

Semester – III			
Part III	Allied III	Statistics I	
Code :18UMMA31	Hrs/week :3	Hrs/ Semester:45	Credits : 3

Unit I

Introduction - Moments - Skewness and Kurtosis

(Text Book 1: Chapter 4, Sec 4.1- 4.2, pages: 82-94)

Unit II

Curve fitting: Principles of Least Squares -Fitting a straight line-Fitting a second degree parabola.

(Text Book 1: Chapter 5, Sec 5.1, pages: 95-105)

Unit III

Correlation - Rank correlation.

(Text Book 1: Chapter 6, Sec. 6.1- 6.2, pages: 106-129)

Unit IV

Regression.

(Text Book 1: Chapter 6, Sec. 6.3, pages: 129-144)

Unit V

Introduction - Uses of Index numbers - Methods of constructing index numbers - Tests of adequacy of index number formulae - The chain index numbers.

(Text Book 2: chapter 13, Pages: 536-568)

Text Books

1. S. Arumugam and A. Thangapandi Issac, Statistics, New Gamma Publishing House, Palayamkottai, 2011.
2. S.P.Gupta, Statistical Methods, Sultan Chand & Sons, Educational Publishers, New Delhi, Forty Third Revised Edition, 2014,

Books for Reference

1. H.C.Saxena, Elementary Statistics, S.Chand & Company Ltd., New Delhi, Tenth Edition, 2011.
2. J.N.Kapur and Saxena, Mathematical Statistics, S.Chand & Company Pvt Ltd., New Delhi, First Edition, 1960.

Semester –III			
Part III	Allied IV	Linear Programming	
Code : 18UMMA32	Hrs/week : 3	Hrs/ Semester :45	Credits : 3

Unit I

Introduction - Mathematical formulation of the problem - Graphical Solution method - General linear programming problem - Canonical and standard forms of L.P.P. (Chapter 2, Sec 2.1, 2.2, 2.3 & 2.4 , pages 39-64 ,Chapter 3, Sec 3.1, 3.2, 3.4 & 3.5, pages 65 - 76 & 79 – 86).

Unit II

Simplex Algorithm – Introduction, Fundamental Properties of Solutions(Theorems-Statement only)-The Computational Procedure

(Chapter 4, Sec 4.1& 4.3, pages 87- 89 & 99 -106).

Unit III

Use of Artificial Variables - The big M method (Charnes Penalty Method) - Two phase simplex method (Chapter 4, Sec 4.4, pages 106 – 114).

Unit IV

Duality – Introduction – General Primal Dual pair – Formulating a Dual Problem - Dual and Simplex method

(Chapter 5, Sec 5.1, 5.2, 5.3, 5.4 ,5.7 & 5.9, pages 129 – 134 & 138 – 142).

Unit V

Duality - Dual and Simplex method.

(Chapter 5, Sec 5.9, pages 148 – 150)

Text Book

1. Gupta P.K., Kantiswarup and Manmohan, Operations Research, Sultan Chand & Sons, Educational publishers, New Delhi -2, Reprint 2011.

Books for Reference

1. Prem Kumar Gupta and Hira D.S., Operations Research, Sultan Chand & Sons, Educational publishers, New Delhi -2
2. Billy E Gillet, Introduction to Operations Research, Tata McGraw Hill publishing Company, New Delhi.

Semester – III			
Part III Core Skill Based Numerical Aptitude and Arithmetic Ability			
Code :18UMAS31	Hrs/week :4	Hrs/ Semester :60	Credits :4

Unit I

Percentage– Time and Work – Time and Distance

(Chapters 10,15,17, pages 179-218, 309-330, 343-360)

Unit II

True discount and Banker's discount – Ratio and Proportion

(Chapters 26, 27, 12, Pages 485-489, 490-493, 248-276)

Unit III

Average – Chain rule - Calendar – Trains – Boats and Streams

(Chapters 6,14,18,19, Pages 123-142, 291-308, 361-370)

Unit IV

Simplification – profit and loss

(Chapters 4,11, Pages 68-95, 219-247).

Unit V

Line Graphs-Pie charts - Bar Diagrams

(Chapters 33,34,35, Pages 525-536, 537-542, 543-549)

Text Book

1. Aggarwal R.S., Arithmetic Subjective and Objective for Competitive Examinations, S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55. Revised Edition 2014

Books for Reference

1. Aggarwal R.S., Quantitative Aptitude , S.Chand and Company Ltd. , Ram Nagar, New Delhi.
2. Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw-Hill Publishing Company Ltd., New Delhi.

Semester – III			
Part III Non Major Elective- Mathematics for Competitive Examinations I			
Code :18UMAN31	Hrs/week :2	Hrs/Semester :30	Credits :2

Unit I

H.C.F and L.C.M of Numbers (**Chapter 2, Pages 22-36**)

Unit II

Simplification (**Chapters 4, Pages 58-75**)

Unit III

Square Root and Cube Root (**Chapter 5, Pages 76-95**)

Unit IV

Time & Work (**Chapters 11, Pages 206-222**)

Unit V

Time & Distance (**Chapter 13, Pages 231-243**)

Text Book

Aggarwal R.S., **Objective Arithmetic** (Edition 2004), S.Chand and Company Ltd. ,
Ram Nagar, New Delhi - 55

Book for Reference

Aggarwal R.S., **Arithmetic Subjective and Objective for Competitive Examinations**
(Revised Edition 2011), S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55

SEMESTER – IV			
Part III	Core VI	Real Analysis	
Code :18UMAC41	Hrs / Week: 6	Hrs / Semester: 90	Credits: 4

Unit I

Algebra of the Real Number System – Upper and Lower bounds – L.U.B property and its applications-Absolute value and Triangle inequality.

(Chapter 1, Sec 1.1- 1.4, pages 1-20).

Unit II

Continuous functions - $\varepsilon - \delta$ Definition of Continuity -Intermediate value theorem- Extreme value theorem - Monotone functions.

(Chapter 3, Sec 3.1- 3.5, pages 63-90).

Unit III

Limits - Uniform continuity - Differentiability of function - Mean value theorem - L'Hospital's Rules.

(Chapter 3, Sec 3.6 - 3.7, Chapter 4, Sec 4.1- 4.3, pages 90-103, 110 -134).

Unit IV

Higher order Derivatives - Taylor's Theorem - Darboux integrability - Properties of the integral - Fundamental theorem of Calculus.

(Chapter 4, Sec 4.4-4.5, Chapter 6, Sec 6.1-6.3, pages 134-144,175-199).

Unit V

Mean value theorem for integrals - Riemann's Original definition -Sum of an infinite series as an integral - Improper Riemann integrals.

(Chapter 6, Sec 6.4, 6.6, 6.7, 6.9, pages 199-203, 205-212, 214-219).

Text Book

1. Ajit Kumar and S.Kumaresan, Real Analysis, Crc Press, 2015.

Books for Reference

1. Richard R. Goldberg Methods of Real Analysis, Oxford & IBH Publishing Co, New Delhi. Reprint 1973.
2. Robert G. Bartle and Donald R. Sherbert Introduction to Real Analysis Fourth Edition Wiley India Edition, Reprint 2017.

Semester – IV			
Part III	Allied V	Statistics II	
Code :18UMMA41	Hrs/week : 3	Hrs/ Semester :45	Credits : 3

Unit I

Random variables - Discrete random variables - continuous random variables –Mathematical expectations.

(Text Book 1: Chapter12, Sec 12.1 - 12.4, pages: 304 -328)

Unit II

Moment generating function - Characteristic function.

(Text Book 1: Chapter12, Sec 12.5 - 12.6, pages: 331-342)

Unit III

Binomial distribution - Poisson distribution.

(Text Book 1: Chapter13, Sec 13.1 - 13.2, pages: 343 -369)

Unit IV

Normal distribution.

(Text Book 1: Chapter13, Sec 13.3, pages: 371 -389)

Unit V

Continuous probability distributions - Beta1, Beta2 & Gamma distributions,

(Text Book 2: Chapter 9, Sec 9.5 - 9.7, pages: 9.38 - 9.50)

Text Books

1. S. Arumugam and A. Thangapandi Issac; Statistics, New Gamma Publishing House, Palayamkottai, 2011.
2. S.C. Gupta and V.K. Kapoor; Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Educational Publishers, New Delhi, Eleventh edition, 2014.

Books for Reference

1. S.C. Gupta and V.K. Kapoor; Fundamentals of Mathematical Statistics, Sultan Chand & Sons, Educational Publishers, New Delhi, Eleventh edition, 2014.
2. Sancheti D.C and Kapoor V.K; Statistics, Sultan Chand & Sons, Educational Publishers, New Delhi, Eleventh edition, 2014.

Semester – IV			
Part III	Allied VI	Discrete Mathematics	
Code :18UMMA42	Hrs/week :3	Hrs/ Semester :45	Credits :3

Unit I

Tautological Implications and Equivalence of Formulae – Replacement Process

(Chapter IX, Sec 8 - 9, pages 9.30 – 9.40).

Unit II

Functionally Complete sets of Connectives and Duality Law – Normal Forms - Principal Normal Forms

(Chapter IX, Sec 10 - 12, pages 9.40 – 9.56).

Unit III

Lattices – Hasse diagrams - Properties of Lattices – Duality Principle – Lattices through algebraic operations

(Chapter X, Sec 1- 2, pages 10.1– 10.12).

Unit IV

New Lattices – Lattice homomorphisms – Product lattice of two lattices - Modular and Distributive Lattices

(Chapter X, Sec 3 - 4, pages 10.13 – 10.34).

Unit V

Boolean Algebras – Boolean polynomials

(Chapter X, Sec 5 - 6, pages 10.34 – 10.50).

Text Book

1. Discrete Mathematics, M.K. Venkataraman, N. Sridharan and N. Chandrasekaran, The National Publishing Company, Chennai, 2009.

Books for Reference

1. J.P.Trembly, R.Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata Mc Graw Hill, NewDelhi, Reprint 2010.
2. Discrete Mathematics, Seymour Lipschutz, Marc Lars Lipson, Tata Mc Graw Hill, New Delhi.

Semester – IV			
Part III Core Skill Based Math Type using LaTeX			
Code :18UMAS41	Hrs/week :4	Hrs/ Semester :60	Credits :4

Unit I

Typing text : Words, sentences, and paragraphs - Symbols not on the keyboard - Comments and footnotes - Changing font characteristics - Lines, paragraphs, and pages – Spaces - Boxes

(Chapter 5, Sec 5.1 - 5.9, pages 61 - 115)

Unit II

Text environments: Some general rules for displayed text environments - List environments - Style and size environments - Proclamations (theorem-like structures) - Proof environments - Tabular environments - Tabbing environments - Miscellaneous displayed text environments

(Chapter 6, Sec 6.1 to 6.8, pages 117 - 149)

Unit III

Typing math: Math environments - Spacing rules - Equations - Basic constructs - Arithmetic operations - Delimiters - Operators - Math accents - Stretchable horizontal lines - Formula Gallery

(Chapter 7, Sec 7.1 to 7.9, pages 151 - 186)

Unit IV

More math: Spacing of symbols Building new symbols - Math alphabets and symbols - Vertical spacing - Tagging and grouping - Generalized fractions - Boxed formulas

(Chapter 8, Sec 8.1 to 8.6, pages 187 - 206)

Unit V

LaTeX documents: The structure of a document - The preamble - Abstract - Sectioning - Cross-referencing - Bibliographies.

(Chapter 10, Sec 10.1 to 10.6, pages 245 - 270)

Semester – IV			
Part III Non Major Elective-Mathematics for Competitive Examinations II			
Code :18UMAN41	Hrs/week :2	Hrs/Semester: 30	Credits :2

Unit I

Average (**Chapter 7, Pages 124-138**)

Unit II

Problems on Numbers (**Chapter 16, Pages 267-278**)

Unit III

Problems on Ages (**Chapters 17, Pages 279-285**)

Unit IV

Simple Interest (**Chapter 18, Pages 286-298**)

Unit V

Compound Interest (**Chapter 19, Pages 299-312**)

Text Book

Aggarwal R.S., **Objective Arithmetic** (Edition 2004), S.Chand and Company Ltd. ,
Ram Nagar, New Delhi - 55.

Book for Reference

Aggarwal R.S., **Arithmetic Subjective and Objective for Competitive Examinations**
(Revised Edition 2011), S.Chand and Company Ltd. , Ram Nagar, New Delhi - 55.