

MANNAR THIRUMALAI NAICKER COLLEGE

(Autonomous)



DEPARTMENT OF MATHEMATICS WITH CA

Program Specific Outcome

- PSO1** Ability to solve problems creatively and effectively
- PSO2** Create and develop software applications using a systematic approach
- PSO3** Apply Discrete Mathematics concepts to practical applications such as those in Computer Science
- PSO4** Provide sufficient knowledge and enable them to pursue further studies in advanced computer science and computational mathematics

Course pattern

Study Component	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	Total Hours	Total Credit	No.of course	Total marks
Part – I Tamil	6(3)	6(3)	6(3)	6(3)			24	12	4	400
Part –II English	6(3)	6(3)	6(3)	6(3)			24	12	4	400
Part –III										
Core subjects	6(4)	6(5)	5(5)	5(5)	5(5) 5(5) 6(5) 6(5)	5(5) 5(5) 6(5) 6(5)	66	59	12	1200
Allied Subject-I	6(4)	4(3)	6(4)	4(3)			16	14	4	400
Allied Subject-I (P)		2(1)		2(1)			8	2	2	200
Allied Subject-II			5(5)	4(4)	6(5)	6(5)	21	19	4	400
Allied Subject – II (P)				1(1)			1	1	1	100
Ancillary Mathematics										
For B.Sc CS	4(4)	4(4)	4(4)	4(4)		-	16	16	4	400
For B.Sc IT	4(4)	-	-	4(4)		2(2)	10	10	3	300
For B.Sc E&C	-	4(3)	-	4(3)		-	8	6	2	200
For B.C.A	4(4)	4(4)	-	-		-	8	8	2	200
Part-IV										
Skill Based Subject	2(2) 2(2)	2(2) 2(2)			2(2)	2(2)	12	12	6	600
Environmental Studies / Value Education	2(2)	2(2)					4	4	2	200
Non major elective			2(2)	2(2)			4	4	2	200
Part V										
Extension activities				0(1)			0	1	1	100
Total	30 (20)	30(21)	30 (22)	30 (23)	30 (27)	30 (27)	180	140	42	4200

CALCULUS

Class : B.Sc(Mathematics with CA)

Semester : I

Sub Code: 15UMCC11

Part III : Core

Hours : 06

Credits : 04

Course Outcomes

- CO1** To develop problem solving skills
CO2 To familiarise the applications of differential calculus.
CO3 To explain about the nature and types of integral calculus.

Unit I:

Successive Differentiation – Expansion of functions – Leibnitz Formula – Maxima and minima of functions of two variables.

Unit II:

Envelopes – Curvature – circle, radius and centre of curvatures- evolutes.

Unit III:

Polar co-ordinates – Radius of curvature in Polar co-ordinates- P-r equation – Pedal equation of curves – Definite integral and their properties

Unit IV:

Reduction formulae for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sin^m x \cos^n x$ – Bernoulli's formula – Double and triple integrals and their properties.

Unit V:

Change of order of integration, Beta and Gamma Functions, Jacobian.

Text Book:

1. T.K.Manicavasagam Pillai & S.Narayanan, **Calculus**, Volume I & II, S.Viswanathan, Publishers, Chennai, 1996.

Unit-I	Chapter 3 (volume –I), Chapter 7, Chapter 8 Section 4(Vol I)
Unit-II	Chapter 10 up to Section 2.5 (Vol I)
Unit–III	Chapter 10, Sections : 2.6, 2.7 (Vol I) and Chapter I, Section 11 (Vol I)
II) Unit-IV	Chapter 1, Sections : 12, 13,14,15.1 (Vol II) Chapter 5, Sections : 1,2,3,4 (Vol II)
Unit- V	Chapter 6, Sections : 1,2 (Vol II) Chapter 7, Sections: 2,3,4,5 (Vol II)

Reference Books :

1. Dr.S.Arumugam and ISSAC, **Calculus**, New gamma publishing house, 2008.
2. Shanthi Narayan, **Differential Calculus**, S.Chand company Ltd , 1979.
3. Shanthi Narayan, **Integral Calculus**, S.Chand company Ltd,1981.

INTRODUCTION TO INFORMATION TECHNOLOGY

Class : B.Sc(Mathematics with CA)

Part III : Allied

Semester : I

Hours : 6

Sub Code : 15UMCA11

Credits : 4

Course Outcomes

CO1 The purpose of the paper is to provide introduction about Information Technology.

CO2 To understand the fundamentals of information technology.

CO3 To learn core concepts of computing and modern system.

Unit-I

Elements of Computer System: - Introduction – types of computers – Characteristics of Computer – Classification of Computer Systems – Functions and Components of a computer.

Unit-II

Central Processing Unit – Memory units – Auxiliary Storage Devices – Input Devices – Output Devices.

Unit-III

Operating Systems - Functions of Operating System – classification of Operating Systems. Windows and GUI: - Overview of GUI and concepts of Windows – basic commands of Windows – basic concepts of Installing Windows based packages.

Unit-IV

Computer Networks and Communication -Overview of a Network – Communication Media – Types of Networks – LAN,WAN and MAN - Network Topology.

Unit-V

INTERNET AND WWW-About Internet – Internet Access – Internet basics – Internet Protocols – Internet Addressing – WWW – Web Browsers – Searching the Web – Internet Chat – e-Mail – Mail Services – Newsgroups. Intranets: - Characteristics – Advantages – Relationship between Intranets and Extranets.

Text Book :

Alexes Leon, Mathews Leon, **Fundamentals of Information Technology** , Leon Press (PVT) Ltd, Chennai , Second Edition, 1999.

Unit-I Chapter 1: Pages 1 to 9.

Chapter 3: Pages 20 to 27.

Unit-II Chapter 7: Pages 77 to 140.

Unit-III Chapter 14: Pages 200 to 204, Chapter 15: Pages 208 to 219.

Unit-IV Chapter 21: Pages 288 to 300.

Unit-V Chapter 24: Pages 319 to 357.

Reference Books:

1. R.Saravanakumar, R.Parameswaran , **A text book of Information Technology.**
2. V.Rajaraman , **Fundamental of Computers**, B.P.B publications, New Delhi.

ARITHMETIC ABILITY

Class : B.Sc(Mathematics with CA)

Part IV : Skill based

Semester : I

Hours : 2

Sub Code : 15UMCS11

Credits : 2

Course Outcomes

- CO1** To introduce concepts of Mathematics along with analytical ability.
- CO2** To develop the computational skills needed.
- CO3** To improve the ability to face the competitive examinations.

Unit-I Problems on numbers.

Unit-II Problems on ages.

Unit-III Ratio and proportion

Unit-IV Time and Distance

Unit-V Permutation and combinations

Text Book:

1. R.S.Agarwal **Quantitative Aptitude For Competitive Examinations** revised and enlarged edition, S.Chand publication, New Delhi, Reprint 2007.

Unit -I: Section 1 : Pages 161-181

Unit -II: Section 1 : Pages 182-194

Unit -III: Section 1 : Pages 294-310

Unit -IV: Section 1 : Pages 384-404

Unit -V: Section 1 : Pages 613-620

Reference Books :

1. Abhigit Guha, **Quantitative Aptitude for Competition Examination** , Tata Mc Graw Hill Publication , New Delhi, 4th Edition, 2011.
2. U.Mohan Rao, **Quantitative Aptitude for Competition Examination**, Scitech Publications, Chennai, Reprint 2013.

SEQUENCES AND SERIES

Course : B.Sc(Mathematics with CA)
Semester : I
Sub Code : 15UMCS12

Part IV : Skill
Hours : 2
Credits : 2

Course Outcomes

- CO1** To learn about sequences through examples.
CO2 To introduce infinite series and alternative series.
CO3 To familiarize the application of series in Trigonometry.

Unit - I Sequences- Bounded Sequences- Monotonic Sequences

Unit - II Convergent Sequences, Divergent and Oscillating Sequences – Algebra of limits.

Unit - III Subsequences – Limit points – Cauchy sequences

Unit - IV Infinite series – Comparison test – Absolute Convergence

Unit - V Kummer's Test – Root test and Condensation test

Text Book:

1. S.Arumugam and Issac, **Sequences and Series**, New Gamma Publishing House, Palayamkottai, 2003.

Unit I to III - Chapter 3 : Section 3.1 to 3.6 & 3.9 to 3.11
Unit IV - Chapter 4 : Section 4.1 to 4.4
Unit V - Chapter 5 : Section 5.2

Reference Books :

1. S. Arumugam and Thangapandi Issac, **Classical Algebra**, New Gamma Publications, Palayamkottai, Edition 2003.
2. K.Chandra Sekara Rao and K.S.Narayanan, **Real Analysis**, Volume –I , S.Viswanathan Pvt.Ltd, Chennai, 2008.

THEORY OF EQUATIONS AND TRIGONOMETRY

Class : B.Sc (Mathematics CA)
Semester : II
Sub code : 15UMCC21

Part III : Core
Hours : 06
Credits : 05

Course Outcomes

- CO1** To study various methods of solving equations.
CO2 To study inequalities and their importance in Mathematics.
CO3 To introduce the expansions of trigonometric functions.

Unit - I: Theory of Equations – Imaginary roots - Rational roots – Relation between the roots and coefficients – Symmetric functions of the roots.

Unit - II: Sum of the power of the roots of an equation – Newton’s theorem – Transformations of equations – Roots multiplied by a given number – Reciprocal roots – Reciprocal equations- Standard forms to increase and decrease the roots of a given equation by a given quantity.

Unit - III: Removal of terms – Descarte’s rule of sign – Roll’s theorem(only statement) – Multiple roots- Strum’s theorem(only problems) – General solution of cubic equations – Cardon’s method.

Unit - IV: Ferrari’s method of solving biquadratic equations – Expansion of $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sin^m x \cos^n x$.

Unit - V: Hyperbolic functions- Inverse Hyperbolic functions – Logarithm of Complex numbers.

Text books:

1. T.K .Manickavashagam Pillai and S.Narayanan, **Algebra – Volume I**, S.Viswanathan Printers Publishers Pvt. Ltd, Chennai, 2007.
2. T.K .Manickavashagam Pillai and S.Narayanan, **Trigonometry**, S.Viswanathan Printers Publishers Pvt. Ltd, Chennai, 2011.
Unit I - Chapter 6: from book 1 : Section 6.1 to 6.12
Unit II - Chapter 6: from book 1 : Section 6.13 to 6.17
Unit III - Chapter 6: from book 1 : Section 6.19, 6.24 to 6.27, 351- 366, 390 -392
Unit IV - Chapter 3 : from book 2 : Page 61-83
Unit V - Chapter 4: from book 2 : Pages 93 – 108
Chapter 5: from book 2 : Section 5.1

Reference Books :

1. Dr.S.Arumugam ISAAC, **Classical Algebra** ,New Gama Publication House, Palayamkottai, 2003.
2. HariKrishan, **Trigonometry**, Atlantic Publishers, New Delhi, 2005.

DATABASE MANAGEMENT SYSTEMS

Class : B.Sc(Mathematics with CA)
Semester : II
Sub Code : 15UMCA21

Part III : Allied
Hours : 4
Credits : 3

Course Outcomes

- CO1** To understand basis of database and to become familiar with data models
- CO2** To learn the update database content with sql and transaction handling.
- CO3** To learn the manicure date with correlated and non- correlated subs queries.

Unit-I

Purpose of Database - Overall System Structure - Entity Relationship Model - Mapping Constraints - Keys - E-R Diagrams.

Unit-II

Relational Model - Structure - Formal Query Language - Relational Algebra - Tuple and Domain Relational Calculus.

Unit-III

Structured Query Language - Basic Structure - Set Operations - Aggregate Functions - Date, Numeric, and Character Functions - Nested Sub queries -Modification Of Databases - Joined Relations-DDL - Embedded SQL.

Unit-IV

Relational Database Design - Pitfalls - Normalisation Using Functional Dependencies - First Normal Form-Second Normal Form-Third Normal Form-Fourth Normal Form And BCNF.

Unit-V

Oracle - Introduction – SQL (DDL,DML, DCL Commands) – Integrity Constraints – PL/SQL – PL/SQL Block – procedure, function – Cursor management – Triggers – Exception Handling.

Text Books:

1. Abraham Silberschatz, H.F.Korth ,S.Sudarshan,**Database System Concepts** ,McGraw-Hill Publications (PVT) Ltd., Fifth Edition, 2006.
 - Unit I : Chapter 1: Pages 3 to 28,
 - Unit II : Chapter 2: Pages 37 to 60, Chapter 5: Pages 163 to 171
 - Unit III: Chapter 3: Pages 75 to 110, Chapter 4: Pages 134 to 136.
 - Unit IV :Chapter 7: Pages 263 to 291
 - Unit V : Chapter 27 :Pages 997 to 1001, Chapter 8 :Pages 329 to 334
 - Chapter 4 :Pages 126 to 132.Chapter3 :Pages 75 to 80

Reference books:

1. Deshpande.P.S, **SQL PL /SQL for Oracle 8 & 8i**, Print Well offset, BhikajiCama Place, New Delhi – 66,2001.
2. Alexis Leon, Mathews Leon, **Database Management Systems** , Leon Vikas publishing, Chennai, 2002.

DATABASE MANAGEMENT SYSTEMS- LAB

Class : B.Sc(Mathematics with CA)
Semester : II
Code : 15UMCAP1

Part III : Allied
Hours : 2
Credits : 1

Course Outcomes

- CO1** To enable the students to learn creating and modifying tables, applying row and aggregate functions using SQL programs.
- CO2** To make the students to learn and review the new and more advance features of PL/SQL.
- CO3** To enable the students to understand advanced error handling and use the available database trigger code.

SQL Programs

1. Table Creation.
2. Selection queries.
3. Queries using Aggregate function.
4. Queries with Built-in function.
5. Nested and Parallel Queries.

PL/SQL Programs

1. Program using Conditional control and sequential control.
2. Program using Exception Handling.
3. Program using implicit cursor.
4. Program using explicit cursor.
5. Program using Database Triggers.
6. Program to design procedure using In, Out, In-Out parameters.
7. Program to design using function.
8. Program to design using Packages.

OFFICE AUTOMATION

Class : B.Sc (Mathematics)
Semester : II
Sub code : 15UMCS21

Part IV : Skill Based
Hours : 02
Credits : 02

Course Outcomes

- CO1** To make the students to understand the tools in MS-Office.
CO2 To train the students how to use MS office applications to carry out office work such as creating professional –quality documents, stove organize and analyze information
CO3 To enable the students to learn crating table an excel chart data manipulation.

Unit - I:

MS-Word Introduction-Word for Windows- Creating and Saving a Document-Page Setup-Printpreview, Print, Edit-Redo, Cut, Copy, Paste, Find and Replace.

Unit - II:

Views-Normal, Print layout, Ruler, Header and Footer, Insert-Page number, Picture, Text Box, Word art, Format font(size, color, type),Bulleted numbering, Border and Shading, Columns and Change cases.

Unit - III:

Tools-Spelling and Grammar-Mail merge, Insert Table, Delete, Select, Split Columns and Rows and draw.

Unit -IV:

Explanation of Excel page(Rows, Columns and Cells) -Entering Data, Usage of Formulae And Functions.

Unit - V:

Creating an Excel Chart, Data Manipulation and Types of Functions.

Text book:

1. C.NellaiKannan, **Ms Office**, Nels Publications, 3rd edition, Tirunelveli, 2004.

Unit I - Chapter 1 : Pages 5 -23

Unit II - Chapter 2 : Pages 23 -70

Unit III - Chapter 3 : Pages 70 -97

Unit IV - Chapter 4 : Pages 105 -120 ,125 -135

Unit V - Chapter 5 : Pages 152 -173

Reference Books :

1. Sanjay Saxena, **A First course in Computers**, Vikas Publishing House Pvt Ltd Edition, New Delhi, 2003.
2. Vikas Gupta, **Comdex Computer Course Kit** , Dream Tech Press Edition, New Delhi, 2003.

MS OFFICE LAB

Class : B.Sc (Mathematics)
Semester : II
Sub code : 15UMCSP1

Part IV : Skill Based
Hours : 02
Credits : 02

Course Outcomes

- CO1** To make the students to design an invitation and to create a daily attendance sheet of a class room for a week with handling, day ,period etc.
- CO2** To enable the students to create main document and database of addresses and merge them using mail – merge tools.
- CO3** To make the students to create a slide should using blank representation.

List of Programs

1. Design a document with at least two pages using MS word with different font style, different font sizes, header and footer, with page number.
2. Design an invitation with two column break, use word to insert picture, design border and shading.
3. Create a daily attendance sheet of a class room for a week with heading, day, period etc.
4. Create a main document and database of addresses and merge them using Mail-merge tools.
5. Create a Yearly salary report in Excel worksheet, use auto fill to enter the month and to sum the column and row total, to calculate DA and others, to insert date and time function in the footer.
6. Create students mark list for three subjects and to list the result and rank by using string function and logical function.
7. Create a yearly budget of a company and create different types of chart for the data.
8. Present the college details or any publishing work using Auto content wizard.
9. Create a slide show using blank representation with at least 20 slides.

MECHANICS

Class : B.Sc – Maths(CA)
Semester : III
Sub code : 15UMCC31

Part III : Core
Hours : 05
Credits : 05

Course Outcomes

- CO1** To introduce the basic laws.
CO2 To explain about postulates.
CO3 To introduce the principles governing static and dynamical systems.

Unit – I

Forces acting at a point – Resultant and components – Parallelogram law of forces- Triangle law of forces – Converse of triangle law of forces-Lami's theorem. Resolution of a force- Theorems of Resolved parts – Resultant of any number of coplanar forces – Condition of equilibrium.

Unit-II

Three force acting on a rigid body – Friction - Laws of friction- coefficient of friction -angle of friction - Problems on friction.

Unit-III

Projectiles – Path of a Projectile – Maximum height – Time taken by a particle – Time of flight – Horizontal Range – Simple problems - Range on a inclined plane - Impact – Laws of impact –Impact in a Fixed plane .

Unit- IV

Direct and oblique impact– Direct impact of two smooth spheres– loss of kinetic energy due to direct impact– oblique impact of two smooth spheres– loss of kinetic energy due to oblique impact.

Unit –V

Central orbits – Components of velocities and accelerations along and perpendicular to radius vector – Differential equation of a central orbit – Pedal equations.

Text Books:

- 1) M.K.Venkataraman, **Statics**, Agasthiyar Book Department, Trichy, Tenth Edition, July 2002.
- 2) M.K.Venkataraman , **Dynamics**, Agasthiyar Book Department ,Trichy, Eleventh Edition , Feb 2004
 - Unit I - From text book 1: Chapter 2: Sections 2.1 to 2.9 & 2.11 to 2.15
 - Unit II - From text book 1: Chapter 5: Sections 5.1 to 5.5, 7.1 to 7.7 & 7.13,
 - Unit III - From text book 2: Chapter 6: Sections 6.1 to 6.12 & Chapter 8: Sections 8.2 to 8.4
 - Unit IV - From text book 2: Chapter 8: Sections 8.5 to 8.8
 - Unit V - From text book 2: Chapter 11: Sections 11.1 to 11.13

Reference Books:

1. Duraipandian.P, Laxmi Duraipandian and Muthamizh Jayaprakash, **Mechanics**, Chand and Company Pvt Ltd, New Delhi- 110055, 2014.
2. Khanna M.L, **Statics**, Jai Prakash Nath and co, Meerut, Fifteenth Edition, 2011.

VISUAL PROGRAMMING

Class : B.Sc (Mathematics with CA)
Semester : III
Sub code : 15UMCA31

Part III : Allied
Hours : 06
Credits : 04

Course Outcomes

- CO1** To enable the students to learn the vb fundamentals, components.
CO2 To make the students to analyze program requirements.
CO3 To make the students to design and develop windows – based business applications using visual basic.

Unit-I

Customizing a form- Writing a simple program- Tool box- Creating control-Name property – Command button- Access keys – Image control – Text boxes-Labels.

Unit-II

Message boxes – Grid – Editing tools – Variables data type – String number - Displaying information – Determinate loops - Indeterminate loops.

Unit-III

Conditionals built in function-Function – Function and procedure - List – Sorting and searching record – control array – Grid control.

Unit-IV:

Project with multiple form - VB object- dialogue boxes – Common control – Menus.

Unit-V

MDI forms – Texting – Debugging and Optimization – A survey of data base development using basic.

Text Book:

1. Gary Cornell, **Visual Basic 6.0 from the Ground up**, Tata McGraw Hill Publishing Company Limited, Chennai, Seventh Edition, Reprint 2009.

Unit I Chapters 3, 4 (Page No : 99 to 124)

Unit II Chapters 4 (Page No : 125 to 128)
Chapter 5 (Page No : 143 to 180),
Chapter 6, 7 (Page No : 220 to 239)

Unit III Chapters 8, 9, 10, 11

Unit IV Chapters 12 (Page No : 426 to 439),13,
Chapter 14 (Page No : 512 to 547)

Unit V Chapters 14 (Page No : 550 to 561)
Chapter 15, 22

Reference Book:

1. Black Book Steven Holzner ,**Visual Basic 6.0 Programming**, Dream Tech Press, New Delhi, 2005.

PROGRAMMING IN C

Class : B.Sc (Mathematics with CA)
Semester : III
Sub code : 15UMCA32

Part III : Allied
Hours : 05
Credits : 05

Course Outcomes

- CO1** To understand and apply advanced programming concepts.
CO2 To gain the knowledge of Arrays , Structures , Union and Functions
CO3 To make the students to understand the basic concepts of pointers operation on pointers.

Unit-I

C fundamentals - Character set - Identifier and Keywords - Data types - Constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical , Assignment and Conditional Operators - Library functions.

Unit-II

Data input/ output functions - Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements.

Unit-III

Functions -Definition - Prototypes - Passing arguments - Recursion. Storage Classes - Automatic, External, Static, Register Variables.

Unit-IV

Arrays - Defining and Processing - Passing arrays to functions – Multi Dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures - Unions - Bit wise operations.

Unit-V

Pointers - Declarations - Passing pointers to Functions - Operation on Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers - Files: Creating, Processing, Opening and Closing a data file.

Text Book:

1. E. Balagurusamy, **Programming in C**, Tata McGraw Hill Publishing Company Ltd, New Delhi, Second Edition, 1997.

Unit I	-	Chapter 1: Section 1.1, 1.2, 1.8, 1.9 Chapter 2: Section 2.1-2.8, Chapter 3: 3.1-3.7
Unit II	-	Chapter 4, 5, 6
Unit III	-	Chapter 9: Section 9.1-9.16, 9.19
Unit IV	-	Chapter 7, 8 (Full) Chapter 9: Section 9.17 Chapter 10 (Full)
Unit V	-	Chapter 11 : Section 11.1-11.16 Chapter 12 : Section 12.1-12.4

Reference Books:

1. B.W. Kernighan and D.M.Ritchie, **The C Programming Language**, PHI, New Delhi - 110001, Second Edition, June, 1999.
2. H. Schildt, **C: The Complete Reference**, TMH Edition, New Delhi – 110001, Third Edition, 2001.

FUNDAMENTALS OF ACCOUNTING

Class	: B.Sc(Mathematics)	Paper	: NME
Semester	: III	Hours	: 02
Sub code	: 15UCON31	Credit	: 02

Course Outcome

- CO1** To educate the learners about fundamentals of accounting
CO2 To equip the students with skills for recording various kinds of business transactions.
CO3 To enable the students to acquire skills in preparing final accounts.

Unit -I

Meaning and definition of Book keeping and accounting – Functions of accounting – Objectives of accounting – Advantages & limitations of accounting – Double entry system of book keeping – Advantages of double entry system – Difference between single entry system and double entry system

Unit-II

Journal – Meaning-advantages of journal – Types of accounts – Rules – Practical exercises for the preparation of journal.

Unit -III

Ledger-Meaning – Advantages – Difference between journal and ledger – Balancing of accounts in the ledger – Practical exercises for the preparation of ledger.

Unit-IV

Trial balance- Meaning – Objectives – Practical Problems.

Unit -V

Final accounts – Meaning of final accounts – Objectives – Distinction between trial balance and balance sheet – Format of trading, profit and loss account and balance sheet. Simple Adjustments in final accounts (outstanding, prepaid, depreciation) – Practical Problems.

80% of marks must be allotted to problem solving questions.

20% of marks must be allotted to Theory questions.

Text book:

1. S.P.Jain and K.L.Narang, **Financial Accounting**, Kalyani Publisher, New Delhi 2014.

Reference Books:

1. T.S.Reddy and A.Murthy, **Advanced Accountancy**, Volume 1, Margam Publisher, Chennai, 2014.
2. S.N.Maheswari, **Advanced Accountancy**, Sultan and Sons, New Delhi, 2010.

ANALYTICAL GEOMETRY OF THREE DIMENSION AND VECTOR CALCULUS

Class : B.Sc (Mathematics with CA)
Semester : IV
Sub code : 15UMCC41

Part III : Core
Hours : 05
Credits : 05

Course Outcomes

- CO1** To learn about straight lines, sphere in Analytical Geometry (three dimensional).
CO2 To explain Vector differentiation.
CO3 To introduce the application of double and triple Integration.

Unit - I

The plane – Angle between two planes – Length of perpendicular – Bisecting plane – Distance between two planes.

Unit -II

The straight line – symmetric form – Image of a line about a plane – A plane and a straight line – Angle Between a plane and straight line, Coplanar lines – Shortest distance between two lines.

Unit -III

The Sphere – Equation of the sphere – Equation of the tangent plane – Simple problems.

Unit -IV

Vector Differentiation, Gradient – Divergence – Curl – properties.

Unit -V

Vector Integration – Line integrals– Surface integrals.

Text Book :

1. Dr.S. Arumugamand Isaac, **Analytical Geometry of three Dimensions and Vector Calculus** , New Gamma Publications ,Palayamkottai, Reprint 2006.

Unit I	-	Chapter 3 : Full
Unit II	-	Chapter 4 : Section 4.1 , 4.2
Unit III	-	Chapter 5 : Section 5.1 to 5.3
Unit IV	-	Chapter 7 : Section 7.1 to 7.4
Unit V	-	Chapter 8 : Section 8.1

Reference books:

1. Manicavasagam Pillai and Natarajan, **Analytical Geometry of three Dimensions and Vector Calculus**, S.Viswanathan Printers and Publishers Pvt. Ltd., Chennai, Reprint 2001.
2. P.Duraipandian, Laxmidurai pandian and D.Muhilan, **Analytical Geometry of two Dimensions** , Emerald Publishers , Chennai, Reprint, 1985.

JAVA PROGRAMMING

Class : B.Sc (Mathematics with CA)

Part III : Allied

Semester : IV

Hours : 04

Sub code : 15UMCA41

Credits : 03

Course Outcomes

- CO1** To enable the students to learn the basic functions, principles and concepts of java Programming.
- CO2** To Understand Java applications program.
- CO3** To make the students to Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.

Unit -I

Evolution of Java Language – Java history – Java features – Object oriented – How Java differ from C and C++ - Java world wide web -Java environment – Overview of Java language – simple Java program – An application with two classes – Java program structure – Java tokens – Java virtual machine – command line arguments.

Unit -II

Constants, variables and data types: Constants - variables - data types – Declaration of variables – Scope of variables – operators and expressions – Arithmetic operator – Relational operator – Logical operator – Assignment operators – Increment and decrement operators – Conditional operators – Bitwise operator –

Unit -III

Decision making and looping – Control statements.

Classes, Objects and Methods:

Classes – Objects – Constructors –Methods Overloading – Inheritance – Overriding Methods - Final Classes – Arrays and Strings : One dimensional Arrays - Creating an array – Two dimensional Arrays – Strings Methods.

Unit -IV

Interfaces : Defining interfaces – Extending interfaces – Implementing interfaces – Accessing interface variable : Packages : Java API Packages Creating Packages – Accessing a package – Using a package – Adding a class to a package.

Unit -V

Multithreaded Programming : Creating threads - Extending the Thread class -
Stopping and blocking a Thread - Life cycle of a Thread – Thread priority.

Text book:

1. E.Balagurusamy, **Programming with Java, A Primer, Third Edition**, TATA
McGraw-Hill Company, 2008.

Unit I- Chapter 2 – Sections: 2.1 - 2.3, 2.5, and 2.9
Chapter 3 – Sections: 3.2, 3.4 - 3.6, 3.9, 3.10

Unit II - Chapter 4 – Sections: 4.1 - 4.7
Chapter 5 – Sections: 5.1 – 5.8
Chapter 6 – Sections: 6.1 – 6.8

Unit III- Chapter 7 – Sections: 7.1 – 7.4
Chapter 8 – Sections: 8.1 – 8.8, 8.11, 8.12, 8.14
Chapter 9 – Sections: 9.1 – 9.5

Unit IV- Chapter 10 – Sections: 10.1 – 10.5
Chapter 11 – Sections: 11.5 – 11.8

Unit V- Chapter 12 – Sections: 12.1 – 12.5, 12.8

Reference Books:

1. P.Radha Krishna, **Object Oriented Programming with Java**, University press India Private limited, 3rd Edition, Hyderabad, 2008.
2. Debasish Jana, **Java Object Oriented Programming Paradigm**, Prentice Hall of India private limited, 3rd Edition, Chennai 2008.
3. C.Xavier Scitech **Programming with Java**, Publication India Private limited, 3rd Edition Chennai, 2004.

JAVA PROGRAMMING – LAB

Class : B.Sc (Mathematics with CA)
Semester : IV
Sub code : 15UMCAP2

Part III : Allied
Hours : 02
Credits : 01

Course Outcomes

- CO1** To enable the students to learn the basic functions, principles and concepts of java Programming.
- CO2** To Understand Java applications programs
- CO3** To enable the students to write a computer program to solve specified problems.

1. Write a JAVA program for Arithmetic operations using switch case.
2. Write a JAVA program for Sum of Digits and Reverse of a number.
3. Write a JAVA program for Sorting list of numbers.
4. Write a JAVA program for Finding Maximum and Minimum Number.
5. Write a JAVA program for Searching the number in the list.
6. Write a JAVA program for Perform Armstrong, Perfect and Fibonacci series.
7. Write a JAVA program for Transpose of a Matrix using function.
8. Write a JAVA program of Swapping Two Values Using Call by Value & Call by Reference.
9. Write a JAVA program for Sorting the Strings.
10. Write a JAVA program for String Manipulations.
11. Write a Java Program to create package.
12. Write a Java program using thread.
13. Write a JAVA program for Student mark list using Multi-level Inheritance.

PROGRAMMING IN C++

Class : B.Sc (Mathematics with CA)

Part III : Allied

Semester : I V

Hours : 04

Sub code : 15UMCA42

Credits : 04

Course Outcomes

- CO1** To gain the knowledge of OOPs concepts.
- CO2** To gain knowledge about different sorting and searching methodology
- CO3** To design and implement efficient algorithms and program development.

Unit - I

Object Oriented Programming - Advantages of OOP – Characteristics of OOP languages - C++ programming basics - Structure of C++ program – Basic data type – Derived data type – User defined data type, operators in C++, Control statements, Functions: Simple Functions- Call by value - Call by reference - Returning values of different type -Function overloading - Inline functions - Default arguments – Recursive functions.

Unit - II

Class - Objects - Constructors - Destructors - Objects as function arguments - Returning objects from functions - Structures and Classes -Static data - Static function - Array of objects.

Unit - III

Access specifiers - Friend function - Friend class – Operator overloading - Type casting - Pointers - Template.

Unit - IV

Inheritance - Derived class constructors - Class hierarchies – Types of inheritance - Virtual base class - Function over riding - Virtual functions -Pure virtual functions - Abstract class.

Unit - V

Files and Streams: I/O manipulators - Streams - String I/O – Character- I/O - Object I/O –I/O with multiple objects - File pointers - Disk I/O with member functions.

Text Books :

1. E.Balagurusamy, **Programming with C++**, Tata McGraw Hill, New Delhi, Second Edition, 2006.
2. Robert Lafore, **Object-Oriented Programming in Microsoft C++**, Galgotia Publications, New Delhi, 2000

Unit I	-	Chapter 1: Sections	: 1.5, 1.6, 1.8
		Chapter 2: Section	: 2.6
		Chapter 3: Sections	: 3.2 -3.7, 3.13, 3.18, 3.19, 3.22, 3.23
Unit II	-	Chapter 3: Sections	: 3.24
		Chapter 4: Sections	: 4.3 - 4.6, 4.6, 4.9, 4.10
		Chapter 5: Sections	: 5.3, 5.4, 5.7, 5.13
Unit III	-	Chapter 6: Sections	: 6.2 – 6.7
		Chapter 7: Sections	: 7.3, 7.4, 7.7
Unit IV	-	Chapter 8: Sections	: 8.2, 8.3, 8.5 – 8.9, 8.12
Unit V	-	Chapter 9: Sections	: 9.2 - 9.6
		Chapter 10: Sections	: 10.3 – 10.6

Reference Book:

1. Bjarne Stroustrup, **The C++ Programming Language**, Addison-Wesley, New York,1999.

PROGRAMMING IN C AND C++ -LAB

Class : B.Sc (Mathematics with CA)
Semester : I V
Sub code : 15UMCAP3

Part III : Allied
Hours : 01
Credits : 01

Course Outcomes

- CO1** To introduce the basic concepts of data structure and some applications using the popular high level programming language C and C++
- CO2** To enhance problem solving and programming skills in C++ with extensive programming projects.
- CO3** To enable the students to learn advanced features of the C and C++ Programming Language

PROGRAMMING IN C AND C++ -LAB

1. Write a C program to calculate Simple interest and compound interest.
2. Write a C program to create student mark list.
3. Write a C program for finding the roots of the quadratic equation using Switch ...case.
4. Write a C program for Testing a given number as a prime or not and finding the prime number between one and any number.
5. Write a C program to calculate factorial of a given number.
6. Write a C program for finding sum of two matrices.
7. Write a C program for finding product of two matrices.
8. Write a C program for arranging the given numbers in ascending order.
9. Write a C program for arranging the given names in alphabetical order.
10. Write a C program to find the number of words and characters in a given text.
11. Write a C program to check whether a given string is a palindrome or not.

List of Programs in C++

1. Write a C++ program for Functions using
 - i) Call by value
 - ii) Call by reference
 - iii) Recursive call
 - iv) Returning different data types.
2. Write a C++ program for In-line function, Overloaded function and Default arguments.
3. Write a C++ program for Operator overloading (Unary and Binary).
4. Write a C++ program for Class and All types of Constructors.
5. Write a C++ program for Static function and Array of objects with static data.
6. Write a C++ program in Friend function and Friend class.
7. Write a C++ program for
 - i) Simple and Multilevel inheritance
 - ii) Write a C ++ program to create a Parcel triangle .
8. Write a C++ program for
 - i) Function overriding
 - ii) Creating objects using Pointers.
9. Write a C++ program for Virtual functions, pure virtual functions and Abstract class.
10. Write a C++ program to find Whether the given year is a Leap year or not.

PRACTICAL BANKING

Class : B.Sc(Mathematics with CA)
Semester : IV
Sub code : 15UCON41

Paper : NME
Hours : 02
Credit : 02

Course Outcome

CO1: Know the banking concepts

CO2: Understand the various types of deposits

CO3: Develop the skills regarding types of various forms.

Unit-I

Banking: Definition of Banking – Definition of Banker and customer- Procedure for opening an account.

Unit -II

Deposits: Types –Saving Bank Account – Current Bank Account – Fixed Deposit Account – Recurring Deposit Account.

Unit -III

Negotiable Instruments: Cheque – Definition –Specimen of a Cheque-Types of cheques –Anti-dated –Post dated – Stale cheque.

Unit-IV

E-Banking –Mobile Banking –Internet Banking.

Unit-V

Electronic Payment System- ATM-Debit Card –Credit Card –Smart Card – NEFT, RTGS.

Self study for Assignment:

1. Filling up of pay in slip and withdrawal slip.
2. Filling up of Account opening form and writing of cheque.

Text Book:

1. Gordon and Natarajan, **Banking Theory Law and Practice**, Himalaya Publishing House, Mumbai, 2014.

Reference Books:

1. S.Gurusamy, **Banking Theory Law and Practice**, Tata McGraw Hill Education Private Limited, New Delhi, 2012.
2. Sundharam K.P.M. and Varshney P.N., **Banking Theory, Law & Practice**, Sultan Chand and Sons, New Delhi, 2014.

REAL ANALYSIS

Class : B.Sc Mathematics (CA)
Semester : V
Subject Code : 15UMCC51

Part III : Core
Hours : 05
Credits : 05

Course Outcomes

- CO1** To acquire knowledge in countable and uncountable sets.
CO2 To learn about inequalities, Metric spaces, continuity, completeness.
CO3 To explain the connectedness and compactness of Metric spaces.

Unit – I

Countable and uncountable sets –Holder’s and Minkowski’s inequalities – Metric space – Definition and examples – Open sets and closed sets (Definitions and examples only)

Unit –II

Completeness – Definitions and examples – Cantor’s intersection theorem and Baire’s category theorem.

Unit –III

Continuity - Definitions and examples – Homeomorphism – Uniform continuity.

Unit –IV

Connected – Definitions and examples – connected subsets of \mathbb{R} - Connectedness and continuity – Intermediate value theorem.

Unit –V

Compactness – Definition and examples – Compact subsets of \mathbb{R} - Equivalent characterization of compactness.

Text Book:

Dr.S.Arumugam, **Modern Analysis**, New Gamma Publication, Palayamkottai, 2005.

- Unit I - Chapter 1: Sections 1.2 -1.4,
Chapter 2: Sections 2.1, 2.4, 2.7
Unit II - Chapter 3 :Full
Unit III - Chapter 4: sections 4.1 -4.3
Unit IV - Chapter 5: Full
Unit V - Chapter 6: Sections 6.1 – 6.3

Reference books:

1. Shanthi Narayan, **Elements of Real Analysis**, Sixth Edition, S.Chand and Company Ltd, New Delhi, Revised edition 1989.
2. Richard R. Goldberg, **Methods of Real Analysis**, Oxford and IBH Publishing Pvt Ltd, New Delhi, 1970.

NUMERICAL ANALYSIS

Class : B.Sc Mathematics (CA)
Semester : V
Subject Code : 15UMCC52

Part III : Core
Hours : 05
Credits : 05

Course Outcomes

- CO1** To develop the skills in solving algebraic, transcendental, difference equations.
- CO2** To solve differential equations numerically.
- CO3** To solve integral equations numerically.

Unit – I

Numerical solutions of Algebraic and Transcendental equations – Iteration method – Newton method of false positions – Solutions of Simultaneous linear equations- Gauss method – Gauss Jordan method – Iteration method – Gauss Jacobi method.

Unit – II

Finite differences – Forward difference and backward differences – Finite differences – operators – relations – properties – Finding missing terms – Inverse operators.

Unit –III

Interpolation and Newton's forward and backward formulae – divided differences and properties – Newton's divided differences formula – Gauss formula – Stirling formula – Bessel formula – Laplace **Everret's** formula – Lagrange formula – Simple problems – inverse interpolation using Lagrange formulation.

Unit –IV

Numerical differentiation – Finding the first and second derivatives – Maximum and minimum values of a function for a given data.

Unit V

Numerical Iteration – Newton's Cote's formula – Trapezoidal Rule – Simpson's one third rule – Simpson's three eight rule – Weddle's rule.

Text Book :

Dr.S.Arumugam, Thangapandi Issac and A.Somasundaram, **Numerical Analysis**, New Gamma Publications, Palayamkottai, Edition 2006.

- Unit I - Chapter 1: Section 1.0 , 1.2,1.5 &
Chapter 2: Section 2.0, 2.1,2.4,2.6
- Unit II - Chapter 3: Section 3.1,3.2
- Unit III - Chapter 4: Section 4.0 to 4.6
- Unit IV - Chapter 5: Section 5.1, 5.2 & 5.4
- Unit V - Chapter 6: Section 6.0 to 6.6

Reference books:

1. Prasun KrNayak, **Numerical Analysis**(Theory and Application) , Asian Books Private Limited, New Delhi, Second Edition, 2012.
2. S.S Sastry, **Introductory Methods of Numerical Analysis**, Prentice Hall of India Pvt Ltd, New Delhi, Third Edition, 1998.

DIFFERENTIAL EQUATIONS

Class : B.Sc Mathematics (CA)
Semester : V
Subject Code : 15UMCC53

Part III : Core
Hours : 06
Credits : 05

Course Outcomes

- CO1** To develop logical skills in the formation of differential equations.
- CO2** To introduce different techniques of finding solutions to these equations.
- CO3** To familiarize the applications of first and second order differential equations.

Unit –I

Exact differential equations of first order but of higher degree – Equations solvable for y – Equations solvable for x – Clairaut's form – Equation that do not contain x, y explicitly, Equation homogeneous in x and y .

Unit –II

Linear Equations with constant coefficients and variable coefficients - Equations reducible to the linear homogeneous equations.

Unit –III

Simultaneous Linear differential equations – Linear Equations of the second order – Reduction to the normal form – Change of independent variables – Variation of parameters.

Unit –IV

Partial differential equation of the first order – Formation of PDEs – Elimination of arbitrary constants and functions - Derivation of partial differential equation – Lagrange method of solving linear equations.

Unit – V

Standard forms – Equations reducible to the standard forms – Charpit's method.

Text book:

1. T.K.Manickavasagam Pillai and S.Narayanan, **Differential equations and its Applications**, S.Viswanathan Publication, Chennai, 2014.

Unit I	-	Chapter 1: Section 6.1, 6.3 and Chapter 4: Section 1,2,3 & 4
Unit II	-	Chapter 5: Section 4,5 & 6
Unit III	-	Chapter 6: Section 6 and Chapter 8: Section 1,2,3, & 4
Unit IV	-	Chapter 12: Section 1,2,3 & 4
Unit V	-	Chapter 12: Section 5,6

Reference Books:

1. Dr. M.D. Raisinghania, **Advanced Differential Equations**, S.Chand and Company PVT.LTD, New Delhi, Reprint, 2012
2. Dr.S. Arumugam and Issac, **Differential equations and its Applications**, New Gamma Publications, Palayamkottai, 2011.

MODERN ALGEBRA

Class : B.Sc Mathematics (CA)
Semester : V
Subject Code : 15UMCC54

Part III : Core
Hours : 06
Credits : 05

Course Outcomes

- CO1** To learn about Groups and Rings with theorems.
CO2 To cope-up with advanced Algebraic systems.
CO3 To introduce UFD and PID.

Unit –I

Subgroups – Definitions, Examples – Theorems on subgroups- Permutation groups – Cycles and transpositions – Even permutations – Theorems on Permutations - S_n and A_n - Cyclic groups- Definitions, Examples, Theorems – Order of an element – Generators – Number of generators of Cyclic groups.

Unit –II

Cosets – Theorems on cosets, Lagrange’s theorem, problems using Lagrange’s Theorem – Euler’s, Fermat’s Theorems – Normal subgroups – Theorems on Normal subgroups – Quotient group

Unit –III

Homomorphisms – Types and examples – Theorems on Homomorphisms and Isomorphisms – Fundamental theorem of Homomorphism – Any infinite cyclic group is isomorphic to $(\mathbb{Z}, +)$ – Any finite group is isomorphic to $(\mathbb{Z}_n, +)$ – Cayley’s Theorem

Unit -IV

Rings – Definition and examples – Elementary properties – Isomorphism types of rings – Integral domains, Fields – zero divisors – Theorems on Integral domains and fields, Characteristic of a ring.

Unit -V

Subrings – Ideals – Quotient rings – maximal and prime ideals – Field of quotient of an Integral domain

Text Book:

Dr.S.Arumugam& Isaac, **Modern Algebra**, Scitech Publication, Chennai, Reprint, July 2008.

- Unit I - Section 3.4 to 3.7
Unit II - Section 3.8 to 3.9
Unit III - Section 3.10 to 3.11
Unit IV - Section 4.1 to 4.5
Unit V - Section 4.6 to 4.11

Reference books:

1. M.L Santiago, **Modern Algebra**, Tata MC Graw Hill Publication, New Delhi, 1988.
2. K.Sivasubramaniam, A.S.Kumaraswamy and K.Sitaraman, **Modern Algebra**, S.Chand and Company Ltd, New Delhi, 1979.

STATISTICS – I

Class : B.Sc Mathematics (CA)
Semester : V
Subject Code : 15UMCA51

Part III : Allied
Hours : 06
Credits : 05

Course Outcomes

- CO1** To develop skills in basic statistical concepts.
CO2 To learn about various techniques on curve fitting.
CO3 To introduce Two-way and Three-way classification tables.

Unit – I

Measures of averages - Measures of dispersion – Skewness based on moments

Unit –II

Correlation and regression- Rank correlation coefficient.

Unit – III

Index numbers and Time series

Unit –IV

Curve fitting (all types of curves)

Unit –V

Theory of attributes

Text Book:

Dr.S.Arumugam& Isaac, **Statistics**, New Gamma Publications, Reprint 2012.

Unit I - Chapter 2, 3, 4

Unit II - Chapter 6

Unit III - Chapter 9, 10

Unit IV - Chapter 5

Unit V - Chapter 8

Reference books:

1. S.C. Gupta, V.K. Kapoor, **Elements of Mathematical Statistics**, Sultan Chand & Sons Publications, New Delhi, 2001.
2. R.S.N.Pillai and Bagavathi, **Practical Statistics**, S.Chand & Company Pvt Ltd, New Delhi, Reprint 2010.

LAPLACE TRANSFORMS AND FOURIER SERIES

Class : B.Sc Mathematics (CA)
Semester : V
Subject Code : 15UMCS51

Part IV : Skill Based
Hours : 02
Credits : 02

Course Outcomes

- CO1** To expose the knowledge on Laplace transforms.
CO2 To introduce the concepts on Fourier series.
CO3 To familiarize the applications of LT and FS to other branches of sciences.

Unit –I

Laplace Transforms –Theorems – Problems – Evaluation of integrals.

Unit –II

Inverse Laplace Transforms – Results.

Unit –III

Solving ordinary differential equations with constant coefficients and variable coefficients – Simultaneous linear equations using Laplace Transforms.

Unit –IV

Fourier series –Trigonometric series – Even and Odd functions.

Unit – V

Half range Fourier Series – Extension to intervals of length 2π .

Text book :

1. T.K.Manicka Vasagam Pillai and S.Narayanan, **Differential equations and its Applications**, S.Viswanathan Publications,Chennai, 1996.
2. Dr.S. Arumugam and Issac, **Sequence & Series And Fourier Series**, New Gamma Publishing House, Palayamkottai, 2006.

Unit I (Book 1) - Chapter 9: Section 1 to 5

Unit II (Book 1) - Chapter 9: Section 6 to 7

Unit III (Book 1) - Chapter 9: Section 8 to 10

Unit IV (Book 2) - Chapter 12: Pg.No: 1 to 16

Unit V (Book 2) - Chapter 12: Pg.No: 17 to 20

Reference Books:

1. Dr. M.D. Raisinghania, **Advanced Differential Equations**, S.Chand and Company PVT.LTD, New Delhi, Reprint, 2012.
2. George yankovsky, **Differential and Integral Calculus (Volume II)**, MIR Publishers, Moscow, 1974.

COMPLEX ANALYSIS

Class : B.Sc Mathematics (CA)
Semester : VI
Subject Code : 15UMCC61

Part III : Core
Hours : 05
Credits : 05

Course Outcomes

- CO1** To introduce the concepts of an analytic function.
CO2 To explain about bilinear transformations and contour integration.
CO3 To explain about poles and residues through Taylor and Laurent's series expansions.

Unit – I

Analytic function –C-R-equation – sufficient conditions – Harmonic functions.

Unit –II

Elementary transformation – Bilinear transformation – Cross ratio – Fixed points – Special Bilinear transformation – Real axis to real axis – Unit circle to unit circle and real axis to unit circle only.

Unit –III

Cauchy's integral formulae and formulae for derivatives – Morera's theorem – Cauchy's inequality – Liouville's theorem – Fundamental theorem of algebra.

Unit –IV

Taylor's theorem, Laurent's theorem – Singular points – Poles – Argument principle

Unit-V

Rouche's Theorem– Calculus of residues – Evaluation of definite integral

Text Book :

Dr.S.Arumugam, Thangapandi Issac and A.Somasundaram, **Complex Analysis**, Scitech Publication, January 2003.

Unit I - Chapter 2 : Section 2.6 to 2.8

Unit II - Chapter 3: Section 3.0 to 3.5

Unit III - Chapter 6 : Section 6.3 and 6.4

Unit IV - Chapter 7 : Section 7.0 to 7.4

Unit V - Chapter 8 : Section 8.0 to 8.3

Reference books:

1. B.Choudhary, **The Elements of Complex Analysis**, New Age International Publishers, New Delhi, 2009.
2. J.V.Desh Pande, **Complex Analysis**, Tata McGraw Hill Publication, New Delhi, 1986.

LINEAR ALGEBRA

Class : B.Sc Mathematics (CA)
Semester : VI
Subject Code : 15UMCC62

Part III : Core
Hours : 05
Credits : 05

Course Outcomes

- CO1** To learn about Vector spaces and Matrices with theorems.
- CO2** To cope-up with the homomorphisms through fundamental theorems.
- CO3** To explain about rank and nullity.

Unit –I

Vector Spaces – Definition and examples – Sub Spaces – Linear Transformation – Fundamental theorem of Homomorphism.

Unit –II

Span of a set Linear independence – Basis and Dimension – Rank and Nullity – Matrix and Linear Transformations.

Unit-III

Inner product Space – Definition and examples – Orthogonality – Orthogonal complement.

Unit –IV

Matrices – Elementary Transformation – Inverse – Rank Test for consistency – Solving Linear equations – Cayley Hamilton theorem – Eigen values and Eigen Vectors.

Unit – V

Bilinear forms – Matrix of a Bilinear form – Quadratic forms – Reduction to Quadratic forms.

Text Book:

Dr.S.Arumugam and Thangapandi Isaac, **Modern Algebra**, Scitech Publication, Chennai, Reprint, July 2008.

Unit I - Chapter 5: Section 5.0 to 5.3

Unit II - Chapter 5: Section 5.4 to 5.8

Unit III - Chapter 6 : Section 6.0 to 6.3

Unit IV - Chapter 7 : Section 7.0 to 7.8

Unit V - Chapter 8 : Section 8.0 to 8.2

Reference books:

1. Leadership Project Committee ,University of Bombay, **Text book of Algebra**, Tata McGraw Hill Publication, New Delhi,1985.
2. V.Krishnamurthy, V.P.Mainra, &J.L.Arora, **An Introduction to Linear Algebra**, Affiliated East – West press Pvt Ltd, New Delhi, 1990.

OPERATIONS RESEARCH

Class : B.Sc Mathematics (CA)
Semester : VI
Subject Code : 15UMCC63

Part III : Core
Hours : 06
Credits : 05

Course Outcomes

- CO1** To develop the skills of formulation of LPP.
CO2 To introduce different techniques to solve LPP.
CO3 To teach more about Transportation and Assignment problems.

Unit –I

Linear Programming Problem – Formulation of L.P.P. Mathematical form – Solution by 1. Graphical Method 2. The Simplex method 3. Method of penalty.

Unit –II

Duality – Dual Simplex Method.

Unit –III

Transportation problem – Mathematical form – Initial solutions by all methods – MODI method for both balanced and unbalanced T.P.- The assignment problems.

Unit –IV

Game theory – Two person zero sum game – saddle point – Game with saddle point – solution of game by using formula, graphical method, method of dominance and L.P.P. method.

Unit –V

Sequencing –Replacement problem .

Text Book :

Kanti Swarup , P.K. Gupta and Man Mohan, **Operations Research** , Sultan Chand and Sons Publications, New Delhi, Reprint 2006.

Unit I - Chapter 5: Section

Unit II - Chapter 5: Section

Unit III - Chapter 6 : Section

Unit IV - Chapter 7 : Section

Unit V - Chapter 8 : Section

Reference books:

1. Dr.S.Arumugam and Thangapandi Isaac, **Topics in Operations Research - Linear Programming**, New Gamma Publishing House, Palayamkottai, June 2012.

P.R.Vital and V.Malini, **Operations Research**, Margham Publications, Chennai, 2002.

GRAPH THEORY

Class : B.Sc Mathematics (CA)
Semester : VI
Subject Code : 15UMCC64

Part III : Core
Hours : 06
Credits : 05

Course Outcomes

- CO1** To learn the basic concepts in Graph theory such as Trees.
CO2 To familiarize the concepts on Planar, Eulerian and Hamiltonian graphs.
CO3 To explain about its applications.

Unit –I

Graphs- Degrees – Subgraphs , Isomorphism, Ramsey Numbers – Independent sets and coverings –Matrices of graphs - Operation on graphs.

Unit –II

Degree sequences – graphic sequences- Walks, Trails and Paths – Connectedness and components – Blocks- Connectivity.

Unit –III

Eulerian graphs – Hamiltonian graphs – Trees – Characterization of trees – centre of a tree – Matchings – Matchings in Bipartite graphs.

Unit –IV

Planar graph and properties – Characterization of Planar graphs – Thickness – Crossing numbers and outer planarity

Unit –V

Chromatic number and chromatic index – Five colour theorem and four colourtheorem - Chromatic polynomials.

Text Book:

Dr.S.Arumugam and S.Ramachandran, **Invitation To Graph Theory**, Scitech Publication, Chennai, 2015.

Unit I - Chapter 2: Section 2.1 to 2.6 &2.8 to 2.9

Unit II - Chapter 3, 4

Unit III - Chapter 5,6 &7

Unit IV - Chapter 8

Unit V - Chapter 9

Reference books:

1. Harry, **Graph Theory**, Narosa publishing House, New Delhi, 2001.
2. S.K.Yadav, **Elements of Graph Theory**, Ane Books Private Ltd, New Delhi, 2010.

STATISTICS – II

Class : B.Sc Mathematics (CA)
Semester : VI
Subject Code : 15UMCA61

Part III : Allied
Hours : 06
Credits : 05

Course Outcomes

- CO1** To know about Sampling Theory.
- CO2** To introduce the applications of various statistical tests.
- CO3** To classify small and large samples along with errors.

Unit – I

Theory of probability – sample space – Probability function – Laws of addition – Boole’s inequality – Law of multiplication – Baye’s theorem – Problems.

Unit – II

Random Variables – Distribution function – Discrete and continuous random variables – Probability density function – Mathematical expectation (one Dimensional only)

Unit –III

Moment generating function – Cumulants – theoretical distributions –Binomial – Poisson –Normal.

Unit –IV

Test of Significance of Large Samples .

Unit –V

Test of Significance of Small Samples – t-test , F-test , Chi-square test

Text Book :

Dr.S.Arumugam and Thangapandi Isaac, **Statistics**, New Gamma Publications , Palayamkottai, Reprint 2012.

Unit I - Chapter 11

Unit II - Chapter 12: Section 12.1 to 12.4

Unit III - Chapter 12: Section 12.5- 12.6 & Chapter 13

Unit IV - Chapter 14

Unit V - Chapter 15,16

Reference books:

1.T. Sankara Narayanan and A.Mangaldoss, **Statistics and its Application**, Preist Publications, New Delhi,1994.

2. R.S.N.Pillai and Bagavathi, **Practical Statistics**, S.Chand and Company Pvt Ltd, New Delhi,1987.

BOOLEAN ALGEBRA AND LOGIC

Class : B.Sc Mathematics (CA)
Semester : VI
Subject Code : 15UMCS61

Part IV : Skill Based
Hours : 02
Credits : 02

Course Outcomes

- CO1** To introduce the concept of Lattice.
- CO2** To teach various types of lattices.
- CO3** To cope up with recent advancements in Boolean algebra and Logic.

Unit –I

Logic: Logic and Propositional Calculus - Statements, Basic Logical operations - Truth values of compound Statements - Propositions and Truth tables.

Unit –II

Tautologies and Contradictions - Logical equivalence - Negation, De Morgan's Laws - Algebra of Propositions – Conditional and Biconditional Statements.

Unit –III

Arguments, Arguments and Statements – Logical Implications – Quantifiers, Negation of Quantified Statements.

Unit –IV

Boolean Algebra: Basic definitions and theorems – Lattices - Sum-of-products forms.

Unit – V

Minimal Boolean Expressions, Prime Implicants – Logic Gates – Logic Circuits - Truth Tables – Karnaugh maps – Minimal AND-OR circuits.

Text book:

1. Seymour Lipschutz, Marcs Lars Lipson, **Discrete Mathematics**, Schaum's series, McGraw-Hill International Editions, Second Edition, Chennai, 1999.
 - Unit I - Chapter 4: Section 4.1 – 4.4
 - Unit II - Chapter 4: Section 4.5 – 4.8
 - Unit III - Chapter 4: Section 4.9 – 4.12
 - Unit IV - Chapter 15: Section 15.1 – 15.8
 - Unit V - Chapter 15: Section 15.9 – 15.12

Reference Books:

1. M.K. Venkataraman, N.Sridharan, N.Chandrasekaran, **Discrete Mathematics**, The National Publishing Company, Chennai, 2000.
2. K.Chandrasekhara Rao, **Discrete Mathematics**, Narosa Publishing House, Chennai, 2012.