology and Modern Analysis. McGraw-Hill, 1963.
3. म.प. हिन्दी ग्रंथ अकादमी की पुस्तकें ।
4. V Raja raman Programming C, Prentice Hall of India, 1994.
5. C E Froberg. Introduction to Numerical Analysis, (Second Edition L Addison-Wesley - 1979,

### Reference Books:

1. T.M Apostol, Mathematical Analysis. Narosa Publishing House. New Delhi, 1 985
  2. S. Lang. Undergraduate Analysis, Springer-Verlag, New York, 1983.
  3. D. Somasundaram and B. Choudhary, A first Course in Mathematical Analysis. Narosa Publishing House, New Delhi 1997.
  4. Shanti Narayan, A Course of Mathematical Analysis. S. Chand & Co. Delhi.
  5. RK. Jain and S.K. Kaushik, An introduction to Real Analysis, S. Chand & Co., New Delhi 2000.
  6. P.K. Jain and K. Ahmed Metric Spaces, Narosa Publishing House, New Delhi, 1996.
  7. S. Lang, Undergraduate Analysis, Springer-Verlag, New York 1983.
  8. E.T. Copson, Metric Spaces, Cambridge University Press, 1968
  9. Henry, Mullish and Herbert, L. Copper, Spirit of C: An Introduction to Modern Programming, Jaico Publishers.
  - 10 M K Jain, S.R.K. Iyengar, R. K. Jain. Numerical Methods Problems and Solutions, New Age International (P)Ltd. 1996.
  11. E. Balaguruswamy- Numerical Method Tata Mc Graw\_ Hill Pub.Com. New York.
1. Statistics by M. Ray
  2. Mathematical Statistics by J.N. Kapoor, H.C. Saxena (S. Chand)
  3. Fundamentals of Mathematical Statistics, Kapoor and Gupta.

## SQC and Numerical Methods

### UNIT- I:

General theory of control charts, causes of variation, process and product control,  $3\sigma$  – control limits, Control charts for variables – X and R chart, Criteron for detecting lack of control in X and R charts. Control chart for attributes – p, np and C chart, applications of c chart.

### UNIT- II:

Principles of acceptance sampling, definition of AQL, LTPD, Producer's risk, consumer's risk, AOQL, LTPD, ASN, ATI and OC curve. Single and double sampling plans for attributes and variables.

### UNIT -III:

Finite differences of different operators,  $\Delta$  and E operators, factorial representation of a polynomial, differences of zero. Binomial expansion, Concept of interpolation and extrapolation: Newton Gregory's forward and backward interpolation formulae for equal intervals.

### UNIT- IV:

Divided differences and their properties, Newton's formula for divided difference, Lagranges formula for unequal intervals, Numerical Quadrature : trapezoidal rule, Simpson's 1/3 (one-third) and 3/8 (three-eight) rules

### UNIT -V:

Numerical differentiation, Numerical solutions of differential equations: Euler's method and Runge-Kutta method. Numerical solutions of polynomials – Newton Raphson and Regula falsi methods, Solutions of simultaneous equations – Gauss elimination and Gauss Seidal methods.

### Books for References

1. Duncan A.J. (1974) : Quality Control and Industrial Statistics, IV Edision, Taraporewala and
2. Montomery, D.C. (1991): Introduction to the Statistical Quality Control, IInd Editions, John
3. Scarborough J.B.: Numerical Mathematical Analysis, Oxford University, Press and Oxford Book Co.
4. Saxena, H.C.: Calculas of finite Differences.
5. Sastry S.S.: Introductory Methods of Numerical Analysis, Fourth Edition, Prentice Hall of India.
6. Kunz, K.S.: Numerical Analysis, McGraw Hill.



# Fundamentals of Computer Network and Java Programming

## UNIT - I

**Essentials of Networking:** Essentials of Networking (H/W, S/W), USES OF COMPUTER NETWORKS, Business Applications, Home Applications, Mobile Users, Social Issues, NETWORK HARDWARE, Local Area Networks, Metropolitan Area Networks, Wide Area Networks, Wireless Networks, Home Networks, Internet works, NETWORK SOFTWARE, Protocol Hierarchies, Design Issues for the Layers, Connection-Oriented and Connectionless Services, Service Primitives, The Relationship of Services to Protocols.

**REFERENCE MODELS,** The OSI Reference Model, The TCP/IP Reference Model, A Comparison of the OSI and TCP/IP Reference Models, A Critique of the OSI Model and Protocols, A Critique of the TCP/IP Reference Model, **EXAMPLE NETWORKS** , The Internet, Connection-Oriented Networks: X.25, Frame Relay, and ATM, Ethernet, Wireless LANs: 802.11, **NETWORK STANDARDIZATION,** Who's Who in the Telecommunications World, Who's Who in the International Standards World, Who's Who in the Internet Standards World.

## UNIT - II

**THE PHYSICAL LAYER : THE THEORETICAL BASIS FOR DATA COMMUNICATION,** Fourier Analysis, Bandwidth-Limited Signals, The Maximum Data Rate of a Channel, **GUIDED TRANSMISSION MEDIA,** Magnetic Media, Twisted Pair, Coaxial Cable, Fiber Optics, **WIRELESS TRANSMISSION,** The Electromagnetic Spectrum., Radio Transmission, Microwave Transmission, Infrared and Millimeter Waves, Light wave Transmission, **COMMUNICATION SATELLITES,** Geostationary Satellites, Medium-Earth Orbit Satellites, Low-Earth Orbit Satellites, Satellites versus Fiber.

**THE NETWORK LAYER IN THE INTERNET,** The IP Protocol, IP Addresses, Internet Control Protocols, OSPF- The Interior Gateway Routing Protocol, BGP- The Exterior Gateway Routing Protocol, Internet Multicasting, Mobile IP, IPv6.

## UNIT - III

**NETWORK SECURITY :CRYPTOGRAPHY,** Introduction to Cryptography, Substitution Ciphers, Transposition Ciphers, One-Time Pads, Two Fundamental Cryptographic principles, **SYMMETRIC-KEY ALGORITHMS,** DES-The Data Encryption Standard, AES-The Advanced Encryption Standard, Cipher Modes, Other Ciphers, Cryptanalysis, **PUBLIC-KEY ALGORITHMS,** RSA, Other Public-Key Algorithms, **DIGITAL SIGNATURES,** Symmetric-Key Signatures, Public-Key Signatures, Message Digests, The Birthday Attack.

The Genesis of Java, Introduction and Creation, Applets and Applications, Security, Bytecodes, Java Buzzwords, Simple, Multi-threaded, Architecture Neutral, Java and Java Script, New in JDK, An Overview of Java, What is an Object, Features of Object Oriented Programming, The First Simple Programme, Compiling, Data Types, Variables and Arrays, Data Types in Java, Literals, Characters, Variable Declaration, Symbolic Constants, Type Casting, Arrays, Vectors, Array Declaration Syntax,

Operating in Java, Arithmetic Operators, Basic Assignment Operators, Relational Operators, Boolean Logical Operators, Ternary Operator, Operator Precedence, Control Statements, Java's Selection Statements, Switch, Nested Switch, Iteration Constructs, Continue, Return.

#### **UNIT - IV**

Class an Introduction, What is a Class, What are Methods, Methods and Classes in Details, Methods Overloading, Constructor Overloading, Objects as Parameters, Returning objects, Recursion, Access Control! Visibility, Understanding Static, Final, Nested and Inner Classes, The String Class, Command Line Arguments, Inheritance, Inheritance Basic, Member Access and Inheritance, Super Class Variable and Sub Class Object, Using Super to Call Superclass Constructors, Another Use of Super, Multilevel hierarchy, Calling Constructor, Overriding Methods, Abstract Classes Method, Final and Inheritance, Object Class.

Interfaces and Packages, Defining Interface, What is a Package, Classpath Variable, access Protection, Important Packages, Exception Handling, Fundamentals of Exception Handling, Types of Exceptions, Uncaught Exceptions, Try and Catch Keywords, Throw, Throws and Finally, Nested Try Statements, Java Built in Exceptions, User Defined Exceptions.

Multithreaded Programming, The Java Thread Model, Priorities, Synchronization, Messaging, Thread Class and Runnable Interface, Creation of Threads, Creating Multiple Threads, Synchronization and Deadlock, Suspending, Resuming and Stopping Threads.

#### **UNIT - V**

Applets and Input Output, Input/Output Basics, Streams (Byte and Character), Reading From and writing to Console, Reading and Writing Files, Printwriter Class, Fundamentals Of Applets, Transient and Volatile Modifier, Strictfp, Native Methods, Problems with Native Methods, Handling Strings, String Length, Operations on Strings, Extract Character Methods, String Comparison Methods, Searching and Modifying, Data Conversion and Value of 0 Methods, Changing Case of Characters, String Buffer, Exploring Java. Lang, Wrapper Classes and Simple Type Wrappers, Void, Abstract Process Class, Runtime Class and Memory Management, Other Programme Execution, System Class, Environment Properties, Using Clone 0 and Clonable 0 Interface, Class and Class loader, Math Class, Thread, Thread Group and Runnable Interface, Throwable Class, Security Manager, The java. lang. ref and java. lang. reflect packages, Java..Util-The Utility Classes, The Enumeration Interface, Vector, Stack, Dictionary, Hash table, Properties, Using Store 0 and Load 0, String Tokenizer, Bit set Class, Date and Date Comparison, Time Zones, Random Class, Observe.

Input Output Classes, File in Java, Directory, File Name Filter Interface, Creating Directory, The Stream Classes, Input Stream and Output Stream, File input Stream and File Output Stream, Byte Array Input Stream and Byte Array Output Stream, Filtered Byte Stream, Buffered ByteStream, Print Stream, Random Access File, Stream Tokenizer, Stream Benefits, Networking, Basic of Networking, Proxy Server, Domain Naming Services, Networking Classes and Interfaces, InetAddress Class, TCP/IP Sockets, Datagram Packet, Networth, Applet Class, Applet Basics, Applet Life Cycle, A Simple Banner Applet, Handling Events, getDocumentBaseO, getCodeBaseO, showDocumentBaseO, Audio Clip and Applet Stub interface.