

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSCMT 501	DC	Advanced Abstract Algebra	60	20	20	-	-	3	0	-	3

Course Objective

To introduce the students to the Higher Algebra.

Course Outcomes

After the successful completion of this course, students will be able to:

- 1. Learn the basics of Ring Theory.*
- 2. Construct various structures in Rings.*
- 3. Justify the concepts of Integral Domain and Field.*
- 4. Characterize the nature of Rings and Fields.*
- 5. Understand and apply the basics of Sylow Theory.*

Course Content:

UNIT – I

Definition and examples of rings, Properties of rings, Subrings, Integral Domains and Fields, Characteristics of a Ring.

UNIT – II

Ideals; Ideal generated by a subset of a Ring; Factor Rings, Operations on Ideals, Prime and maximal ideals.

UNIT – III

Ring Homomorphism, Properties of Ring Homomorphism, Isomorphism, Field of Quotients.

UNIT – IV

Principal ideal domains, Euclidean domains and Unique factorization domains.



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			END SEM	MST	Q/A	END SEM	Q/A				
BSCMT 501	DC	Advanced Abstract Algebra	60	20	20	-	-	3	0	-	3

UNIT – V

p -group, Cauchy Theorem, Sylow Theorem, Sylow p -subgroups, Applications of Sylow Theory: Application to p -groups and Class equation.

Reference Book:

1. John B. Fraleigh, A First Course in Abstract Algebra Narosa Publication.
2. Joseph A. Gallian, Contemporary Abstract Algebra, Cengage Learning.
3. M. Artin: Algebra, Pearson.
4. S. D. Dummit and M. R. Foote: Abstract Algebra, John Wiley
5. I. N. Herstein: Topics in Algebra, Wiley.
6. N.S. Gopalkrishnan, University Algebra, John Wiley & Sons.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSCMT 502	Major	Analysis I	60	20	20	-	-	3	0	-	3

Course Objective

To introduce the students to the fundamentals of Mathematical Analysis.

Course Outcomes

After the successful completion of this course students will be able to:

- 1. Understand the basics of the Real Analysis.*
- 2. Analyze and solve the fundamental problems of the convergence of sequences and series.*
- 3. Classify the nature of various types of functions of one and two variables.*
- 4. Justify the concepts and role of the Real Analysis.*

Course Content:

UNIT – I

Real numbers, Sequences, Bounded and Unbounded Sequences, Monotone sequences and their convergence, Limit Supremum, Limit Infimum and convergence criterion using them, Subsequences, Cauchy sequence and their convergence criterion.

UNIT – II

Series of non-negative terms, Infinite series and their convergence, Geometric series, p-series test, Comparison test, Ratio and root tests, Raabe's test, Logarithmic test, Bertrand test, Condensation test and Integral test, Absolute and conditional convergence.

UNIT – III

Alternating series and Leibnitz's theorem, Absolute and Conditional Convergence of Series of Real terms and Rearrangement of terms.

UNIT – IV

Continuity of function of single variable, Sequential continuity, Properties of Continuous functions. Uniform continuity.

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			END SEM	MST	Q/A	END SEM	Q/A				
BSCMT 502	Major	Analysis I	60	20	20	-	-	3	0	-	3

UNIT – V

Limit, continuity and differentiability of functions of two variables.

Reference Book:

1. W. Rudin: Principles of Mathematical Analysis, Mac Graw Hill Education.
2. Tom Apostol: Mathematical Analysis, Pearson.
3. Tom Apostol: Calculus I and II, Pearson.
4. Terence Tao : Analysis I, Hindustan Book Agency.
5. W. Rudin: Real and Complex Analysis, Mac Graw Hill Education.
6. Gorakh Prasad, Differential Calculus, Pothishala pvt. Ltd. Allahabad.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSCMT 503(1)	DSC (Major)	Probability and Statistics	60	20	20	-	-	4	0	-	4

Course Objective

To introduce the students to probability theory and inferential statistics

Course Outcomes

After the successful completion of this course, students will be able to:

- 1. Represent the data in a better way using different graphs.*
- 2. apply the fundamental measure of central tendency, dispersion, skewness, kurtosis*
- 3. Correlate the data and fit the regression lines.*
- 4. Apply the concepts of probability and probability distributions.*
- 5. Understand the concept of testing of hypothesis and apply the test of significance.*

Unit I:

Definition and scope of Statistics, frequency distributions and their graphical representations (Histograms, Frequency Polygon). Measures of Central Tendency: arithmetic mean, median, mode, Measures of Dispersion: standard deviation, skewness, kurtosis.

Unit II:

Probability: Introduction, random experiments, sample space, events, and algebra of events. Definitions of Probability – classical, statistical, and axiomatic. Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Bayes' theorem, and its applications.

Unit III:

Discrete Probability Distributions: Binomial, Poisson. Continuous probability distributions: Normal distribution. (Related Examples)

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			END SEM	MST	Q/A	END SEM	Q/A				
BSCMT 503(1)	DSC (Major)	Probability and Statistics	60	20	20	-	-	4	0	-	4

Unit IV:

Concepts of statistical hypotheses, null and alternative hypothesis, two types of errors, level of significance. Test of significance: t-test for single mean, difference of means and paired t-test. χ^2 -test for goodness of fit and independence of attributes. F-test for equality of variances.

Unit V:

Correlation: Definition, scatter diagram, Karl Pearson's coefficient of correlation. Spearman's rank correlation coefficient for tied and untied ranks. Linear regression: definition, lines of regression, regression coefficients, properties of regression coefficient. Principle of least squares and fitting of polynomials and exponential curves. (Related examples).

Reference Books:

1. S.C. Gupta, V.K. Kapoor, Fundamentals of Mathematical Statistics, S. Chand & Sons.
2. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata
3. E.N. Nadar, Statistics, PHI Learning.
4. P. Mukhopadhyaya, Mathematical Statistics, New Central Book Agency, Calcutta.
5. Goon A.M., Gupta M.K. and Dasgupta B. (2002): Fundamentals of Statistics, Vol. I & II, 8th Edn. The World Press, Kolkata
6. Miller, Irwin and Miller, Marylees (2006): John E. Freund's Mathematical Statistics with Applications, (7thEdn.), Pearson Education, Asia.

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			END SEM	MST	Q/A	END SEM	Q/A				
BSCMT 503(2)	DSC (Major)	Discrete Mathematics	60	20	20	-	-	4	0	-	4

Course Objective

To introduce the students to the Discrete Mathematics and Graph Theory

Course Outcomes

After the successful completion of this course, students will be able to

- 1. understand and apply the basics of Discrete Mathematics.*
- 2. understand and discuss the structure of Lattice and its types.*
- 3. know the fundamentals of graphs.*
- 4. create and evaluate the fundamental problems of discrete mathematics and graph theory.*

Course Content:

UNIT – I

Discrete Numeric Functions: Introduction to Discrete Numeric functions, Manipulation of Numeric functions, Convolution of Numeric functions, Generating functions, Application of Generating functions.

UNIT – II

Relations: Partially ordered relation, Total ordered relation, Partially ordered set, Chain, Antichain, Hass Diagram, Maximal and Minimal elements, least upper bounds.

UNIT – III

Lattices: Lattice, Sub lattices, Distributive inequality, Lattice homomorphism, Lattice isomorphism, complete lattice, Complemented lattice, Distributive lattice.

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BSCMT 503(2)	DSC (Major)	Discrete Mathematics	60	20	20	-	-	4	0	-	4

Unit IV

Graphs: Finite Graphs, Incidence and degree, isomorphism, Subgraphs and union of graphs, connectedness, walk, path and circuits, weighted graphs, shortest path in weight graphs, Eulerian graphs, matrix representation of graphs and digraphs.

Unit V

Trees; distance and centers in a tree, Rooted trees and binary trees, Spanning tree, Euler's formula, Cut sets.

Reference Book:

1. Fred S. Roberts. Applied Combinatorics.
2. Mott J. L. , Kandel A. and Baker T. P., Discrete Mathematics for Computer Scientists and Mathematicians, Second Edition, Prentice Hall India, 1986.
3. Liu C.L., Elements of Discrete Mathematics, Second Edition, Mc Graw Hill 1985.
4. Ivan Niven, Herbert S. Zuckerman and Hugh L. Montgomery. An Introduction to the Theory of Numbers.
5. E. M. Wright and G. H. Hardy. An Introduction to the Theory of Numbers
6. Frank Harary. Graph Theory.
7. Douglas West. Introduction to Graph Theory.

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