

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

2023-2024

DEPARTMENT OF MATHEMATICS

(PG – Odd & Even Semester)



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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 23OPMA11

Title of the Paper: Algebraic Structures

Total Hours: 105

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|--------|------|---|-----------------|-------------------------|--------------------------|
| July | I | Another Counting Principle - Sylow's theorems | 21 | Chalk & Talk | <i>selvi</i> |
| August | II | Solvable groups - Direct products - Finite abelian groups-Modules. | 21 | Chalk & Talk | <i>selvi</i> |
| Sep | III | Linear Transformations: Canonical forms –Triangular form -Nilpotent transformations | 21 | Chalk & Talk | <i>selvi</i> |
| Oct | IV | Canonical forms – A Decomposition of V - Jordan form - Rational canonical form. | 21 | Chalk & Talk | <i>selvi</i> |
| Nov | V | Trace and transpose - Hermitian, unitary, normal transformations - Real quadratic form. | 21 | Chalk & Talk | <i>selvi</i> |

P. S. A.

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E. M. G. Yadava

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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2023-2024


Sub. Code: 23OPMA12

Title of the Paper : Real Analysis-I

Total Hours: 105

| Month | Unit | Description of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|--------|------|--|-----------------|-------------------------|--------------------------|
| July | I | Functions of bounded variation - Introduction - Properties of monotonic functions - Functions of bounded variation - Total variation - Additive property of total variation - Total variation on $[a, x]$ as a function of x - Functions of bounded variation expressed as the difference of two increasing functions - Continuous functions of bounded variation. Infinite Series: Absolute and conditional convergence - Dirichlet's test and Abel's test - Rearrangement of series - Riemann's theorem on conditionally convergent series. | 21 | Chalk & Talk | |
| August | II | The Riemann - Stieltjes Integral - Introduction - Notation - The definition of the Riemann - Stieltjes integral - Linear Properties - Integration by parts- Change of variable in a Riemann - Stieltjes integral - Reduction to a Riemann Integral - Euler's summation formula - Monotonically increasing integrators, Upper and lower integrals - Additive and linearity properties of upper, lower integrals - Riemann's condition - Comparison theorems. | 21 | Chalk & Talk | |

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| Sep | III | The Riemann-Stieltjes Integral - Sufficient conditions for the existence of Riemann-Stieltjes integrals- Necessary conditions for the existence of RS integrals- Mean value theorems -integrals as a function of the interval – Second fundamental theorem of integral calculus-Change of variable -Second Mean Value Theorem for Riemann integral | 21 | Chalk & Talk | T. Thyj |
| Oct | IV | Sequences of Functions – Pointwise convergence of sequences of functions - Examples of sequences of real -valued functions – Definition of Uniform Convergence- Uniform convergence and continuity - Cauchy condition for uniform convergence - Uniform convergence of infinite series of functions - Riemann - Stieltjes integration –Sufficient condition for uniform convergence of a series - Mean convergence. | 21 | Chalk & Talk | T. Thyj |
| Nov | V | Power series -Multiplication of power series-The Substitution Theorem-Reciprocal of a Power series-The Bernstein's Theorem-Abels Limit Theorem-Tauber's Theorem | 21 | Chalk & Talk | T. Thyj |


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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics
LESSON PLAN
2023-2024

Sub. Code: 23OPMA13

Title of the Paper: Ordinary Differential Equations

Total Hours: 90

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|--------|------|---|-----------------|-------------------------|--------------------------|
| July. | I | Linear equations with constant coefficients: Introduction - The Second order homogeneous equation –Initial value problems for second order equations –Linear dependence and independence- A formula for the Wronskian -The Non-homogeneous equation of order two. | 18 | Chalk & Talk | R. K. Math. |
| August | II | Linear equations with constant coefficients: The Homogeneous equation of order n – Initial value problems for n^{th} order equations – Equations with real constants – The non-homogeneous equation of order n – A special method for solving the non- homogeneous equation – Algebra of constant coefficient operators. | 18 | Chalk & Talk | R. K. Math. |
| Sep | III | Linear equation with variable coefficients: Introduction - Initial value problems for the homogeneous equation.- Solutions of the homogeneous equation.– The Wronskian and linear independence–Reduction of the order of a homogeneous equation– The non-homogeneous equation.- Homogeneous equations with an analytic coefficients-The Legendre equation. | 18 | Chalk & Talk | R. K. Math. |

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| Oct | IV | Linear equation with regular singular points: Introduction – The Euler equation–Second order equations with regular singular points– an example – Second order equations with regular singular points – the general case – The Bessel Equation – The Bessel Equation (continued) . | 18 | Chalk & Talk | <i>R. K. K.</i> |
| Nov | V | Existence and uniqueness of solutions to first order equations: Introduction – Equation with variables separated–Exact equations –method of successive approximations– The Lipschitz condition– convergence of the successive approximations. | 18 | Chalk & Talk | <i>R. K. K.</i> |

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DEPARTMENT OF MATHEMATICS

I- M.Sc., Mathematics

LESSON PLAN

2023-2024


Sub. Code: 23OPMADSE1A

Title of the Paper: Number Theory and Cryptography

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|---|-----------------|-------------------------|--------------------------|
| June | I | Introduction –Conjectures - Well Ordering and Induction – Sigma notation and product notation - Binomial Coefficients – Greatest Integer functions – Divisibility – Greatest Common Divisor (GCD) – Euclid Algorithm. | 15 | Chalk & Talk | |
| July | II | Introduction – primes counting function – prime number theorem –canonical factorization – fundamental theorem of arithmetic – Seive of Eratosthenes – Determining factorization | 15 | Chalk & Talk | |
| Aug | III | Congruence – equivalence relations- linear congruences – linear Diophantine equations and Chinese remainder theorem – Polynomial Congruences – modular arithmetic and Fermat's theorem – Wilson's theorem and Fermat number | 15 | Chalk & Talk | |

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| Sep | IV | Arithmetic functions – Sigma function - tau functions – Dirichlet product – quadratic reisdues and Legendre symbols | 15 | Chalk & Talk | R.M |
| Oct | V | Cryptography: Introduction – Character Ciphers – Block Ciphers – One time Pods – Public – Key Cryptography | 15 | Chalk & Talk | P.M |


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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2023-2024


Sub. Code: 23OPMADSE1C

Title of the Paper: Mathematical Programming

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|--------------------------|
| June | I | Network Models: Network Definitions – Minimal Spanning tree Algorithm – Shortest Route Problem – Examples of the Shortest Route Applications – Shortest Route Algorithms – Maximal flow Model – Maximum flow algorithm - CPM – PERT – CPM Computations – Construction of the Time Schedule. | 15 | Chalk & Talk | M. Jan - |
| July | II | Deterministic Inventory Models: General Inventory Model - Role of demand in the development of Inventory models - Static Economic order Quantity EOQ Models – Classic EOQ Model – EOQ Problems with Price Breaks – Multiitem EOQ with storage limitation- Dynamic EOQ models – No- Setup model – Set up model | 15 | Chalk & Talk | M. Jan - |
| Aug | III | Queuing Systems: Elements of Queuing model - Role of Exponential Distribution – Pure Birth and Death Models – Pure Birth models _ Pure | 15 | Chalk & Talk | M. Jan - |

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| | | 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); $R < K$ | | | M. Jey |
| Sep | IV | Classical Optimization Theory: Unconstrained Problems: Necessary and Sufficient Conditions – The Newton-Raphson Method – Constrained Problems: Equality Constraints – Inequality Constraints (Karush-Kuhn-Tucker Conditions) | 15 | Chalk & Talk | M. Jey |
| Oct | V | Nonlinear Programming Algorithms: Unconstrained Algorithms: Direct search method – Gradient method – Constrained Algorithms: Separable Programming – Quadratic Programming | 15 | Chalk & Talk | M. Jey |


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DEPARTMENT OF MATHEMATICS

II - M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 22OPMA31

Title of the Paper: Advanced Statistics II

Total Hours: 90

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|--------|------|---|-----------------|-------------------------|--------------------------|
| July | I | Introduction To Statistical Inference- Point Estimation-Confidence Interval for mean-Confidence intervals for difference of mean | 18 | Chalk & Talk | <i>[Signature]</i> |
| August | II | Introduction To Statistical Inference (cont): Test of Statistical Hypothesis – Additional comments about statistical test-Chi-Square Test | 18 | Chalk & Talk | <i>[Signature]</i> |
| Sep | III | Sufficient Statistics: Measures of quality estimation – A sufficient statistic for a parameter-Properties of a sufficient statistic –Completeness and uniqueness-The exponential class of probability density function –Functions of a parameter | 18 | Chalk & Talk | <i>[Signature]</i> |
| Oct | IV | More About Estimation : Bayesian Estimation-Fisher Information and the Rao-Cramer Inequality –Limiting Distributions of Maximum likelihood Estimations | 18 | Chalk & Talk | <i>[Signature]</i> |
| Nov | V | Theory of Statistical Tests: Certain Best Tests- Uniformly Most powerful Test- Likelihood Ratio Test-The sequential probability Ratio Test | 18 | Chalk & Talk | <i>[Signature]</i> |

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DEPARTMENT OF MATHEMATICS

II- M.Sc., Mathematics

LESSON PLAN

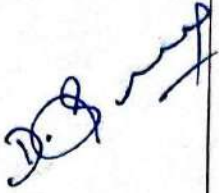
2023-2024

Sub. Code : 22OPMA32

Title of the Paper: Complex Analysis

Total Hours : 90

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|--------|------|---|-----------------|-------------------------|--------------------------|
| June | I | Complex Numbers – The Spherical Representation – Complex functions - Introduction to the Concept of Analytic Function – Limits and Continuity – Analytic Functions – Polynomials – Rational Functions – Elementary Theory of Power Series – Sequences – Series – Uniform Convergence – Power Series – Abel's Limit Theorem. | 18 | Chalk & Talk | |
| July | II | Analytic Functions as Mappings: Elementary Point Set Topology- Sets and Elements – Metric Spaces – Connectedness – Compactness – Continuous Functions – Topological Spaces. Conformality: Arcs and Closed Curves – Analytic Functions in Regions – Conformal Mapping – Length and Area. Linear Transformations: The Linear Group – The Cross Ratio – Symmetry – Oriented Circles – Families of Circles. | 18 | Chalk & Talk | |
| August | III | Complex Integration-Fundamental Theorems: Line Integrals – Rectifiable Arcs – Line Integrals as Functions of Arcs – Cauchy's Theorem for a Rectangle – Cauchy's Theorem in a Disk – Cauchy Integral formula: The Index of a point with respect to a Closed Curve – The Integral Formula – Higher Derivatives. | 18 | Chalk & Talk | |
| Sep | IV | Local Properties of Analytical Functions – Removable Singularities – Taylor's Theorem – Zeros and Poles – The Local Mapping – The Maximum Principle – The General form of Cauchy's Theorem – Chains and Cycles – Simple Connectivity – Homology – The General Statement of Cauchy's Theorem – Proof of Cauchy's Theorem – Locally Exact Differentials. | 18 | Chalk & Talk | |

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| Oct | v | The Calculus of Residues – The Residue Theorem – The Argument Principle – Evaluation of Definite Integrals – Harmonic Functions – Definition and Basic properties – The Mean Value Property – Poisson's Formula – Schwarz's Theorem – The Reflection Principle – Series and product developments – Power Series Expansions-Weierstrass's Theorem – The Taylor Series – The Laurent Series. | 18 | Chalk & Talk |  |
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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 22OPMA33

Title of the Paper: Mechanics

Total Hours: 90

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|--------|------|--|-----------------|-------------------------|--------------------------|
| July | I | Survey of the elementary principles: Mechanics of a particle-Mechanics of a system of particles- Constraints-D'Alembert's principle and Lagrange's equations | 18 | Chalk & Talk | |
| August | II | Survey of the elementary principles (Continuation) Velocity dependent potential and the dissipation function-Simple application of the Lagrangian formulation Variation principles and Lagrange's equations: Hamilton's principle – Some techniques of the calculus of variations. | 18 | Chalk & Talk | |
| Sep | III | Variation principles and Lagrange's equations(cont): Derivation of Lagrange's equations from Hamilton's principle-Extension of Hamilton's principle to nonholonomic system- Advantages of a variational principle formulation-Conservation theorems and symmetry properties. | 18 | Chalk & Talk | |
| Oct | IV | The two-body central force problem: Reduction to the equivalent one-body problem- The equation of motion and first integrals-The equivalent one-dimensional problem and classification of orbits-The virial theorem-The differential equation for the orbit, and integrable power-law potential-Conditions for closed orbits (Bertrand's theorem) | 18 | Chalk & Talk | |
| Nov | V | The two-body central force problem (cont): The Kepler Problem : Inverse square law of force- The motion in time in the Kepler problem- The Laplace -Runge-Lenz vector. | 18 | Chalk & Talk | |

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DEPARTMENT OF MATHEMATICS

II - M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 22OPMA34

Title of the Paper: Topology

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|--------------------------|
| July | I | Topological Spaces: Topological Spaces - Basis for a Topology – The Order Topology – The Product Topology on $X \times Y$ – The Subspace Topology – Closed Sets and Limit Points. | 18 | Chalk & Talk | |
| Aug | II | Continuous Functions: Continuous Functions – The Product Topology – The Metric Topology - The Metric Topology (continued) . | 18 | Chalk & Talk | |
| Sep | III | Connectedness: Connected Spaces – Connected Subspaces of the Real Line. | 18 | Chalk & Talk | |
| Oct | IV | Compactness: Compact Spaces – Compact Subspaces of the Real Line – Limit Point Compactness. | 18 | Chalk & Talk | |
| Nov | V | Countability and Separation Axioms: The Countability Axioms – The Separation Axioms – Normal Spaces -The Urysohn Lemma – The Urysohn Metrization Theorem. | 18 | Chalk & Talk | |

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DEPARTMENT OF MATHEMATICS

II - M.Sc., Mathematics
LESSON PLAN
2023-2024

Sub. Code : 22OPMADSE3A
Title of the Paper: Numerical Analysis
Total Hours : 90

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher |
|--------|------|---|-----------------|-------------------------|----------------|
| July | I | Transcendental and Polynomial Equations: Introduction- Bisection Method - Iteration Methods Based on First degree Equation - Iteration Methods Based on Second Degree Equation –Rate of Convergence(Secant method, Regular false method ,Newton Ropson method only) System of Nonlinear Equations – Methods for Complex Roots. | 18 | Chalk & Talk | |
| August | II | System of Linear Algebraic Equations and Eigen value Problems: Introduction - Direct Methods – Error Analysis for Direct Methods – Iteration Methods – Eigen values and Eigen vectors – Power Method. | 18 | Chalk & Talk | |
| Sep | III | Interpolation and Approximation: Introduction - Lagrange and Newton Interpolations - Finite Difference Operators – Interpolating Polynomials Using Finite Differences – Hermite Interpolation – Piecewise and Spline Interpolation. | 18 | Chalk & Talk | |
| Oct | IV | Differentiation and Integration: Introduction-Numerical Differentiation – Optimum Choice of Step Length – Extrapolation Methods – Numerical Integration–Methods based on Interpolation – Composite Integration Methods – Romberg Integration –Double Integration. | 18 | Chalk & Talk | |
| Nov | V | Ordinary Differential Equations: Initial Value Problems Introduction – Difference Equations – Numerical Methods –Single step method- Runge - Kutta method-Higher order methods only | 18 | Chalk & Talk | |

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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 23OPMA21

Title of the Paper: Advanced Algebra

Total Hours: 90

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|--------------------------|
| Dec | I | Extension fields – Transcendence of e. | 18 | Chalk & Talk | S. Selvi |
| Jan | II | Roots of Polynomials - More about roots | 18 | Chalk & Talk | S. Selvi |
| Feb | III | Elements of Galois theory | 18 | Chalk & Talk | S. Selvi |
| Mar | IV | Finite fields - Wedderburn's theorem on finite division rings. | 18 | Chalk & Talk | S. Selvi |
| Apr | V | Solvability by radicals - A theorem of Frobenius - Integral Quaternions and the Four - Square theorem. | 18 | Chalk & Talk | S. Selvi |

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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

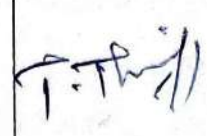
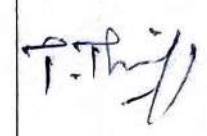
2023-2024


Sub. Code: 23OPMA22


Title of the Paper: Real Analysis-II

Total Hours: 90

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|--------------------------|
| Dec | I | Measure on the Real line - Lebesgue Outer Measure - Measurable sets - Measurable Functions | 18 | Chalk & Talk | T. Thiruj |
| Jan | II | Integration of Functions of a Real variable - Integration of Non-negative functions - The General Integral – Integration of series- Riemann and Lebesgue Integrals | 18 | Chalk & Talk | T. Thiruj |
| Feb | III | Fourier Series and Fourier Integrals - Introduction -Orthogonal system of functions - The theorem on best approximation - The Fourier series of a function relative to an orthonormal system - Properties of Fourier Coefficients - The Riesz-Fischer Theorem - The Riemann - Lebesgue Lemma - The Dirichlet Integrals - An integral representation for the partial sums of Fourier series - Riemann's localization theorem – Cesaro summability of Fourier series- Consequences of Fejer's theorem - The Weierstrass approximation theorem | 18 | Chalk & Talk | T. Thiruj |
| Mar | IV | Multivariable Differential Calculus - Introduction - The Directional derivative - Directional derivative and continuity - The total derivative - The total derivative | 18 | Chalk & Talk | |

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| | | expressed in terms of partial derivatives – An Application of complexed valued functions-The matrix of linear function - The Jacobian matrix - The chain rule - Matrix form of chain rule - The mean - value theorem for differentiable functions - A sufficient condition for differentiability - A sufficient condition for equality of mixed partial derivatives - Taylor's theorem for functions of R^n to R^1 | | |  |
| Apr | V | Implicit Functions and Extremum Problems: Functions with non-zero Jacobian determinants – The inverse function theorem- The Implicit function theorem-Extrema of real valued functions of one variable and severable variables-Extremum problems with side conditions. | 18 | Chalk & Talk |  |


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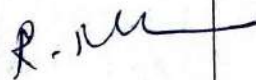


LESSON PLAN

2023-2024

Sub. Code: 23OPMA23

Title of the Paper: Partial Differential Equations

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|---|
| Dec | I | Mathematical Models and Classification of Second-Order Linear Equations: Classical Equations- The Vibrating String – The Vibrating Membrane – Waves in an Elastic Medium – Conduction of Heat in Solids – The Gravitational Potential – Second-Order Equations in Two Independent Variables – Canonical Forms – Equations with Constant Coefficients – General Solutions | 15 | Chalk & Talk |  |
| Jan | II | The Cauchy Problem and Wave Equations: The Cauchy Problem – The Cauchy- Kowalewskaya Theorem – Homogeneous Wave Equations – Initial Boundary- Value Problems- Equations with Non-Homogeneous Boundary Conditions – Vibration of Finite String with Fixed Ends – Non-Homogeneous Wave Equations – The Riemann Method – Solution of the Goursat Problem – Spherical Wave Equation – Cylindrical Wave Equation | 15 | Chalk & Talk |  |
| Feb | III | Method of separation of variables: Separation of Variable- The Vibrating String Problem – Existence and Uniqueness of Solution of the Vibrating String Problem – The Heat Conduction Problem – Existence and Uniqueness of Solution of the Heat Conduction | 15 | Chalk & Talk |  |

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| | | of Solution of the Heat Conduction Problem – The Laplace And Beam Equations | | | |
| March | IV | Boundary Value Problems and Applications: Boundary Value Problems – Maximum and Minimum Principles – Uniqueness and Continuity Theorems– Dirichlet Problem for a Circle, A Circular Annulus, a Rectangle – Dirichlet Problem Involving the Poisson Equation – Neumann Problem for a Rectangle, a Circle. | 15 | Chalk & Talk | <i>P.M.</i> |
| April | V | Green's Functions and Boundary-Value Problems: Introduction - The Dirac Delta function – Properties of Green's function – Method of Green's function – Dirichlet's Problem for the Laplace and Helmholtz operators – Method of images and eigen functions – Higher dimensional problem – Neumann Problem. | 15 | Chalk & Talk | <i>P.M.</i> |

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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 23OPMADSE2A

Title of the Paper: Modelling And Simulation With Excel

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|---|-----------------|-------------------------|--------------------------|
| Dec | I | First look at Excel: The screen and its Elements – Navigating the spreadsheet – Writing the cells – Adaptation of cell size – Selecting Cells. | 15 | Chalk & Talk | A. Marickavally |
| Jan | II | Calculations: Formulas – Formulas with references – Functions – Copying cells: Simple copying – Series – Copying Formulas. | 15 | Chalk & Talk | A. Marickavally |
| Feb | III | Formatting: Text and colours – Number Formats – Date and Time – Formatting Tables – Conditional Formatting – Themes and Styles. | 15 | Chalk & Talk | A. Marickavally |
| March | IV | Working with Tables: Create a Table – Filtering – Auto filter – Advanced Filter – Advanced Filter with Formulas – Sorting – Pivot tables – Preserving Results. | 15 | Chalk & Talk | A. Marickavally |
| April | V | Charts: Bar Charts – Line Charts – Charts with both Columns and Lines – Circle Charts – Scatter Charts – Chart Sheet – Viewing and Printing – Viewing – Adjust Print Range | 15 | Chalk & Talk | A. Marickavally |

P. S. P.

Signature of the HOD

A. Marickavally
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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 23OPMADSE2C

Title of the Paper: Mathematical Statistics

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|--------------------------|
| Dec | I | Distribution of Functions of Random Variables: Sampling Theory – Transformations of Variables of the Discrete Type – Transformations of Variables of the Continuous Type – The t and F Distributions. | 15 | Chalk & Talk | N. Uma Maheswari |
| Jan | II | Order Statistics: Distributions of Order Statistics - The Moment Generating Function Technique. The Distributions of X and ns^2/σ^2 – Expectations of Functions of Random Variables. | 15 | Chalk & Talk | N. Uma Maheswari |
| Feb | III | Estimation Theory: Point Estimation – Measures of Quality of Estimators – Confidence Intervals for Means – Confidence Intervals for Differences of Means - Confidence Intervals for Variances – Bayesian Estimates. | 15 | Chalk & Talk | N. Uma Maheswari |
| March | IV | Statistical Hypothesis: Some Examples and Definitions – Certain Best Tests – Uniformly Most Powerful Tests – Likelihood Ratio Tests. | 15 | Chalk & Talk | N. Uma Maheswari |

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| April | V | Nonparametric Methods: Confidence Intervals for Distribution Quantiles - Tolerance Limits for Distributions - The sign Test - A Test of Wilcoxon - The Equality of Two Distributions - The Mann Whitney - Wilcoxon Test. | 15 | Chalk & Talk | N. Uma Maheswari |
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DEPARTMENT OF MATHEMATICS

I - M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 23OPMASEC2

Title of the Paper: Office Automation and ICT Tools

Total Hours: 30

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|--------------------------|
| Dec | I | Introductory concepts: Memory unit– CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems &its features: DOS–UNIX–Windows. Introduction to Programming Languages | 7 | Chalk & Talk | A. Marickavally |
| Jan | II | Word Processing: Open, Save and close word document; Editing text – tools, formatting, bullets; Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, numbering; printing– Preview, options, merge | 7 | Chalk & Talk | A. Marickavally |
| Feb | III | Spreadsheets: Excel –opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying; Charts – creating, formatting printing, analysis tables, preparation of financial statements, introduction to data analytics. | 6 | Chalk & Talk | A. Marickavally |
| March | IV | Database Concepts: The concept of data base management system; Data field, records, and files, Sorting and indexing data; Searching records. Designing queries, and reports; Linking of data files; Understanding Programming environment in DBMS; Developing menu drive applications in query language(MS–Access). | 5 | Chalk & Talk | A. Marickavally |

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| April | V | Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition– Animation effects, audio inclusion, timers. | 5 | Chalk & Talk | A. Manickavally |
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II- M.Sc., Mathematics

LESSON PLAN

2023-2024

Sub. Code: 22OPMA41

Title of the Paper: Advanced Topology

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|---|-----------------|-------------------------|--------------------------|
| 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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II - M.Sc., Mathematics
LESSON PLAN
2023-2024

Sub. Code: 22OPMA42

Total Hours: 90

Title of the Paper: Research Methodology and Mathematical Methods

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|---|-----------------|-------------------------|--------------------------|
| Dec | I | <p>1. 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.</p> <p>2. Dissertation -Thesis-Expository- Research Paper-Abstract, review-Referee. Components of Dissertation and Thesis- Difference between Dissertation and Thesis.</p> <p>3. Document Preparation –PowerPoint Presentation-Poster Presentation-using the special software like MS-Word-Scientific Word-Latex AMS classification-Impact Factor- Citation Index- Search engines and how to search using Google main and Google.</p> | 18 | Chalk & Talk | |
| Jan | II | INTRODUCTION: Introduction- Types of Kernel-Eigen values and eigen function – differentiation under the sign of integration (Leibtnz's rule) – | 18 | Chalk & Talk | |

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| | | connection with differential equation – solution of an integral equation – conversion of differential equation to Integral equation: Intial value problem – boundary value problem | | | |
| 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 | <i>P. M.</i> |
| Mar | 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 | <i>P. M.</i> |
| Apr | 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 | <i>P. M.</i> |

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II - M.Sc., Mathematics
LESSON PLAN
2023-2024

Sub. Code : 22OPMA43

Title of the Paper: Functional Analysis

Total Hours : 90

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|--------------------------|
| Dec | I | The definition and examples of Banach Spaces- Continuous linear transformation –The Hahn Banach theorem. | 18 | Chalk & Talk | |
| Jan | II | The Natural imbedding of N and N^{**} - The Open Mapping Theorem –The Conjugate of an Operator. | 18 | Chalk & Talk | |
| Feb | III | The definition and some simple Properties - Orthogonal Complements – Orthonormal Sets. | 18 | Chalk & Talk | |
| March | IV | The Conjugate Space H^* - The Adjoint of an Operator- Self Adjoint Operators- Normal and Unitary Operators - Projections. | 18 | Chalk & Talk | |
| April | V | The Weierstrass Approximation Theorem - The Stone Weierstrass Theorems - Locally Compact Hausdorff Spaces – The Extended Stone- Weierstrass Theorems | 18 | Chalk & Talk | |

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II- M.Sc., Mathematics

LESSON PLAN

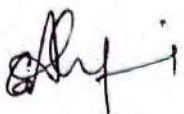
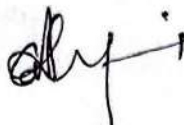
2023-2024

Sub. Code: 22OPMA44

Title of the Paper: Operations Research

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|---|-----------------|-------------------------|--------------------------|
| 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 | |
| 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 | |
| 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 | |

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| March | IV | Classical Optimization Theory: Unconstrained Problems- Necessary and Sufficient Conditions-The Network -Raphson Method- Constrained Problems-Equality Constraints - Inequality Constraint | 18 | Chalk & Talk |  |
| 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 |  |



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LESSON PLAN


2023-2024

Sub. Code: 22OPMADSE4A

Title of the Paper: Discrete Mathematics

Total Hours: 75

| Month | Unit | Description Of The Syllabus | Hours Allocated | Teaching Mode & Methods | Course Teacher Signature |
|-------|------|--|-----------------|-------------------------|--------------------------|
| 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 | |
| Jan | II | Counting: The Basics of Counting – The Pigeonhole Principle - Permutations and Combinations - Generalized Permutations and Combinations - Generating Permutations and Combinations | 18 | Chalk & Talk | |
| 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 | |
| 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 | |

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| April | V | Boolean Algebras(cont) Uniqueness of finite Boolean Algebras-Boolean Functions and Boolean Expressions -Propositional Calculus-Design and Implementation of Digital Networks-Switching | 18 | Chalk & Talk |  |
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