PSG College of Arts & Science

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B.Sc.
MATHEMATICS WITH COMPUTER APPLICATIONS

2017 - 2020

BSc Mathematics with Computer Applications

Scheme of Examination

(For students admitted from 2014-15 and onwards)

CODE NO	SUBJECT	EXAM DURA-TION (Hrs)	Max. Marks			Credit Points
			CA	CE	Total	
First Semester						
	Part-I					
14LAU01 12LAU01 14LAU01	Tamil – I OR Hindi – I OR French-I	3	25	75	100	3
	Part-II					
14EU01	Communicative English – I - Interpersonal Communication	3	25	75	100	3
	Part –III					
14MCU01	Calculus	3	25	75	100	3
14MCU02	Differential Equations, Laplace Transforms and Fourier Series	3	25	75	100	3
14MCU03	Accountancy-I (Allied-CO)	3	25	75	100	5
Second Semester						
	Part- I					
14LAU02 12LAU02 14LAU02	Tamil – II OR Hindi – II OR French-II	3	25	75	100	3
	Part- II					
14EU02	Communicative English II – Academic Communication	3	25	75	100	3
	Part-III					
14MCU04	Numerical Methods	3	25	75	100	3
14MCU05	RDBMS	3	25	75	100	4
14MCU06	Mechanics	-	100	-	100	4
14MCU07	Accountancy–II (Allied - CO)	3	25	75	100	5
	Part –IV					
14VEU01	Value Education*	-	100	-	100	2

Cont …

CODE NO	SUBJECT	EXAM DURA-TION (Hrs)	Max. Marks			Credit Points
			CA	CE	Total	
Third Semester						
	Part- I					
14LAU03 12LAU03 14LAU03	Tamil – III OR Hindi – III OR French-III	3	25	75	100	3
	Part- II					
14EU03	Communicative English III – English for Career	3	25	75	100	3
	Part –III					
14MCU08	Classical Algebra and Trigonometry	3	25	75	100	3
14MCU09	Visual Basic	3	25	75	100	2
14MCU10	Visual Basic Practical	3	40	60	100	2
14MCU11	Digital Electronics (Allied - EL)	3	25	75	100	4
	Part- IV					
14ESU01	Environmental Studies	-	100	-	100	2
Fourth Semester						
	Part –I					
14LAU04 12LAU04 14LAU04	Tamil – IV OR Hindi – IV OR French-IV	3	25	75	100	3
	Part –II					
14EU04	Communicative English- IV English Through Literature and Newspapers	3	25	75	100	3
	Part- III					
14MCU12	Analytical Geometry of 3D and Vector Calculus	3	25	75	100	4
14MCU13	C Programming	3	25	75	100	3
14MCU14	C Programming Practical	3	40	60	100	2
14MCU15	PC Hardware(Allied-EL)	3	25	75	100	4
14MCU16	Digital Electronics – Lab(Allied-EL)	3	40	60	100	2
	Part – IV					
14SBU01	**Skill Based Subject:** Internet Security	-	100	-	100	2

* Classes will be conducted after the working hours.

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CODE NO	SUBJECT	EXAM DURA-TION (Hrs)	Max. Marks			Credit Points
			CA	CE	Total	
Fifth Semester						
	Part- III					
14MCU17	Abstract Algebra	3	25	75	100	4
14MCU18	Real Analysis	3	25	75	100	5
14MCU19	Discrete Mathematics and Graph Theory	3	25	75	100	4
14MCU20	C++ Programming	3	25	75	100	3
14MCU21	C++ Programming - Practical	3	40	60	100	2
14MCU22A 14MCU22B	***Core Elective-I :*** Matlab OR Computer Algorithms	3	25	75	100	4
14MCU23	Internship and Viva	-	40	60	100	5
	Part- IV					
14NME01	**Non-Major Elective (1) :** EDC	--	100	--	100	2
14NME02	**Non-Major Elective (2) :** General Awareness (On-line Test)	1½	--	100	100	2
Sixth Semester						
	Part- III					
14MCU24	Linear Algebra	3	25	75	100	4
14MCU25	Complex Analysis	3	25	75	100	5
14MCU26	Operations Research	3	25	75	100	4
14MCU27A 14MCU27B	***Core Elective-II :*** Mathematical Statistics OR Astronomy	3	25	75	100	4
14MCU28	Java Programming	3	25	75	100	3
14MCU29	Java Programming – Practical	3	40	60	100	2
					Total Credits	**136**

PART-V			Credits
1.	**Extension Activity** : NSS / NCC / Sports / Department Activity	I – VI semesters	2
2.	**Competence Enhancement :** Add-on Course / Women's Studies / Extra paper	I – VI semesters	2
		Grand Total	**140**

14MCU01 **CALCULUS**

SEMESTER I **Total Hours: 60**

Unit I (Sections 8.1.3 to 8.1.5- 8.4 and 8.5) **12hrs**

Total Differential coefficient :- Implicit functions - Maxima and Minima of functions two variables - Lagrange's method of Undetermined Multipliers.

Unit II (Sections 10.1.1 to 10.1.4, 10.2.1 to 10.2.5) **12hrs**

Envelopes- Curvature of plane curves :- Envelope Curvature - Radius of Curvature (Cartesion formula- parametric form) - Centre of Curvature - Evolutes and Involutes.

UnitIII (Sections 1.11, 1.13.1 to 1.13.10, 1. 14.1 and 15.1) **14hrs**

Line Integral :- Properties of Definite Integrals - Reduction Formula - Bernoulli's Formula.

Unit IV (Sections 5.2.1, 5.2.2, 5.4) **10hrs**

Multiple Integrals :- Evaluation of Double and Triple Integral.

Unit V (Sections 7.2.1 to 7.2.3, 7.3 to 7.6) **12hrs**

Improper Integrals :- Beta and Gamma Functions – Definition - Recurrence formula- Properties of Beta and Gamma functions - Applications of Gamma Functions to Multiple Integrals.

Text Book:

1. S. Narayanan and T.K. Manicavachagam Pillai, "Calculus" - Volume I, Viswanathan Publications, 2012. (For Units I and II)

2. S. Narayanan and T.K. Manicavachagam Pillai, "Calculus" - Volume II, Viswanathan Publications, 2007. (For Units III, IV and V)

14MCU02 DIFFERENTIAL EQUATIONS, LAPLACE TRANSFORMS AND FOURIER SERIES

SEMESTER I Total Hours: 60

Unit I (Sections 1.5.1 to 1.7.3, 2.1 to 2.4, 2.8 to 2.10) 14hrs

Ordinary differential equations:

Equations of first order but of higher degree: Equations solvable for p - Equations solvable for x and y - Clairaut's form - Equations that do not contain x explicitly - Equations the do not contain y explicitly - Equations homogeneous in x and y.

Linear differential equations of higher order with constant coefficients:

Evaluation of equations of the form f(D) y = X where X is e x^m or e^xV or x^mV where V is any function of x of the form constant, sin bx, cos bx, x^m (Self study) - Linear differential equations with variable coefficients - Equations reducible to the Linear homogeneous equations - Variation of parameters.

Unit II (Sections 4.1 to 4. 5.4, 4.6) 10hrs

Partial differential equations:

Formation of partial differential equations by eliminating constants and arbitrary functions - Definitions of complete- singular and general solutions - Solutions of first order partial differential Equations – Standard types I, II, III and IV – Lagrange's equation.

Unit III (Sections 5.1 to 5.5) 12hrs

Laplace Transforms:

Definition of Laplace Transforms – Laplace Transform of elementary functions. Linearity property - Shifting property - Change of scale property – Laplace transform of derivatives – Laplace Transform of integrals – Periodic function and some general theorem.

Unit IV (Sections 5.6 to 5.9) 12hrs

Inverse Laplace transform - Solving second order ordinary differential equations with constant coefficients and Simultaneous linear differential equations using Laplace transforms.

Unit V (Sections 6.1 to 6.5.2) **12hrs**

Fourier Series

Definitions – Properties – Dirichlet Conditions – Full range series - Even and Odd functions – Half range Fourier Series – Development in Sine series – Development in Cosine Series.

Text Book:

S.Narayanan and T.K.Manickavachagam Pillai, "Calculus" Vol. III, Revised Edition, 2011.

14MCU03 **ACCOUNTANCY - I (ALLIED)** **Semester –I**

(For B.Sc Mathematics with Computer Application)

Learning Objective: To learn the Principles and Practices of Book keeping

Hours

UNIT I - Accounting Concepts And Conventions **14**

Double Entry Book Keeping – Meaning – Accounting - Objectives of Accounting, Uses And Limitations of Accounting - Principles, Conventions And Concepts of Accounting – Journal – Ledger- Trial Balance – Preparation of Trial Balance.(Simple Problems).

UNIT II - Subsidiary Books **14**

Subsidiary Books - Purchase Book - Sales Book - Purchase Return Book - Sales Return Book - Bills Payable Book - Bills Receivable Book- Cash Book- Double Column – Triple Column Cash Book – Petty Cash Book.

UNIT III - Bank Reconciliation Statement And Rectification of Errors **14**

Bank Reconciliation Statement – Debit Balance - Over Draft Balance, Rectification of Errors - Suspense Account.

UNIT IV - Final Accounts **15**

Final Accounts of Sole Trading Concerns – Trading Account – Profit And Loss Account – Balance Sheet – Adjustment Entries.

UNIT V - Average Due Date And Account Current **15**

Average Due Date - Account Current –Various Methods of Calculation of Interest – Red Ink Interest Entry.

Distribution of Marks : 80% Problems and 20% Theory .

Text Book

Grewal .T.S., "Introduction to Accountancy", S.Chand & Co.Ltd, New Delhi .

Reference Books

1. Gupta R.L & Radhaswany.M., "Advanced Accountancy", Sultan chand & Son's, New Delhi.
2. Jain.S.P., Narang.K.L., "Advanced Accountancy", Kalyani Publishers, New Delhi.

14MCU04 **NUMERICAL METHODS**

SEMESTER II **Total Hours:45**

Unit I : Chapter III (Sections 3.1 to 3.6) **8hrs**

Solutions of Algebraic and Transcendental Equations – Introduction - Bisection Method – Iteration Method – Method of False Position – Newton Raphson Method – Convergence of Newton's Method.

Unit II : Chapter IV (Sections 4.1 to 4.4 , 4.6- 4.7) **9hrs**

Simultaneous Linear Algebraic Equations – Introduction - Gauss Elimination Method – Gauss Jordon Method – Computation of the inverse of a matrix using Gauss's Elimination Method - – Method of factorization – Iterative Methods – Gauss Jacobi Method – Gauss Seidal Method.

Unit III: Chapter VI & Chapter VII (Sections 6.3 to 6.5 , 7.1 to 7.6) **10hrs**

Interpolation: Gregory – Newton's Forward And Backward Interpolation Formula- Construction of Polynomials - Equidistant terms with one or more missing values – Central Difference Interpolation Formulae - – Gauss's central difference formula – Stirling's formula – Bessel's formula – Problems.

Unit IV: Chapter IX (Sections 9.1 to 9.3 , 9.7 to 9.10) **9hrs**

Numerical Differentiation and Integration: Numerical differentiation – Numerical integration – Trapezoidal rule – Simpson's 1/3 rule – Simpson's 3/8 rule – Romberg's Method.

Unit V : Chapter XI (Sections 11.6 to 11.16 , 11.19 to 11.21) **9hrs**

Numerical Solution of Ordinary Differential Equations: Solution by Taylor's series – Picard's method – Euler's method – Improved Euler's Method - Modified Euler's method – Runge-kutta method – Predictor – Corrector Methods – Adam's Method – Milne's Method.

Text Book:

Dr. M.K. Venkataraman , "**Numerical methods in Science and Engineering**", **The National Publishing Company , 2013**

RDBMS

14MCU05 **SEMESTER II** **Total Hours:45**

UNIT I (Sections 1.1 to 1.13) **9hrs**

Introduction – Database – System applications – Purpose of Database Systems – View of data – Database languages – Relational database – Database design – Object based and semi-structure database – Data storage and querying – Transaction management – Data mining and analysis – Database architecture – Database users and administrators – History of database systems.

Unit II(Sections 2.1 to 2.3) **9hrs**

Relational model – Structure of relational database – Fundamental relational-algebra operations – Additional relational-algebra operations.

Unit III(Section 3.1 to 3.4) **9hrs**

SQL – Background – Data definition – Basic structure of SQL queries – Set operations.

Unit IV(Sections 3.5 to 3.9) **9hrs**

Aggregate functions – Null values – Nested sub-queries – Complex queries – Views.

Unit V(Sections 6.1 to 6.5) **9hrs**

Database design and E-R model – Overview of the design process – The Entity relationship model – Constraints – Entity – Relationship diagrams – Entity-Relationship design issues.

Text Book:

"Database System Concepts" by Henry F. Korth and Abraham Silberschatz- McGraw Hills (2006)

14MCU06 **MECHANICS**

SEMESTER II **Total Hours:55**

Unit I (Sections 2.1 to 2.16- 3.1 to 3.12) **13hrs**

Forces acting at a point:

(i) Parallelogram law – Triangle law – Polygon law of forces – λ- μ theorem.

(ii) Coplanar forces.

Parallel forces moments and couples:

(i) Composition of parallel forces (like and unlike).

(ii) Moment of a force (a) about a point (b) about a line Varigon's theorem on moments.

Unit II (Sections 7.1 to 7.13) **10hrs**

Friction: Laws of friction – Angle of friction – Coefficient of friction – Cone of friction – Equilibrium of a body as a rough plane with and without any forces.

Unit III (Sections 4.1 to 4.12- 4.24 to 4.36- 7.1 to 7.6- 8.1 to 8.8) **11hrs**

The laws of motion: Newton's law of motion- work- power- energy. Collision of Elastic bodies: Impulsive forces: Impact of a smooth sphere on fixed smooth plane- Direct and oblique impacts.

Unit IV (Sections 6.1 to 6.15) **10hrs**

Projectiles: Path of a projectile – Greatest height- time of flight- Range on an inclined plane through the point of projection – Maximum range.

Unit V (Sections 11.1 to 11.15) **11hrs**

Central orbits: Radial and transverse components of velocity and acceleration- Areal velocity- central orbit- differential equation of a central orbit in polar coordinates- circular and elliptic orbits.

Tex Book:

1. **M.K. Venkataraman ,"Statics", (For Unit I and II)**

   Thirteenth Edition , Agasthiar Publications,2010

2. **M.K. Venkataraman ,"Dynamics",(For Units III -IV andV) ,**

   Fourteenth Edition, Agasthiar Publications,2011

14MCU07 ACCOUNTANCY - II (ALLIED) Semester -II

(For B.A Economics, BSc Mathematics and BSc Maths with CA)

Learning Objective: To Learn Accounting Practices in Special Categories

	Hours
UNIT I - Consignment Accounts	14 (EC)
Accounting Entries in the Books of Consignor - Consignee – Valuation of Closing Stock – Cost Price Method – Invoice Price Method.	8 (MA) 12 (CA)
UNIT II - Joint Venture Accounts	14 (EC)
Accounts Maintained by one Co-Venturer – By all Venturers Memorandum Joint Venture Account -Separate Set of Books.	10 (MA) 12 (CA)
UNIT III - Accounts of Non- Trading Concerns	14 (EC)
Receipts And Payment of Accounts – Income and Expenditure Account Balance Sheet.	10 (MA) 12 (CA)
UNIT IV - Depreciation	15 (EC)
Meaning – Objectives - Causes – Straight Line Method – Diminishing Balance Method- Annuity Method – Sinking Fund Method.	10 (MA) 12 (CA)
UNIT V - Hire Purchase And Royalty Accounts	15 (EC)
Hire Purchase Accounts – Default And Repossession (Excluding Hire Purchase Trading Account) Royalty Accounts – Minimum Rent Account – Short Working Accounts (Excluding Sub Lease)	10 (MA) 12 (CA)

Distribution of Marks : 80% Problems and 20% Theory.

Text Book

Grewal .T.S., “Introduction to Accountancy”, S.Chand & Co.Ltd, New Delhi .

Reference Books

1. Gupta R.L and Radhaswany.M., “Advanced Accountancy”, Sultan chand & Son’s, New Delhi.

2. Jain.S.P., and Narang.K.L., “Advanced Accountancy”, Kalyani Publishers, New Delhi.

14MCU08 CLASSICAL ALGEBRA AND TRIGONOMETRY

SEMESTER III Total Hours: 55

Unit I (Sections 6.1 to 6.13- 6.16) 11hrs

Theory of equations – Roots of an equation – Relation between roots and coefficients – Symmetric functions of roots – Sum of powers of roots of an equation – Reciprocal Equation.

Unit II (Sections 2.4 to 2.15) 12hrs

Convergency and Divergency of series:- Sets-Sequences-Limit of a sequence-Upper and Lower bounds of an Aggregate-Bounded sequences-Upper and Lower Limits of a sequences-Cauchy's General principle of convergence –Monotone sequences-Infinite series –Convergent-Divergent series-Some General theorems on Infinite series –Comparison Test –Cauchy's Condensation Test.

Unit III (Sections2.16 to 2.26.2) 11hrs

D'Alemberts Ratio Test –Cauchy's Root Test- Rabbi's Test- Absolutely Convergent series-Uniform Convergence- Geometrical Interpretation-Test for uniform Convergent of a series-Weierstrass's M Test for uniform Convergence.

Unit IV (Chapters 3 and 4) 10hrs

Trigonometry: Expansions of sin nθ- cos nθ- tan nθ(formation of equations omitted). Expansions of $\sin^n\theta$- $\cos^n\theta$ interms of functions of multiples of θ – Expansions of sinθ- cosθ in a series of ascending powers of θ – Evaluation of Limits of Expressions – Hyperbolic functions.

Unit V (Sections 5.5- 6.1 to 6.3.1) 11hrs

Logarithms of complex quantities – To find Logarithm of x + iy – General value of Logarithm of x +iy – Summation of trigonometrical series – Method of differences – Sum of series of n angles in A.P. – Sum of cosines of n angles in A.P. – Summation of series by using complex quantities – Gregory's series.

Text Book:

1. **T.K.Manicavachagam pillai- T. Natarajan and K.S. Ganapathy, "Algebra" Vol. I, (Unit I, II and III), S. Viswanathan Printers and Publishers Ltd, 2013.**

2. **S.Narayanan and T.K. Manicavachagom pillay, "Trigonometry", (Unit IV, V) S. Viswanathan Printers and Publishers Ltd.,2004.**

14MCU09 **VISUAL BASIC**

SEMESTER III **Total Hours:35**

Unit I (Chapter 1 and 2) **7hrs**

Introduction to VB-Event and event procedure-Object related concepts-VB program development process- components- VB environment- Saving and running a VB project- VB Fundamentals-Constants- Variables- Operators-Library functions.

Unit II (Chapter 3 and 4) **7hrs**

Branching and Looping-Logical operators-if-then- if-then-else- select case- For next- Do loop- While-wend- stop- VB Control functions- Forms and Controls.

Unit III (Chapter 5 and 6) **7hrs**

Menus and Dialog Boxes : Building Drop-Down menus-Menu enhancements-submenus-popup menus-Dialog Boxes-MsgBox Function-Input Function-Syntactic Errors-Logical Errors Setting through a program – Uses-Induced Errors - Error Handlers.

Unit IV (Chapter 7- 8) **7hrs**

Procedures : Modules and Procedures – Sub Procedures – Function Procedures – Scope – Optional Arguments. Arrays : Array Characteristics – Array Declarations – Processing Array Elements – Passing Arrays to Procedures- Dynamic Arrays- Array- Related Functions – Control Arrays – Looping with For Each-Next.

Unit V (Chapter 9) **7hrs**

Data files: Data File Characteristics – Accessing and Saving a File in VB: The Coommon Dialog Control – Processing a Data File – Sequential Data Files – Random Access Data Files – Binary Files.

TEXT BOOK:

Byron S Goutfried ,"Visual Basic", Fourteenth Edition, The Tata McGraw – Hill Companies,2009.

14MCU10 PRACTICAL LIST FOR VISUAL BASIC

SEMESTER III

1. a) In VB- create a project that displace the current date and time. Use VB variable Now and the format library function. Write a program to enter and display text. Use textbox and command button

   b) Write a program to convert temperature from Fahrenheit to Centigrade and vice versa

2. a) Write a program to select any one from a list U combo box to display choices

   b) Write a program to calculate factorial of a given number

3. a) Write a program to illustrate the usage of Timer control

   b) Write a program to illustrate the usage of Scroll bars

4. a) Write a program to illustrate the usage of Dropdown menus

   b) Write a program to illustrate the usage of menu enhancement

5. a) Write a program to illustrate the usage of pop-up-menu

   b) Write a program to illustrate the usage of input boxes

6. a) Write a program to find the smallest of n numbers

   b) Write a program to find the sine of an angle

7. a) Write a program to sort a list of numbers

   b) Write a program to determine average of a frequency distribution

8. a) Write a program to determine deviations about average

   b) Write a program to determine the value of standard deviations

9. a) Write a program to determine the roots of a quadratic equation

   b) Write a program to determine the sum of squares of any n numbers

10. Write a program to arrange the numbers in ascending order

14MCU11 **III SEMESTER**

DIGITAL ELECTRONICS

(For B. Sc., Mathematics with CA)

Objective

- To understand concepts of combinational and sequential circuits
- Analyze the synchronous and asynchronous logic circuits

Unit – I – Digital Signals, Number System and codes (9 Hrs)

Definition for Digital Signals: Analog vs Digital – TTL and CMOS Logic Levels - Switching Time – Period & Frequency – Duty Cycle – Number System: Binary – Octal – Hexadecimal – Conversion from one Number System to the Other – BCD code – Gray Code – Excess 3 Code – Parity Codes – ASCII Code.

Unit – II - Logic gates and Boolean Algebra (8 Hrs)

AND, OR, NOT, NAND, NOR, EX-OR and EX-NOR Gates – Boolean Algebra – Commutative, Associative and Distributive Laws – Duality Theorem – Demorgan's Theorem – Karnaugh's Map – Implementation of Logic Circuits using Gates.

Unit – III - Arithmetic and Data Processing Circuits (9 Hrs)

Binary Addition and Subtraction – 1's and 2's Complement – Half Adder – Full Adder – 4-bit Parallel Binary Adder – Half Subtractor – Full Subtractor – Multiplexer – Demultiplexer – Encoder – Decoder.

Unit – IV - Flip flops, Registers and Counters (9 Hrs)

RS, JK, JK Master Slave Flip-flops – D and T types – Shift Register Types: Serial in Serial out – Serial in Parallel out, Parallel in Serial out – Synchronous and Asynchronous Counters, Ring Counter – Decade Counter.

Unit – V - Converters (9 Hrs)

D/A Converters: Weighted Resistors – Binary Ladder – Accuracy and Resolution – A/D Converters: Simultaneous Conversion – Counter Type – Successive Approximation Method.

Text Book

1. Albert Paul Malvino and Donald P. Leech, "**Digital Principles and Applications**", 4th Edition, McGraw Hill Company, 1986.

14MCU12

ANALYTICAL GEOMETRY OF 3-D AND VECTOR CALCULUS

SEMESTER IV **Total Hours:55**

Unit I : (Sections 2.1 to 2.10) **12hrs**

The Plane – Theorem- Converse of the Preceding Theorem – Transformation of the Normal Form- Determination of a plane under Given conditions- Systems of Planes – Two sides of a Plane- Length of the Perpendicular From a Point to a Plane- Joint Equation of two Planes - Orthogonal projection on a Plane – Volume of a Tetrahedron - Problems.

Unit II : (Sections 3.1 to 3.8) **12hrs**

The Right Line – Representation of Line – Angle between a line and a plane – Conditions for a Line to lie in a plane- Coplanar lines Condition for the Coplanarity of Lines – Number of Arbitrary Constants in the Equations of a Straight Line - The Shortest Distance Between Two Given Lines - - Length of the Perpendicular from a Point to a Line – Intersection of Three Planes.

Unit III : (Sections 6.1to 6.7) **10hrs**

The Sphere: Definition – The Sphere Through Four Given Points – Sphere – Equations of a Circle – Intersection of a Sphere and a Line – Equation of a Tangent Plane – Angle of Intersection of Two Spheres .

Unit IV : Chapter I &II (pp 1-23) **10hrs**

Differentiation of Vectors : Gradient- Divergence and Curl.

Unit V : Chapter III (pp24 - 92) **11hrs**

Integration of Vectors : The Line Integral - Surface Integral - Volume Integral - Greens Theorem in the Plane- Gauss Theorem - Stoke's Theorem .

Text Book:

1. **Shanthi Narayan and Dr.P.K. Mittal ,"Analytical Solid Geometry" (For Units I, II& III), S.Chand & Company Ltd, 2010**
2. **P.Kandasamy & k. Thilagavathi ,"Mathematics " (For Units IV and V), Volume III S.Chand & Company Ltd , 2005**

14MCU13 **C PROGRAMMING**

SEMESTER IV **Total Hours:35**

Unit I (Chapters 1 and 2) **7hrs**

Overview of C- constants- variables and data types-character set-C tokens-Keywords and identifiers-constants-variables-data types-declaration of variable-assigning values to variables-defining symbolic constants.

Unit II (Chapter 3 and 4) **7hrs**

Arithmetic operators-relational operators-logical operators-assignment operators-increment and decrement operators-conditional operators-bitwise operators-special operators-arithmetic expressions-evaluation of expressions-precedence of arithmetic operators-type conversions in expressions-operator precedence and associativity-mathematical functions. Managing input and output operators –Reading a character-writing a character-formatted input-formatted output.

Unit III (Chapter 5 and 6) **7hrs**

Decision making with IF statement-IF-ELSE statement-nesting of IF-ELSE statement-the Switch statement-the GOTO statement- The WHILE statement-DO statement-FOR statement-Jumps in loops

Unit IV (Chapters 7 and Sections 9.1 to 9.10) **7hrs**

One-dimensional array-two-dimensional arrays-initializing two dimensional arrays-multi dimensional arrays. Need for user defined functions-A multi function program-the form of C functions-return values and their types-calling a function-category of functions-no arguments and no return values.

Unit V (Chapter 10 , Sections 11.1 to 11.6 and 12.1 to 12.4) **7hrs**

Defining Structure-Declaring structure variables- Accessing structure members-structure initialization-copying and comparing structure variables-Operations on individual members-arrays of structures- arrays within structures- structures within structures-structures and functions- unions- size of structures-Pointers-understanding pointers- accessing the address of the variable-declaring and initializing pointers-accessing a variable through its pointers- File management in C-defining and opening a file-closing a file-input/output operations on files.

TEXT BOOK:

E.BALAGURUSAMY, "**Programming in ANSI C**" , **Sixth edition,Tata Mcgraw Hill,2013 .**

14MCU14 C PROGRAMMING PRACTICAL

SEMESTER IV

1. Write a program to generate ‘n’ prime numbers.

2. Arrange a set of numbers in ascending order using Quick sort.

3. Arrange a set of numbers in descending order using Heap sort

.

4. Program to matrix addition- subtraction- multiplication and transpose.

5. Program to verify whether a given number is an Armstrong number.

6. Program to solve a quadratic equation and print all the roots.

7. Program for solving nonlinear equation by Newton-Raphson method.

8. Program for numerical integration by Simpson’s rule.

9. Program to find the factorial of a given number.

10. Write a program to perform all manipulation like insertion- deletion and modification in files.

14MCU15 **IV SEMESTER**

PC HARDWARE

(For B. Sc., Mathematics with CA)

Objective

To Study about the various parts of computer.

To understand the concept of interfacing in PC.

Unit - I - Personal Computer **(8 Hrs)**

Evolution – Specifications – PC System – Functional Blocks of Motherboard – BIOS – Bus Standards: EISA – PCI – USB – IEEE 1394 Fire Wire – I/O ports: Serial Port – Parallel Port – Game Port – USB Port – SMPS.

Unit – II – Storage Devices **(9 Hrs)**

PC Memory Organization – Memory Packages – Magnetic Storage Fundamentals – Diskette Basics – Disk Organization in DOS – Floppy Disk Drive Sub-assemblies – Floppy Disk Controller – Hard Disk Drive Sub-assembles – Hard Disk Controller – Interface Types.

Unit – III – Audio and Video Devices **(9 Hrs)**

CD-ROM Disk – CD-ROM Drive – Sound Blaster – Video on the PC – Input Devices – Keyboard – Mouse – Scanner.

Unit - IV – Display and Printers **(9 Hrs)**

Display – Video Basics – VGA Monitor – CGA – EGA – VGA – SVGA – Dot Matrix Printer – Plotter – Laser Printer – Ink Jet Printer.

Unit – V – Troubleshooting **(9 Hrs)**

Trouble Shooting and Servicing: Motherboard – Key board – FDD/HDD – Computer and Communication: Networking – MODEM – Internet.

Text Book

Balasubramaniam. D, "**Computer Installation and Servicing** ", 2nd edition, Tata McGraw Hill publishing company, New Delhi, 2001.

14MCU16 **IV SEMESTER**

DIGITAL ELECTRONICS LAB

(For B. Sc., Mathematics with CA)

Any 18 Experiments

1. Characteristics of TTL Gates
2. Verification of logic gates
3. NAND and NOR gates as Universal building blocks
4. Binary to Gray & Gray to Binary Conversion
5. Verification of Demorgan's theorem
6. Parity checker/Generator
7. Half and Full Adder
8. Half and Full Subtractor
9. 4-Bit Parallel Binary adder
10. Multiplexer and Demultiplexer
11. Encoder and Decoder
12. Flip flops using Logic gates.
13. Shift Register
14. Decade counter
15. Ring Counter
16. Digital to Analog converter
17. Analog to Digital converter
18. Study of PC
19. Study of mother board
20. Study of mouse, keyboard and modem
21. Study of hard disk drive.
22. Study of monitor
23. Assembling of a PC

14MCU17 **ABSTRACT ALGEBRA**

SEMESTER V **Total Hours:55**

Unit I (sections 2.1 to 2.6) **11hrs**

Group Theory: Definition and examples – Some Preliminary Lemmas – Subgroups – A Counting Principle-Normal subgroups and Quotient groups.

Unit II(sections 2.7 to 2.10) **12hrs**

Group Theory: Homomorphisms – Automorphisms - Cayley's theorem – Permutation Groups.

Unit III(sections 3.1 to 3.4) **11hrs**

Ring Theory: Definition and examples – Some special classes of Rings – Integral domain and fields – Homomorphisms of rings – Ideals and quotient Rings .

Unit IV(sections 3.5 to 3.8) **11hrs**

Ring Theory: More Ideals and Quotient Rings – The Field of Quotients of an integral domain – Euclidean rings – A Particular Euclidean Ring.

Unit V (sections 3.9 to 3.11) **10hrs**

Ring Theory: Polynomial rings – Polynomials over the rational field – Polynomial Rings over Commutative Rings.

TEXT BOOK:

I.N.Herstien , "**Topics in Algebra**", **Second Edition, John wiley & Sons , INC , 2010.**

14MCU18 **REAL ANALYSIS**

SEMESTER V

Total Hours:60

Unit I (Sections 2.1 to 2.30) **14hrs**

Basic Topology :- Finite – Countable and Uncountable sets – Metric spaces.

Unit II (Sections 2.31 to 2.47) **10hrs**

Basic Topology :- Compact sets **--** Perfect sets – Connected sets .

Unit III (Sections 3.1 to 3.44) **14hrs**

Numerical sequences and series :- Convergent sequences – Subsequences – Cauchy sequences – Upper and Lower limits – Some special sequences – Series – Series of non negative terms – The number "e" – The Root and Ratio tests – Power series – Summation by parts.

Unit IV (Sections 4.1 to 4.27) **12hrs**

Continuity:- Limits of functions – Continuous functions – Continuity and Compactness – Continuity and Connectedness – Discontinuities.

Unit V (Sections 5.1 to 5.15) **10hrs**

Differentiation:- The derivative of a real function – Mean value theorems – The continuity of derivatives - L'Hospital's rule – Derivatives of Higher order – Taylor's Theorem.

Text Book:

Walter Rudin, "Principles Of Mathematical Analysis" , Third Edition- McGraw Hill Book Company, 2013.

14MCU19 DISCRETE MATHEMATICS AND GRAPH THEORY

SEMESTER V Total Hours:55

UNIT-I: (Sections 12.1 to 12.3, 12.5 , 12.7 to 12.13) 11hrs

Mathematical logic: Introduction- propositional Calculus -Basic Logical Operations -Conditional Statements - Bi conditional Statements- Tautologies- Contradiction- Contingency- Argument - Methods of proof -Equivalence and Implication.

UNIT-II: (Sections 3.3 to 3.7, 3.11, 4.3 to 4.6) 12hrs

Relations: Binary Relations- Set operations on Relations- Types of Relations- Partial order Relations- Equivalence Relation- Composition of Relations.

Functions : Types of Functions- Invertible Functions - Composition of Functions -Identity Function.

UNIT-III: (Sections 14.1 to 14.5, 14.7) 11hrs

Posets and Lattices : Introduction- Totally Ordered Set or Chain -Product Set and Partial Order Relation - Hasse Diagrams of Partially Ordered Sets- Lattice- Types of Lattices.

Unit - IV (Sections 1.1 to 1.5, 2.1 to 2.5 (except 2.3)) 10hrs

Introduction: What is a graph? -Application of graphs – Finite and Infinite graphs –

Incidence and degree – Isolated Vertex- Pendant Vertex and Null graph. Paths and Circuits:

Isomorphism – Sub graphs – Walks- Paths and Circuits – Connected graphs- disconnected graphs and components.

Unit – V (Sections 2.6, 2.7, 3.1 to 3.7(except 3.6)) 11hrs

Euler graphs – Operations on graphs – Trees and Fundamental Circuits: Trees – Some properties of trees – Pendant Vertices in a tree – distance and centers in a tree – Rooted and Binary tree – Spanning trees.

Text Books:

1. J.K. Sharma, "Discrete Mathematics" , Third Edition , Macmillan Publishers India Ltd, 2011 (for units I,II,III)

2. Narsingh Deo, "Graph Theory with Applications to Engineering and Computer Science" , PHI learning Private Limited New Delhi , 2012 (for units IV,V)

14MCU20 **C++ PROGRAMMING**

SEMESTER V **Total Hours:45**

Unit I (Sections 1.4- 1.5, 2.1 to 2.8, 3.1 to 3.6) **8hrs**

Object Oriented Programming paradigm – Basic Concepts of Object-Oriented programming – What is C++ - A simple C++ program – More C++ Statements – An Example with Class – Structure of C++ Program – Creating the source file – Compiling and Linking Introduction – Tokens – Keywords – Identifiers and Constants – Basic Data Types – User-Defined Data Types.

Unit II (Sections 3.8 to 3.15, 3.18 , 3.25, 4.1 to 4.10(except 4.9)) **9hrs**

Derived Data Types – Symbolic Constants – Type Compatibility – Declaration of variables – Dynamic Initialization of variables – Reference Variables _ Operators in C++ - Scope Resolution Operator – Manipulators – Control Structures- Introduction – The main Function – Function Prototyping – Call by Reference – Return by Reference – Inline Functions – Default arguments – Const Arguments – Function Overloading.

Unit III (Sections 5.2 to 5.16) **9hrs**

C Structures Revisited – Specifying a Class – Defining Member Functions – A C++ Program with Class – Making an Outside Function Inline – Nesting Of Member Functions – Private Member Functions – Array within a Class - Memory Allocation for Objects – Static Data Members – Static Member Functions – Arrays of Objects – Objects as Function Arguments – Friendly Functions – Returning Objects.

Unit IV (Sections 6.1 to 6.5, 6.11, 7.2 to 7.9 (except7.5,7.7)) **10hrs**

Introduction – Constructors – Parameterized Constructors – Multiple Constructors in a Class – Constructors with Default Arguments – Destructors – Defining Operator Overloading - Overloading Unary Operators – Overloading Binary Operators – Manipulation Of Strings Using Operators – Rules For Overloading Operators – Type Conversions.

Unit V (Sections 8.1 to 8.8) **9hrs**

Introduction – Defining Derived Classes – Single Inheritance – Making a Private Member Inheritable – Multilevel Inheritance – Multiple Inheritance – Hierarchical Inheritance – Hybrid Inheritance.

Text Book:

E. Balagurusamy ,"**Object Oriented Programming with C++", Sixth Edition, McGraw Hill Education (India) Private Limited, 2013.**

14MCU21 **C++ PROGRAMMING (PRACTICAL)**

SEMESTER V

(Any Seven Programs)

1. Write a function 'power()' to raise a number 'm' to a power 'n'. The function takes a 'double' value for 'm' and 'int' value for 'n'- and returns the result correctly. Use a default value of 2 for 'n' to make the function to calculate squares when this argument is omitted. Write a main() that gets the values of 'm' and 'n' from the user to test the function.

2. Write a program to compute Compound interest of a given amount AMT for 'n' years. Use

Function overloading so that the program gets input of interest rate RATE in any of the data type 'float' of 'int'.

3. Create a class which consist of Employee detail ENO-ENAME-DEPAT-BASIC SALARY. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA-HRA and PF depending on the grade and display the

payslip in a neat format using console I/O.

4. Define two classes POLAR and RECTANGLE to represent points in the polar and rectangle system. Write a program to convert from one system to another.

5. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.

6. Create a class MAT of size M*N. Define all possible matrix operations for MAT type objects.

Verify the identity.

(A-B)^2 =A^2+B^2-2*A*B

7. Define a class for vector containing scalar values. Apply overloading concepts for vector addition-Multiplication of a vector by a scalar quantity – replace the values in a position vector.

8. Write a program to compute Area computation using derived class:

Area of rectangle = $X*Y$

Area of triangle = ½ * X * Y

9. Write a program to add two time variables.

10.Write a program to prepare the Student Mark list using inheritance.

Core Elective - I

14MCU22A **MATLAB**
SEMESTER IV **Total Hours:55**

Unit I (Sections 1.1 to 1.8, 2.1, 2.2, 2.4) **11hrs**

Starting with MATLAB

Starting MATLAB- MATLAB Windows – working in the command Window –

Arithmetic operations with scalars – Display formats – Elementary Math Built – In Functions – Defining Scalar variables – Useful commands for managing variables.

Creating Arrays

Creating A One – Dimensional Array(Vector) – Creating A Two – Dimensional Array (Matrix) – The Transpose Operator.

Unit II (Sections 2.5 to 2.10, 3.1 to 3.6) **11hrs**

Array Addressing – Using a Colon in Addressing Arrays – Adding Elements to Existing Variables – Deleing Elements – Built – In Functions for Handling Arrays – Strings and Stings as Variables.

Mathematical Operations with Arrays

Addition and Subtraction – Array Multiplication – Array Division – Element by Element Operations – Using Arrays in MATLAB Built – In Math functions – Built – In Functions for Analyzing Arrays.

Unit III (Sections 4.2 to 4.6, 5.1 to 5.3) **11hrs**

Script Files

Creating and Saving a Script File – Running A Script File – Global Variables – Input to Script File – Output Commands.

Two – Dimensional Plots

The Plot Command – The fplot Command – Plotting Multiple Graphs in the same plot.

Unit IV (Sections 5.4 to 5.9, 6.1 to 6.6, 6.8, 6.9) **11hrs**

Formatting a plot – Plots with Logarithmic Axes – Plots with Special Graphics – Histograms – Polar plots – Plotting Multiple plots in the same page.

Functions and Function Files

Creating a Function file – Structure of a function file – Local and Global Variables – Saving a function file – Using a function file – Examples of Simple Function file – Inline Funcitons – The feval Command.

Unit V (Sections 7.1 to 7.6) **11hrs**

Programming in MATLAB

Relational and Logical Operators – Conditional Statements – The switch – case Statement – Loops – Nested Loops and Nested Conditional Statements – The break and continue Commands.

Text Book:

Amos Gilat, "MATLAB – An Introduction with Applications", Department of Mechanical Engineering- The Ohio State University.

Core Elective - I

COMPUTER ALGORITHMS

14MCU22B **SEMESTER V** **Total Hours:55**

Unit I (sections 1.2 to 1.4) **11 hrs**

Intoduction: Fundamentals Of Algorithmic Problem Solving-Important Problem Types.

Fundamental Data Structures: Linear data structures-Graphs-Trees-Sets and Dictionaries.

Unit II(sections 3.1, 3.2, 4.1,4.2,4.3) **11 hrs**

Brute Force:- Selection Sort and Bubble Sort-Sequential Search and Brute-Force String matching. **Divide and Conquer:** Merge Sort- Quick Sort- Binary Search.

Unit III(sections 4.4, 6.4, 8.3, 8.4) **11 hrs**

Divide and Conquer: Binary Tree Traversals and Related Properties-**Transform and Conquer:** Heaps and Heap Sort. **Dynamic Programming :** Optimal Binary Search Trees-The Knapsack Problem and Memory Functions.

Unit IV(sections 9.2, 9.3, 9.4, 10.3, 10.4) **11 hrs**

Greedy Technique: Kruskal's Algorithm-Dijkstra's Algorithm-Huffman Trees.

Iterative Improvement: Maximum Matching in Bipartite Graphs-The Stable Marriage Problem.

Unit V (sections 12.1, 12.2, 12.4) **11 hrs**

Coping with the Limitations of Algorithm Power: Backtracking: n-queen's Problem-Hamilton Circuit Problem-Subset Sum Problem- Branch and Bound: Assignment Problem-Travelling Salesman Problem- Algorithm for Solving NonLinear Equations:Bisection Method-Method of False Position.

TEXT BOOK:

Anany Levitin ,"Intoduction to the Design and Analysis of Algorithms", Second Edition , Pearson Education , Inc, 2009

14EDCMCU **MATHEMATICS**

(EDC - For Cluster – IV -UG Programs)

Total Hours:20

Unit I (Chapter 1-2) **7hrs**

Indices : Law of multiplication – Law of Division – Law of power of power –Illustrations

Logarithms : Definition of Log – rules of Logarithms – Characteristics and mantissa –Illustrations.

Unit II (Chapter 3-4) **7hrs**

Ratio and Proportion: Rules of Ratio – Properties of proportion – Illustrations.

Equations : Simple Equations – Linear Equations –Quadratic equations – Simultaneous Linear equations in two Unknowns – Illustrations.

Unit III (Chapter 6) **6hrs**

Mathematics of Finance : Simple interest – Compound interest – Annuity – Illustrations.

Text book:

Prof. H . R.VYAS and Prof. J.B. SHAH, "QUANTITATIVE APTITUDE"

(Mathematics) .

14MCU24 **LINEAR ALGEBRA**

SEMESTER VI **Total Hours:60**

Unit I (Sections 1.5 to 1.9, 2.9, 3.9) **11hrs**

Matrices : Triangular- Diagonal- Scalar and Unit Matrices – Transpose- Adjoint and Inverse of Square Matrix – Symmetric and Skew Symmetric – Hermitian and Skew Hermitian Matrices – Orthogonal and Unitary matrices – Rank of a Matrix – Characteristic roots and Characteristic vectors of a Square matrix.

Unit II (Sections 4.1 to 4.4) **12hrs**

Vector Spaces : Elementary basic concepts – Linear independence and bases –

Dual Spaces – Inner Product Spaces.

Unit III (Sections 5.1 , 5.3) **14hrs**

Extension Fields – Roots of Polynomials.

Unit IV (Sections 6.1 to 6.3) **12hrs**

Linear Transformations – Algebra of linear transformations – Characteristic roots – Matrices.

Unit V (Sections 6.4 to 6.5, 6.10) **11hrs**

Canonical forms and triangular form – Canonical form –Nilpotent Transformations – Hermitain- Unitary and Normal transformations.

TEXT BOOK

1. R. Balakrishnan and N. Ramabhadran, "Modern Algebra" (unit I),Second Edition,Vikas publishing house,New delhi,1994

2. I.N.Herstien,"Topics in Algebra"(Unit II to V), 2nd Edition, John wiley & Sons , INC, 2010.

14 MCU25 **COMPLEX ANALYSIS**

SEMESTER VI **Total Hours:60**

Unit I (Sections 2.1 to 2.7) **12hrs**

Analytic Functions: Complex Differentiation - Limit and continuity – Differentiability – Necessary and Sufficient conditions for f(z) to be analytic – Method of constructing an Analytic function – A Simple Method of Constructing an Analytic Function - Polar form of Cauchy – Riemann Equations.

Unit II (Sections 4.1 to 4.9) **10hrs**

Conformal Mappings: Mapping or Transformations – Jacobian of a transformation – Conformal Mapping – Necessary and Sufficient Conditions for Conformal mappings – Superficial magnification – The circle – Inverse points with respect to a circle – Some elementary transformations.

Unit III (Sections 6.1 ,6.2, 6.8, 6.11 to 6.15) **12hrs**

Complex Integration: Introduction – Some basic Definitions – Cauchy's fundamental theorem – Cauchy's integral formula – Poisson's Integral Formula of a circles – Derivative of an analytic function – Higher order derivatives - Morera's theorem.

Unit IV (Sections 6.17 to 6.21 , 6.27 to 6.30 and 6.32) **14hrs**

Complex Integration: Cauchy's inequality – Liouville's theorem – Expansions of Analytic functions as power series: Taylor's and Laurent's theorems – The Zeros of an Analytic function – Types of singularities – Maximum modulus principle – The excess number of Zeros over the number of poles of a meromorphic function – Rouche's theorem – Schwarz lemma – Fundamental Theorem of algebra.

Unit V (Sections 7.1 to 7.11) **12hrs**

Calculus of Residues: Residue at simple pole – Residue at a pole of order greater than unity – Residue at infinity – Cauchy's Residue theorem – Evaluation of definite integrals – Integration round the unit circle – Evaluation of the integral ∫f(x)dx – Jordan's inequality – Jordan's lemma – Evaluation of the integrals of the form – Case of the poles on the real axis.

$$\int \frac{P(x)}{Q(x)} \sin mx\, dx$$

Text book:

J.N. Sharma ,"Functions of a Complex Variable", Fifty First Edition , Krishna Prakashan Media (P) Ltd , Meerut, 2013.

14MCU26 **OPERATIONS RESEARCH**

SEMESTER VI **Total Hours:60**

Unit I (Sections 2.1 to 2.3, 3.2 to 3.5, 4.1 to 4.4, 5.1 to 5.4, 5.7, 5.9) **14hrs**

Linear Programming Problem: Introduction - Mathematical Formulation - Graphical Solution - Simplex Method – Duality in Linear programming – Primal and Dual Problems -Duality and Simplex method – Dual Simplex Method.

Unit II (Sections 10.1 to 10.6, 10.8 to 10.10, 10.12, 10.13, 10.15, 11.1 to 11.4, 11.7) 12hrs

Transportation Problem: Introduction – LP Formulation of the Transportation Problem - Existence of solution in T.P.- Duality in Transportation problem- The Transportation table- Loops in Transportation Tables- Solution of a Transportation Problem- Finding an Initial Basic Feasible Solution- Test for Optimality- Degeneracy in Transportation Problem- Transportation Algorithm(MODI Method)- Some Exceptional Cases.

Assignment Problem: Introduction- Mathematical Formulation of the Problem- Solution methods of Assignment Problem- Special Cases in Assignment Problems – The Travelling Salesman Problem.

Unit III (Sections 17.1 to 17.7) **10hrs**

Games and Strategies :- Introduction - Two Person Zero Sum Games - The Maximin - Minimax Principle - Games without Saddle Points - Mixed Strategies - Graphic Solution of 2 x n and m x 2 games - Dominance Property.

Unit IV (Sections 25.1 to 25.4, 25.6 to 25.8) **12hrs**

Network Scheduling by PERT / CPM :- Introduction - Network Basic components -Logical Sequencing - Rules of Network construction - Critical Path Analysis – Probability Considerations in PERT – Distinction between PERT and CPM.

Unit V (Sections 21.1 to 21.4, 21.7 to 21.9) **12hrs**

Queueing Theory :- Introduction - Queueing Systems – Elements of a Queueing System - Characteristics of a Queueing System - Classification of Queueing Models - Definition of Transient and Steady States - Poisson Queueing Systems - (M/M/1):(∞/FIFO)- (M/M/1):(N/FIFO)- (M/M/C):(∞/FIFO)- (M/M/C):(N/FIFO) Models.

Text Book :

Kantiswarup, P.K.Gupta and Manmohan, "Operations Research", Fifteenth edition, Sultan Chand and Sons publications, 2010.

Core Elective - II

14MCU27A **MATHEMATICAL STATISTICS**

SEMESTER VI **Total Hours:55**

Unit I (Sections 3.8 to 3.15- 4.2) **12hrs**

Theory of Probability: Axiomatic approach to Probability- Event- Statistical Probability- Probability Function- Multiplication Law of Probability and Conditional Probability- Baye's Theorem-(Simple Problems –self study).

Unit II (Sections 5.1 to 5.4) **10hrs**

Random variables: Discrete and continuous random variable –Probability Density Function-Various measures of Central Tendency- Dispersion- Skewness and Kurtosis for Continuous Distribution.

Unit III (Sections 6.1 to 6.9) **12hrs**

Mathematical Exceptation: Addition Theorem- Multiplication Theorem- Exceptation of a Linear Combination of a Random variables- Covariance- Conditional Exceptation and Conditional Variance.

Unit IV (Sections 8.1to 8.5-9.2 to 9.2.5) **9hrs**

Bernoulli- Binomial- Poisson- Normal probability distribution- Simple problems.

Unit V (Sections16.1 to 16.2.3-16.3-16.3.4-16.5-16.5.1-16.6.1) **12hrs**

Exact Sampling Distributions: Introduction-Derivation of Students "t" distribution – Fisher's "t"- Distribution of Fisher's 't'- t-test for single mean- difference of means- testing significance of an observed sample correlation coefficient- F-test for equality of population variances.

Text Book:

S.C. Gupta and V.K. Kapoor ,"**Fundamentals of Mathematical Statistics**" ,

Eleventh edition, 2003.

Core Elective – II

14MCU27B ASTRONOMY

SEMESTER VI **Total Hours:55**

Unit I(Chapter 1- Chapter 2- Chapter 3 : Section 5 and 6) **12hrs**

Astronomical Definitions: Astronomical Formula(Without Proof). **Celestial Sphere:** Diurnal Motion- Celestial Coordinates- Sidereal Time- Morning and Evening Stars- Circum Polar Star- Dip of Horizon- Twilight.

Unit II(Chapter 3 : Section 1-Chapter 4) **11hrs**

Zones of Earth: Variation of Length of Day. **Refraction:** Tangent and Cassini's Formula.

Unit III(Chapters 5- 8- 9) **11hrs**

Geocentric Parallax. Heliocentric Parallax. Aberration: Parsec- Light year.

Unit IV(Chapters 6 & 7) **10hrs**

Kepler's Laws: Kepler's Laws (Statement only)- Three Anomalies. Equation of Time.

Unit V(Chapters 12 & 13) **11hrs**

The Moon: Phases. **Solar and Lunar Eclipses:** Ocurances.

Text book:

S.Kumaravelu & Mrs. Susheela Kumaravelu, "Astronomy for Degree Classes" (1999).

14MCU28 **JAVA PROGRAMMING**

SEMESTER VI **Total Hours:45**

Unit I: (Chapter 1- 8) **9hrs**

Features of Java- An overview of java - Data types- variables and arrays- Operators-Control statements- Classes- Inheritance.

Unit II: (Chapter 9-12) **9hrs**

Packages and Interfaces-Exception Handling- Multithreaded Programming- I/O- Applets and other Topics .

Unit III: (Chapter 13-18) **9hrs**

String Handling- Exploring java.lang- Java.util- Input/Output- Exploring java.io – Networking.

Unit IV:(Chapter 19-22) **9hrs**

The Applet class- Event handling- Introducing the AWT: Working with Windows- Graphics and text- Using AWT Controls- Layout Managers and Menus .

Unit V: (Chapter 23, 25, 26, 28) **9hrs**

Images - Java Beans- A Tour of Swing- Migrating from C++ to Java.

TEXT BOOK:

Herbert Schildt, "JAVA 2- The Complete Reference", Fifth Edition ,Tata McGraw-Hill Education Private Ltd, 2012

14MCU29 **JAVA PROGRAMMING - PRACTICAL**

SEMESTER -VI

1. a. Write a program that will accept command line arguments and print the Same.

   b. Write a program to display the months of year. The months of the year should be held in an array.

2. Write a program that has overload methods.
3. Write a program to short the elements of an array in ascending order.
4. Create a class called Numeral that accepts an array of 10 numbers. Create a subclass called Numplay which has a menu as follows:
   (a) Display Numbers
   (b) Sum of the numbers
   (c) Average of the numbers
   (d) Maximum of the numbers
   (e) Minimum of the numbers
5. Create an applet to obtain the fonts available with the current java working environment.
6. Write a frame application that has an edit menu. This menu contains cut-copy and paste as menu item and does similar activities. Include a text area into which text can be entered and the cut, copy and paste activities can be demonstrated.
7. Create Desktop Pane, add it to a frame and display two internal frames in it. Internal frames should have different layers.
8. Create an interface called variable Test, which contains a method disp()

and two variables x,y which are integers and whose value is set as 10 and 20. Create a class called varint Test which implements this interface. The disp() method should display a message, “Inside interface-variable test and method disp”. Write a method called display() within Varinttest class prints the value of x and y.

9. Create two threads one of the threads has to print even numbers and another should print odd numbers.
10. Write a program to display the course name, fees and the duration using a String Tokenizer class.