

E.M. GOPALAKRISHNA KONE YADAVA WOMEN'S COLLEGE

An Autonomous Institution –Affiliated to Madurai Kamaraj University
Re-accredited (3rd Cycle) with Grade A⁺ & CGPA 3.51 by NAAC



LESSON PLAN

2022-2023

DEPARTMENT OF **MATHEMATICS**

(PG –Even Semester)



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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics
LESSON PLAN
2022-2023(Even)

Sub. Code : 22OPM21

Title of the Paper: Linear Algebra

Total Hours : 75

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	Linear Transformations Linear Transformations–The Algebra of Linear Transformations– Isomorphism – Representations of Transformations by Matrices – Linear Functionals.	15	Chalk & Talk	Selvi
Jan	II	Polynomials, Determinants Algebras-The Algebra of Polynomials –Polynomial Ideals - The Prime Factorization of a Polynomial – Commutative Rings - Determinant Functions.	15	Chalk & Talk	Selvi
Feb	III	Determinants, Elementary Canonical Forms Permutations and the Uniqueness of Determinants – Additional Properties of Determinants - Characteristic Values – Annihilating Polynomials.	15	Chalk & Talk	Selvi
March	IV	Elementary Canonical Forms Invariant Subspaces – Simultaneous Triangulations; Simultaneous Diagonalization –Direct- Sum Decompositions – Invariant Direct Sums – The Primary Decomposition Theorem.	15	Chalk & Talk	Selvi
April	V	The Rational and Jordan Forms Cyclic Subspaces and Annihilators– Cyclic Decompositions and the Rational Forms– The Jordan Form.	15	Chalk & Talk	Selvi


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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2022-2023

Sub. Code : 22OPM22

Title of the Paper: Measure and Integration

Total Hours : 75

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	Measure on a Real line: Lebesgue Outer Measure-Measurable Sets – Measurable Functions .	15	Chalk & Talk	T. Thiy.
Jan	II	Integration of functions of a Real line: Integration of non - negative functions- The General Integral - Integration of Series – Riemann and Lebesgue Integral.	15	Chalk & Talk	T. Thiy.
Feb	III	Abstract Measure Spaces: Measures and outer Measures- Extension of a Measure-Measure Spaces- Integration With Respect to a Measure.	15	Chalk & Talk	T. Thiy.
March	IV	Inequalities and the L^p Spaces: The L^p spaces -Convex functions – Jensen's Inequality- The Inequalities of Holder and Minkowski.	15	Chalk & Talk	T. Thiy.
April	V	Signed Measures and their Derivatives: Signed measures and the Hahn Decomposition – The Jordan Decomposition- The Radon – Nikodym theorem	15	Chalk & Talk	T. Thiy.

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I - M.Sc., Mathematics
LESSON PLAN
2022-2023

Sub. Code : 22OPM23

Title of the Paper: Graph Theory with Applications

Total Hours : 90

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	Graphs and Subgraphs Definition and Examples of a Graph – Simple Graphs - Graphs Isomorphism- The Incidence and Adjacency Matrices - Subgraphs – Vertex Degrees – Paths and Connection– Cycles - Trees - Cut Edges and Bonds – Cut Vertices – Cayley's Formula(Applications) -The Connector Problem.	18	Chalk & Talk	R. Revathy
Jan	II	Connectivity Connectivity – Blocks (Applications) - Construction of Reliable Communication Networks	18	Chalk & Talk	R. Revathy
Feb	III	Euler Tours and Hamilton Cycles Euler Tours - Hamilton Cycles (Applications) - The Chinese Postman Problem – The Travelling Salesman Problem.	18	Chalk & Talk	R. Revathy
March	IV	Directed Graphs Directed Graphs - Directed Paths - Directed Cycles (Applications) – A Job sequencing Problem - Designing an Efficient Computer Drum - Making a Road System One-way - Ranking the Participants in Tournament.	18	Chalk & Talk	R. Revathy
April	V	Networks Flows-Cuts-The Max-Flow Min-Cut Theorem (Applications)–Menger's Theorems - Feasible Flows	18	Chalk & Talk	R. Revathy

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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2022-2023

Sub. Code : 22OPM24

Title of the Paper: Advanced Statistics - II

Total Hours : 90

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	Probability and Distributions Introduction – Set Theory – The Probability Set Function – Conditional Probability and Independence – Random Variables of the Discrete Type – Random Variables of the Continuous Type – Properties of the Distribution Function – Expectation of a Random Variable – Some Special Expectations – Chebyshev's Inequality .	18	Chalk & Talk	<i>Shaw</i>
Jan	II	Multivariate Distributions Distributions of Two Random Variables – Conditional Distributions and Expectations – The Correlation Coefficient – Independent Random Variables – Extension to Several Random Variables.	18	Chalk & Talk	<i>Shaw</i>
Feb	III	Some Special Distributions The Binomial and Related Distributions – The Poisson Distribution – The Gamma and Chi-square Distributions – The Normal Distribution – The Bivariate Normal Distribution.	18	Chalk & Talk	<i>Shaw</i>
March	IV	Distributions of Functions of Random Variables Sampling Theory – Transformations of Variables of the Discrete Type – Transformations of Variables of Continuous Type – The Beta, t and F Distributions – Extensions of the Change of Variables Technique – Distributions of Order Statistics – The Moment Generating Function Technique – The Distributions of \bar{X} and nS^2/σ^2 – Expectations of Functions of Random Variables..	18	Chalk & Talk	<i>Shaw</i>
April	V	Limiting Distributions Convergence in Distribution – Convergence in Probability – Limiting Moment Generating Functions – The Central Limit Theorem – Some Theorems on Limiting Distributions.	18	Chalk & Talk	<i>Shaw</i>

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2022-2023

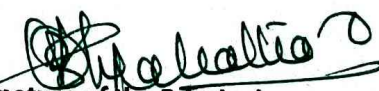
Sub. Code : 22OPMEDSE2A

Title of the Paper: Fuzzy sets and logics

Total Hours : 90

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	Introduction ,Crisp Sets: An Overview, The Notation of Fuzzy Sets, Basic Concepts of Fuzzy Sets, Classical Logic: An Overview, Fuzzy Logic	18	Chalk & Talk	A. Manickavalli
Jan	II	General Discussion, Fuzzy Complement, Fuzzy Union, Fuzzy Intersection, Combinations of Operations, General Aggregation Operations.	18	Chalk & Talk	A. Manickavalli
Feb	III	Crisp and Fuzzy Relations, Binary Relations, Binary Relations On a Single Set, Equivalence and Similarity Relations.	18	Chalk & Talk	A. Manickavalli
March	IV	Compatibility or Tolerance Relations, Orderings	18	Chalk & Talk	A. Manickavalli
April	V	Morphisms, Fuzzy Relation Equations	18	Chalk & Talk	A. Manickavalli


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LESSON PLAN

2022-2023

Sub. Code : 21OPMAID22

Title of the Paper: Teaching and Research Aptitude Paper - II

Total Hours : 30

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	Data Interpretations: Sources of data – Acquisition of Data – Discrimination of Data	6	Chalk & Talk	A. Rayan
Jan	II	Data Interpretations: Collection of data – Representation of data – Interpretation of data	6	Chalk & Talk	A. Rayan
Feb	III	Information and communication Technology: Application of Information Technology in Modern World – Data and Information – Value Of Information – Quality of Information – Aims of Information – Need and Importance of Information – Role of Information.	6	Chalk & Talk	A. Rayan
March	IV	Information and communication Technology: Evolution of Computer – Computer Generations – Structure of Modern Computer – Objectives of ERNET – Terminology Related to Computer.	6	Chalk & Talk	A. Rayan
April	V	Higher Education System: Value Education – Scriptural Value System and Operational Value System – Type of Values – Value system and Mental Health – The need of Value Education – Value and Science.	6	Chalk & Talk	A. Rayan

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I - M.Sc., Mathematics

LESSON PLAN

2022-2023

Sub. Code : 21OPM41

Title of the Paper: Advanced Topology

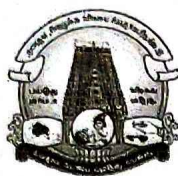
Total Hours : 90

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	Local compactness: Local compactness - The Tychonoff theorem - The Stone-Cech Compactification.	18	Chalk & Talk	
Jan	II	Metrization theorems: Local finiteness -The Nagata-Smirnov metrization theorem - The Smirnov metrization theorem	18	Chalk & Talk	
Feb	III	Complete metric spaces and Function Spaces: Complete Metric Spaces - A Space- Filling Curve - Compactness in Metric Spaces.	18	Chalk & Talk	
March	IV	Complete metric spaces and Function Spaces: Pointwise and Compact Convergence - Ascoli's Theorem.	18	Chalk & Talk	
April	V	Baire spaces and Dimension Theory : Baire Spaces - A Nowhere Differentiable Function	18	Chalk & Talk	

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I - M.Sc., Mathematics
LESSON PLAN
2022-2023

Sub. Code : 21OPM42

Title of the Paper: Research Methodology of Mathematical Methods

Total Hours : 90

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	What is Research in Mathematics?-Fixing an area for research, Proof Techniques- Pure and Applied Mathematics Research – Articles (popular Technical, Review, Survey) Magazines, Journals- Websites related to Mathematical articles and software(free and commercial),Mathematical and Statistical Societies (National and International), Prizes and Medals in Mathematics.	18	Chalk & Talk	
Jan	II	INTRODUCTION: Introduction- Types of Kernel-Eigen values and eigen function – differentiation under the sign of integration(Leibtnz's rule) – connection with differential equation – solution of an integral equation –conversion of differential equation to Integral equation: Intial value problem – boundary value problem	18	Chalk & Talk	
Feb	III	Solution of Fredholm integral equations :Solution of Fredholm integral equations:Solution of homogeneous Fredholm integral equation of the second kind with separable (degenerate)kernel- Orthogonality and reality of eigen functions –Fredholm integral equation with separable kernel.	18	Chalk & Talk	

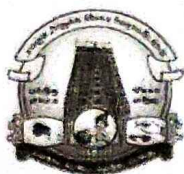
March	IV	Solution of integral equations of second kind: Successive Approximation and Substitution Methods: Introduction - Solution of Fredholm integral equations of second kind by successive Substitution - solution of Volterra integral equation of the second kind by successive substitution - solution of Fredholm integral equation of the second kind by successive approximation	18	Chalk & Talk	R. ph
April	V	Solution of integral equations of second kind: Successive Approximation and Substitution Methods: Volterra's solution of Fredholm integral equation of the second kind - solution of Volterra integral equation of second kind by successive approximation - Newmann series - some particular cases - reduction of Volterra integral equation in to differential equation - reduction of Volterra integral equation of first kind to a Volterra integral equation of second kind	18	Chalk & Talk	R. ph

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I - M.Sc., Mathematics

LESSON PLAN

2022-2023

Sub. Code : 21OPM43

Title of the Paper: Functional Analysis

Total Hours : 90

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	The Definition and Examples of Banach Spaces Continuous Linear Transformation. The Hahn Banach spaces	18	Chalk & Talk	D. B. Singh
Jan	II	The Natural Imbedding of N and N^{**} - The Open Mapping Theorem – The Conjugate of an Operator	18	Chalk & Talk	D. B. Singh
Feb	III	Properties of Orthogonal Sets	18	Chalk & Talk	D. B. Singh
Feb	IV	The Conjugate space H^* - Adjoint of an operator – Self adjoint operator - Normal and Unitary Operators - Projections	18	Chalk & Talk	D. B. Singh
March	V	The Weierstrass Approximation theorem - The Stone Weierstrass theorem – Locally Compact Hausdorff spaces – The Extended Stone Weierstrass theorem	18	Chalk & Talk	D. B. Singh

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I - M.Sc., Mathematics

LESSON PLAN

2022-2023

Sub. Code : 21OPM44

Title of the Paper: Operations Research

Total Hours : 90

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	Network Models: Network Definitions - Minimal Spanning Tree Algorithm – Shortest Route Problem - Examples of the Shortest –Route Applications - Shortest Route Algorithms- Maximal Flow Model - Enumeration of Cuts – Maximal Flow Algorithm-	18	Chalk & Talk	M. Kalyani
Jan	II	Network Models: Minimum - Cost Capacitated Flow Problem - Network Representation -Linear Programming Formulation - Capacitated Network Simplex Algorithm –CPM and PERT- Network Representation – Critical Path(CPM) Computations - Construction of the Time Schedule.	18	Chalk & Talk	M. Karthi
Feb	III	Queuing Systems: Elements of a Queuing Model - Role of Exponential Distribution - Pure Birth and Death Models-Pure Birth Models- Pure Death Model - Generalized Poisson Queuing Model - Specialized Poisson Queues – Steady – State Measures of Performance – Single – Server Models – Multiple –Server Models – Machine Servicing Model (M/M/R) : (GD/K/K), $R < K$.	18	Chalk & Talk	M. Karthi

March	IV	Classical Optimization Theory: Unconstrained Problems- Necessary and Sufficient Conditions-The Network - Raphson Method-Constrained Problems-Equality Constraints - Inequality Constraint	18	Chalk & Talk	H. K. K. K.
April	V	Nonlinear Programming Algorithms: Unconstrained Algorithms - Direct Search Method -Gradient Method- Constrained Algorithms - Separable Programming - Quadratic Programming- Geometric Programming- Stochastic Programming -Linear Combinations Method.	18	Chalk & Talk	M. K. K. K.

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II - M.Sc., Mathematics

LESSON PLAN

2022-2023

Sub. Code : 21OPME4A

Title of the Paper: Discrete Mathematics

Total Hours : 90

Month	Unit	Description Of The Syllabus	Hours Allocated	Teaching Mode & Methods	Course Teacher
Dec	I	The Foundations: LOGIC and PROOFS, Sets and Functions:: Logic-Propositional Equivalences-Predicates and Quantifiers-Nest Quantifiers—Methods of Proof .The Fundamentals Algorithms, the integers and Matrices, Algorithms –The Growth of functions.	18	Chalk & Talk	N. Uma Maheswari
Jan	II	Counting: The Basics of Counting - The Pigeonhole Principle - Permutations and Combinations - Generalized Permutations and Combinations - Generating Permutations and Combinations	18	Chalk & Talk	N. Uma Maheswari
Feb	III	Advanced Counting Techniques –Recurrence Relations –Solving Recurrence Relations –Divide and Conquer Algorithms and Recurrence Relations – Generating Functions – Inclusion –Exclusion – Applications of Inclusion - Exclusion	18	Chalk & Talk	N. Uma Maheswari

March	IV	Boolean Algebras: Lattices and Algebraic Systems- Principle of Duality-Basic Properties of Algebraic Systems Defined by Lattices-Distributive and Complemented Lattices- Boolean Lattices and Boolean Algebras	18	Chalk & Talk	N. Uma Maheswari
April	V	Boolean Algebras(cont) : Uniqueness of finite Boolean Algebras-Boolean Functions and Boolean Expressions – Propositional Calculus-Design and Implementation of Digital Networks-Switching Circuits	18	Chalk & Talk	N. Uma Maheswari

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