

# MAHARISHI MAHESH YOGI VEDIC VISHWA VIDYALAYA

DIRECTORATE OF DISTANCE EDUCATION

B.Sc. (CS)

B.Sc. (CS) FIRST YEAR

S. NO.	PAPER CODE	P. No.	PAPER NAME
1.	1DBSCCS1	I	FUNDAMENTALS OF MAHARISHI VEDIC SCIENCE (MAHARISHI VEDIC SCIENCE -I)
2.	1DBSCCS2	II	HINDI LANGUAGE
3.	1DBSCCS3	III	ENGLISH LANGUAGE
4.	1DBSCCS4	IV	DEVELOPMENT OF ENTREPRENEURSHIP
5.	1DBSCCS5	V	DISCRETE MATHEMATICS
6.	1DBSCCS6	VI	ADVANCE CALCULUS AND MATRICES
7.	1DBSCCS7	VII	STATISTICAL METHODS & PROBABILITY THEORY
8.	1DBSCCS8	VIII	FUNDAMENTALS OF COMPUTER AND INFORMATION TECHNOLOGY
9.	1DBSCCS9	IX	PROGRAMMING METHODOLOGY AND C PROGRAMMING
10.	1DBSCCS10	X	PRACTICAL- PROGRAMMING USING C

DIRECTORATE OF DISTANCE EDUCATION

**B.Sc. (CS) SECOND YEAR**

S. NO.	PAPER CODE	Paper No.	PAPER NAME
1.	2DBSCCS1	I	Advanced Concept of Maharishi Vedic Science (Maharishi Vedic Science –II)
2.	2DBSCCS2	II	Hindi Language-II
3.	2DBSCCS3	III	English Language-II
4.	2DBSCCS4	IV	Environmental Studies
5.	2DBSCCS5	V	Calculus, Differential Equation and Mechanics
6.	2DBSCCS6	VI	Advanced Calculus, Partial Differential Equations, Complex Analysis and Abstract Algebra.
7.	2DBSCCS7	VII	Sampling Theory and Sampling Distribution
8.	2DBSCCS8	VIII	Relational Database Management System Using Oracle
9.	2DBSCCS9	IX	Software Engineering
10.	2DBSCCS10	X	PRACTICAL- RDBMS Using Oracle

**B.Sc. (CS) THIRD YEAR**

S. NO.	PAPER CODE	Paper No.	PAPER NAME
1.	3DBSCCS1	I	Sampreshan Kaushal ,Hindi Language and General Knowledge
2.	3DBSCCS2	II	English Language and General Awareness
3.	3DBSCCS3	III	Computer
4.	3DBSCCS4	IV	Real Analysis, Linear Algebra and Discrete Mathematics
5.	3DBSCCS5	V	Metric Spaces, Numerical Analysis and Elementary Statistics
6.	3DBSCCS6	VI	Applied Statistics and Numerical Methods
7.	3DBSCCS7	VII	Object Oriented Technology and JAVA Programming
8.	3DBSCCS8	VIII	Introduction to Operating System
9.	3DBSCCS9	IX	PRACTICAL- Object Oriented Technology and JAVA Programming

# FUNDAMENTALS OF MAHARISHI VEDIC SCIENCE

## (MAHARISHI VEDIC SCIENCE – I)

DIPLOMA/ADVANCED DIPLOMA/UG COURSES

### 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 Yogijee
- 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, व्याकरणिक, 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।

## 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).

## उद्यमिता विकास

### 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

# 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 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 विधिया

## FUNDAMENTAL OF COMPUTER AND INFORMATION TECHNOLOGY

**UNIT-I** 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.

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.

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

Operating System: Function, types –batch, single, Multiprogramming, Multiprocessing. Programming languages-Machine, Assembly High Level, 4GL, their merit and demerits.

Application Software: Word –processing, spreadsheet, presentation graphics, data base management software, characteristics, user and example and area of application of each of them.

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

**UNIT-IV** 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 .

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

### **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.

## PROGRAMMING METHODOLOGY AND C PROGRAMMING

**UNIT-I: An overview:** Problem identification, analysis, design, coding, testing & debugging, implementation, modification & maintenance; algorithms & flowcharts; Characteristics of a good program - accuracy, simplicity, robustness, portability, minimum resource & time requirement modularization; Rules/ conventions of coding, documentation, naming variables; Top down design; Bottom-up design.

**UNIT-II: Fundamentals of C Programming:** History of C; Structure of a C Program; Data types; Constant & Variable, naming variables; Operators & expressions; Control Constructs - if-else, for, while, do-while; Case switch statement; Break, continue, exit(), goto & labels, Arrays; Formatted & unformatted I/O; Type modifiers & storage classes; Ternary operator; Type conversion & type casting; Priority & associativity of operators.

**UNIT-III: Modular Programming:** Functions; Arguments; Return value; Parameter passing - call by value, call by reference; Return statement; Scope, visibility and lifetime rules for various types of variable, static variable; Calling a function; Recursion - basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion, examples.

**UNIT-IV: Advanced Programming Techniques:** String; Pointer v/s array; Pointer to pointer; Array of pointer & its limitation; Function returning pointers; Pointer to function, Function as parameter; Structure -basic, declaration, membership operator, pointer to structure, referential operator, self referential structures, structure within structure, array in structure, array of structures; Union - basic, declaration; Enumerated data type; Typedef; command line arguments.

**UNIT-V: Miscellaneous Features:** File handling and related functions; printf & scanf family; C preprocessor- basics, #Include, #define, #undef, conditional compilation directive like #if, #else, #elif, #endif, #ifdef and #ifndef; Variable argument list functions.

### Text Books:

1. Kerninghan & Ritchie, "The C Programming Language", PHI
2. Programming in Ansi C by E. Balaguruswamy, TMH, 2004
3. Let us C Yaswant Kanetkar, BPB publications
4. Gottfried:"Problem solving in C",Schaum Series
5. How to solve it by Computer by R.G. Dromey (P.H.II),1994

# **Advanced Concept of Maharishi Vedic Science**

## **(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

## हिन्दी भाषा -II

### इकाई एक

(क) हिन्दी की व्याकरणिक कोटियाँ – रचनागत और प्रयोगगत उदाहरण संज्ञा, सर्वनाम, विशेषण, क्रिया विशेषण आदि तथा समास, सन्धि एवं सक्षिप्तियों रचना और प्रयोगगत विवेचन।

(ख) पाठ – मुक्त गगन है : माखनलाल चतुर्वेदी , शिकागों व्याख्यान : स्वामी विवेकानन्द और वर्ण विन्यास: विश्वनाथ प्रसाद मिश्र।

### इकाई दो

(क) विविध विषयों पर संक्षिप्त निबंध लेखन।

(ख) पाठ – क्या लिखूँ : पदुमलाल पुन्नालाल बख्शी, भय से मुक्ति: जे कष्णमूर्ति, शिरीष के फूल : हजारी प्रसाद द्विवेदी, माण्डव : रामनारायण उपाध्याय, पर्यावरण और राष्ट्रीय सेवा योजना, नर-नारी समानता।

### इकाई तीन

(क) हिन्दी में प्रयुक्त पारिभाषिक एवं तकनीकी शब्दावली तथा मुहावरे और लोकोक्तियाँ।

(ख) औद्योगिक क्रांति : डॉ श्यामाचरण दुबे, छोटा जादूगर : जयशंकर प्रसाद।

### इकाई चार

विज्ञान और साहित्य : जैनेन्द्र कुमार, विज्ञान परिभाषा, शाखाएँ और संक्षिप्त इतिहास, प्रमुख वैज्ञानिक आविष्कार, हमारा ब्रह्माण्ड और जीवन हमारा सौर मण्डल, जीवन : उद्भव और विकास, भारत की वनस्पतियाँ और जीव।

### इकाई पाँच

भोजन और स्वास्थ्य।

## ENGLISH LANGUAGE -II

### UNIT – I

Reading Comprehensions of an unseen Passage.

### UNIT – II

Vocabulary.

### UNIT – III

Report – Writing.

### UNIT – IV

Expansion of ideas.

### UNIT – V

Grammar.

Questions shall be asked from the prescribed text which will comprise specimens of popular creative/ writing and following items.

- **(a) Matter & Technology**
  - (i) State of Matter and its structure.
  - (ii) Technology (Electronics, Communication, Space Science)
- **(B) Our Scientists & Institutions :**
  - (i) Life & work of our Eminent Scientists : Arya Bhatt, Kaurd, Charak, Shohruta, Nagarjun, J.C. Bose, C.V. Raman, S. Ramanujan, Homi J. Bhabha, Birbal Sahani.
  - (ii) Indian Scientific Institutions ( Ancient & Modern)
  - (iii) Gender Issues

The Text Book Published by the M.P. Hindi Granth Academy.

# ENVIRONMENTAL STUDIES

## UNIT – I

The Multidisciplinary nature of environmental studies Definition, scope and importance. Need for public awareness. Natural Resources: Renewable and non-renewable resources.

Natural resources and associated problems:

- (a) Forest resource : Use and over-exploitation, deforestation, case studies, Timber extraction. Mining, dams and their effects on forests and tribal people.
- (b) Water resources : Use and over-Utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- (c) Mineral resources : Use and exploitation , environmental effects of extracting and using mineral resources, cases studies.
- (d) Food resources World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problem, water logging, salinity, case studies.
- (e) Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources Case studies.
- (f) Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
  - Role of an individual in conservation of natural resources.
  - Equitable use of resources for sustainable lifestyles.

## UNIT – II

**Ecosystems** : Concept of an ecosystem , Structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structure and function of ecosystem : (a) Forest ecosystem (b) Grassland Ecosystem. (c) Desert ecosystem . (d) Aquatic ecosystems (Ponds, streams, lakes, rivers, oceans, estuaries,

## UNIT – III

**Biodiversity and its conservation** : Introduction – Definition : genetic, species and ecosystem diversity. Biogeographically classification of India. Value of biodiversity consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Treats to biodiversity : habitat loss, poaching of wildlife, man wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

## UNIT – IV

**Environmental Pollution:** Definition : Causes, effects and control measures of : Air Pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal polluting, Nuclear hazards.

Solid waste Management: Causes effects and control measure of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management floods, earthquake, cyclone and landslides.

## UNIT – V

**Social Issues and the Environment :** From Unsustainable to Sustainable development. Urban problem related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people, its problems and concerns Case studies. Environmental ethics : Issues and possible solutions. Climate change, global warming acid rain, ozone layer depletion nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act . Forest conservation Act. Issues involved in Enforcement of environmental legislation. Public awareness.

**Human Population and the Environment:** Population growth, Variation among nations. Population explosion – Family Welfare Programme. Environment and human health. Human Rights. Value Education. HIV / AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Case Studies.

**Text Book :** Environmental Awareness . Edi- Dr. Danjay Verma in Hindi & English Pub, by MP Hindi Granth Academy.



# 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.

## **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.

## RELATIONAL DATA BASE MANAGEMENT SYSTEM USING ORACLE

**UNIT-I:- INTRODUCTION:** -Advantages of DBMS approach, various views of data, data independence, Schema & sub-schema, Primary concepts of data models, Database languages, Transaction management, Database administrator & uses, data dictionary, Overall system architecture.

ER MODEL: - Basic concept, Design issues, Mapping constraints, Keys, ER diagram, weak & strong entity sets, specialization & generalization, aggregation, inheritance, design of ER schema, Reduction of ER schema to tables.

**UNIT –II: - DOMAIN RELATIONS & KEYS:** - Domains, Relations, Kinds of relation, relational databases, various types of keys, candidate, primary, alternate & foreign Keys.

RELATION ALGEBRA & SQL :- The structure, relation algebra with extended operations, Modification of database, idea of relational calculus, Basic structure of SQL, set operation, Aggregate function, Null values, Nested sub queries, Derived relations, views modification of database, Join relations, DDL & SQL .

**UNIT– III:- FUNCTIONAL DEPENDENCIES & NORMALIZATION:** Base definitions, Trivial & non-Trivial dependencies, Closure set of dependencies & of attributes, Irreducible set of dependencies, introduction to normalization, Non- loss decomposition, FD diagram of I, II & III NF, Dependencies prevention, BCNF, Multi-valued dependencies prevention's, BCNF, Multi-valued dependencies & ANF, Join dependencies & 4NF. DATABASE INTEGRITY :-General idea, Integrity rules, Domain rules, Attribute rules, Relation rules, Database rule, assertions, triggers, Integrity & SQL.

**UNIT -IV: - DISTRIBUTED DATABASES:** - Basic idea, distributed data storage, Data replication, Data Fragmentation, horizontal, vertical & mixed fragmentation. EMERGING TRENDS IN DBMS :- Object – Oriented database- Basic idea & the model Object structures Object, Class, inheritance, multiple object identity, Data warehousing terminology, definitions, characteristics, Data mining & its overview, Database on www, multimedia database difference with conventional DBMS, issues, similarity based retrieval continuous media data, multimedia data formats, video servers.

**UNIT- V: - NETWORK & HIERARCHICAL MODEL:** Basic idea , Data structure diagram, DBTG model, implementation, Tree structure diagram, Implementation techniques, comparison of three models.

TRANSACTION CONCURRENCY & RECOVERY:- Basic concept, ACID properties, Transaction state, Implementation of atomicity & durability concurrent executions, Basic idea of serializability, Basic idea of concurrency control, Basic idea of deadlock, Failure, classification, storage structure - types, stable storage implementation, data access, Recovery& Atomicity – Log based recovery, deferred database modifications, immediate database modifications, checkpoints.

### **Text Books:-**

1. Henry F.Korth & A. Silbershatz: Data System Concepts. Mc-GrawHill.
2. Arun K. Majumdar & P.Bhattacharya: Data Base Management System. TMH

### **References Books:-**

1. Bipin C. Desai: An Introduction to Database System, Galgotia Pub. Co.Ltd.
2. Jeffrey O. Ullman: Principles of Database Systems, Galgotia Pub. Co.Ltd.
3. James Martin: Principles of Database Management . PHI
4. James Martin, Computer Database organization. PHI

# Software Engineering

## UNIT - I

Introduction to Software and Software Engineering: The Origin of Software Engineering, Characteristics of Software Engineering, Software Crisis,

## UNIT-II

Software Engineering: Models: Life Cycle Model, Spiral Model, Models of the Software Process.

## UNIT - III

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

## UNIT- IV

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 - V

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 .

## संप्रेषण कौशल, हिन्दी भाषा और सामान्य ज्ञान

इकाई – एक

(क) भारत माता: सुमित्रानंदन पंत, परशुराम की प्रतीज्ञा : रामधारी सिंह दिनकर, बहुत बड़ा सवाल: मोहन राकेश, संस्कृति और राष्ट्रीय एकीकरण: योगेश अटल ।

(ख) कथन की शैलियाँ : रचनागत उदाहरण और प्रयोग ।

इकाई – दो

(क) विकासशील देशों की समस्याएँ, विकासात्मक पुनर्विचार, और प्रौद्योगिकी एवं नगरीकरण ।

(ख) विभिन्न संरचनाएँ ।

इकाई – तीन

(क) आधुनिक तकनीकी सभ्यता, पर्यावरण प्रदूषण तथा धारणीय विकास ।

(ख) कार्यालीन पत्र और आलेख ।

इकाई – चार

(क) जनसंख्या: भारत के संदर्भ में और गरीबी तथा बेरोजगारी ।

(ख) अनुवाद ।

इकाई – पाँच

(क) ऊर्जा और शक्तिमानता का अर्थशास्त्र ।

(ख) घटनाओं, समारोहों आदि का प्रतिवेदन और विभिन्न प्रकार के निमंत्रण-पत्र ।

निर्धारित पाठ्यपुस्तक हिन्दी भाषा और समसामायिकी म.प्र. हिन्दी ग्रन्थ अकादमी ।

# English Language and General Awareness

## UNIT – I

Writing skills for compositing-essay writing

## UNIT – II

Precise Writing.

## UNIT – III

Reading Comprehension of an unseen passages

## UNIT – IV

Vocabulary based on text

## UNIT – V

Grammar : Advanced Exercises .

Questions shall be asked from the prescribed text which will comprise specimens of popular creative/ writing and following items.

Minimum needs : Housing and Transport, Geo-economic profile of M.P. Women and empowerment, Management of change. Physical quality of life, war and human survival, the question human social values.

# COMPUTER

## UNIT – I

**INTRODUCTION TO COMPUTER ORGANIZATION:** History of development of computers , computer system concepts. Characteristics, Capability and Limitations. Generation of computers, types of PC's Desktop, Laptop, Notebook, Palmtop, workstation & their Characteristics. Basic components of a computer system, Control Unit, ALU, Input/ Output function and Characteristics, memory RAM, ROM, EPROM, PROM.

## UNIT – II

**INPUT, OUTPUT AND STORAGE, 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 : **Storage Devices :** Storage fundamentals primary Vs Secondary, Various Storage Devices Magnetic Tape, Cartridge Tape. Data Drives, Hard Disk Drives. Floppy Disks. CD, VCD, CD- R. CD-RW, Zip Drive. DVD. DVD-RW.

## UNIT – III

**INTRODUCTION TO OPERATING SYSTEM AND WORD :** 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 & director structure and naming rules. Booting process DOS system files. **OS Commands:** Internal DIR. MD, CD, RD. Copy DEL, REN, VOL,. DATE. TIME, CLS PATH, TYPES. External CHKDSK, SCOPY, PRINT, DISKCOPY, DISKCOMP. DOSKEY, TREE, MO. LABET, APPEND FORMAT, SORT, FDISK, BACKUP, EDIT, MODE, ATTRIB, HELP SYS etc. Executable V/s Non executable files in DOS. **Word Processing : Word :** Introduction to Word Processing. MS Word features, Creating, Saving and Opening Window Editing Text Selecting. Inserting, deleting, moving text. Previewing documents. Printing documents, Print a document from the standard toolbar, Print a document from the menu, shrinking a document to file page, Reduce the number of pages by one. Formatting Documents : Paragraph, formats, Aligning Text and Paragraph, Borders and shading, Header and Footer Multiple Columns.

## UNIT – IV

**INTRODUCTION TO EXCEL AND POWER POINT: Excel & Worksheet:** Worksheet basics: Creating worksheet, entering data into worksheet, leading 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. **PowerPoint :** Features and various versions. Creating presentation using slide master and template in various colour scheme. Working with different views and menus of PowerPoint : Working with slider make news slide move, copy, delete, duplicate, lay cutting 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. Bullets, footer, paragraph formatting, spell checking. Printing presentation Print slides, notes handout Clip Arts pictures and charts. Slides sorter, slide transition effects and other animation effects. Presenting the show making stand alone presentation Pack and go wizards.



## UNIT – V

**INTRODUCTION TO INTERNET:** Evolution protocol, concept, Internet, Intranet, Dial-Up connectivity, leased , VSAT, Broad band, URLs. Domain names, Portals, e-mail, Pop & web based Email. Basics of sending and receiving Emails, Email & Internet Ethics, Computer virus, Antivirus software usage. Web Browsers.

### BOOKS RECOMMENDED :

- 1- Computer Fundamentals : P.K. Sinha, BPB publication.
- 2- Microsoft Office : Ron Mansfield. BPB publication.
- 3- Introduction to computers : A. Leon & M. Lean.
- 4- Microsoft Office by Guru Courter & Annettes marquis, BPB publication.

### Practical's Based Upon:

**DOS :** DOS commands : Internal s, & External commands. Special batch file Auto-exe. Batch Hard disk Setup.

**Window :** Desktop setting – new folder, rename, recycle bin operations, briefcase, function. Control panel utility. Display properties : Screen saver. Background setting.

**MS- Word :** Creating file, save as, as HTML,. Save as, Text, template, RTE format . Page setup utility : Margin settings. Paper size, setting, paper source layout. Editing cut, paste, paste special, undo, redo, find, replace, goto etc. View file page layout Normal outline , master document ruler, header, footer, footnote, full screen. Insert : break, pagenumber, symbol, data & 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 autofomat, sort formula.

**MS- Power Point:** Creating new slide, formatting slide, slide layout, slide show & sorter, Inserting new slide, slide no., date, time, chart, formatting slide, tool operation.

### List of suggested practical work :

- 1- Understanding of a dial up connection through modem.
- 2- Configuring a computer for an e-mail and using Outlook or Netscape Messenger.
- 3- Registration an e-mail address.
- 4- Understanding of address book maintenance for e-mail.
- 5- Understanding of e-mail drafting.
- 6- Understanding of different Mail program tools.
- 7- Send and receive functions of e-mail.

# 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

# 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.

# 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.

# Object Oriented Technology and Java Programming

## UNIT – I Object Oriented Technology and Java

**Object Oriented Methodology :** Paradigms of Programming Languages, Evolution of OO Methodology, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Introduction to Common OO Language, Applications of OOPs.

**Java Language Basics :** Introduction To Java, Basic Features, Java Virtual Machine Concepts, A Simple Java Program, Primitive Data Type And Variables, Java Keywords, Integer and Floating Point Data Type, Character and Boolean Types, Declaring and Initialization Variables, Java Operators.

**Expressions, Statements and Arrays:** Expressions, Statements, Control Statements, Selection Statements, Iterative Statements, Jump Statements, Arrays.

## UNIT – II Object Oriented Concepts

**Class and Objects :** Class Fundamentals, Creating objects, Assigning object reference variables, Introducing Methods, Static methods, Constructors, Overloading constructors, This Keyword, Using Objects as Parameters, Argument passing, Returning objects, Method Overloading, Garbage Collection, The Finalize ( ) Method.

**Inheritance and Polymorphism :** Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword. Abstraction and Encapsulation.

**Packages and Interfaces :** Package, Defining Package, CLASSPATH, Package naming, Accessibility of Packages, Using Package Members, Interfaces, Implementing Interfaces, Interface and Abstract Classes, Extends and Implements Together.

## UNIT – III Exceptions Handling and Multithreading

**Exceptions Handling:** Exception, Handling of Exception, Using try-catch, Catching Multiple Exceptions, Using finally clause, Types of Exceptions, Throwing Exceptions, Writing Exception Subclasses.

**Multithreaded Programming :** Multithreading: An Introduction, The Main Thread, Java Thread Model, Thread Priorities, Synchronization in Java, Inter thread Communication.

## **UNIT – IV I/O and String Handling**

**I/O in Java :** I/O Basics, Streams and Stream Classes, Byte Stream Classes, Character Stream Classes, The Predefined Streams, Reading from, and Writing to, Console, Reading and Writing Files, The Transient and Volatile Modifiers, Using Instance of Native Methods.

**Strings and Characters:** Fundamentals of Characters and Strings, The String Class, String Operations, Data Conversion using Value Of ( ) Methods, String Buffer Class and Methods.

**Exploring Java I/O :** Java I/O Classes and Interfaces, I/O Stream Classes, Input and Output Stream, Input Stream and Output Stream Hierarchy, Text Streams, Stream Tokenizer, Serialization, Buffered Stream, Print Stream, Random Access File.

## **UNIT – V Applets Programming and Advance Java Concepts**

**Applets:** The Applet Class, Applet Architecture, An Applet Skeleton: Initialization and Termination, Handling Events, HTML Applet Tag.

**Graphics and User Interfaces :** Graphics Contexts and Graphics Objects, Color Control, Fonts, Coordinate System, User Interface Components, Building User Interface with AWT, Swing-based GUI, Layouts and Layout Manager, Container.

**Networking Features:** Socket Overview, Reserved Ports and Proxy Servers, Internet Addressing: Domain Naming Services (DNS), JAVA and the net: URL, TCP/IP Sockets, Datagrams.

**Advance Java :** Java Database Connectivity, Establishing A Connection, Transactions with Database, An Overview of RMI Applications, Remote Classes and Interfaces, RMI Architecture, RMI Object Hierarchy, Security, Java Servlets, Servlet Life Cycle, Get and Post Methods, Session Handling, Java Beans.

# INTRODUCTION TO OPERATING SYSTEM

## UNIT - I

**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 – II

**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.

## UNIT – III

**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.

## UNIT – IV

**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

## UNIT – V

**Introduction to Linux Operating System:** Features of Linux, Drawbacks of Linux, Components of Linux, Memory Management Subsystems, Linux Process and Thread Management, File Management System, Device Drivers. **Linux Commands and Utilities:** Entering the Machine, User Names and Groups, Logging In, Correcting Typing Mistakes, Format of Linux Commands, Changing Your Password, Characters with Special Meanings, Linux Documentation, The File System, Current Directory, Looking at the Directory Contents, Absolute and Relative Pathnames, Some Linux Directories and Files.

**Linux Utilities and Editor:** Some Useful Commands, Permission Modes and Standard Files, Pipes, Filters and Redirection, Shell Scripts, Graphical User Interface, Editor. **User-to-User Communication:** On-Line Communication, Off-Line Communication, Apache Server Settings, Network Server Settings, Domain Name Server, Network File Server.

**UNIX System Administration:** System Administration, Installing Linux, Choosing an Installation Method, Choosing an Installation Class, Pre-installation checks, Installation, Booting the System, Maintaining User Accounts, File Systems and Special Files, Backups and Restoration.

### Text Books:-

1. Operating System Concept (IVth ed.) by Silbersantz and Galvin (Addition Wesley)

### Reference Books :-

1. Operating system Principles By P. B. Hansen, P.H.I.

2. An introduction to operating system design N. Haberman, Galgotia publicati