

Lesson Plan

Name of the Faculty : **Dr Ravinder Kumar Sahrawat**
Discipline : M.Sc. Mathematics
Semester : IInd
Subject : Methods of applied Mathematics (MAT-506B)
Lesson Plan duration: 42 Lectures (From January 8, 2018 to April 27, 2018).

OBJECTIVES:

1. To familiarize the students about the basic aspects of applied mathematics like Fourier transform, curvilinear co-ordinates etc.
2. To discuss various modes of mathematical statistics.
3. To make students familiar with various sampling distributions.

OUTCOME:

1. Fourier transform is useful in solving boundary value problem i.e. conduction of heat, wave propagation etc.
2. Curvilinear co-ordinates can be used not only for defining anisotropic material but also all kind of other application, such as electrical currents or visualization.
3. Statistics has a wide application in almost all sciences-social as well physical- such as biology, psychology, education, business management, etc. It becomes indispensable in all phase of human endeavour.

BOOKS RECOMMENDED:

1. I.N Sneddon., The Use of Integral Transforms, McGraw Hill, 1972.
2. Murray and R.Spiegel, Vector Analysis, Schaum's Series.
3. S.C. Gupta and V.K Kapoor, Fundamentals of Mathematics Statistics, S. Chand & Sons, Educational Pub., New Delhi.

LECTUREWISE PROGRAMME:

Lectures	Topics
L-1	Fourier transform: Definition and properties.
L-2	Fourier transform of some elementary function
L-3	Problem regarding Fourier infinite sine and cosine transform

L-4	Problem regarding Fourier finite sine and cosine transform
L-5	Convolution theorem and Parseval's identity
L-6	Problem regarding Convolution theorem and Parseval's identity
L-7	Fourier transform of the derivative of a function
L-8	Solution of Ordinary Differential Equation
L-9	Problems regarding Solution of Ordinary Differential Equation
L-10	-continue-
L-11	Solution of Partial Differential Equation and problems
L-12	-continue-
	Surprise test/Quiz/Presentation of first unit
L-13	Curvilinear Co-ordinates : Definitions
L-14	Gradient, Divergence and Curl, Laplacian, volume element
L-15	Derivation of Gradient, Divergence and Curl in Curvilinear co-ordinate system
L-16	Derivation of Gradient, Divergence and Curl in cylindrical and spherical co-ordinate system
L-17	Some articles regarding cylindrical and spherical system
L-18	-continue-
L-19	Expression of velocity and acceleration in cylindrical and spherical system
L-20	Gradient, Divergence and Curl, Laplacian for orthogonal co-ordinates
L-21	Contravariant and covariant, derivation of contravariant of a vector
L-22	Derivation of covariant of a vector and some more problems
	Surprise test/Quiz/Presentation of second unit
L-23	Simple definitions like sample space, random variable, distribution function etc. and their problems
L-24	Some more definition like conditional probability, joint density function, conditional density function, marginal function etc and their problems
L-25	Mathematical expectation, Moments, central moments, moment generating function for continuous random variable and discrete random variable, Some article regarding Mathematical expectation
L-26	Some more problems regarding above definitions, comulants and relations between them
L-27	Theoretical discrete probability distribution: Bionmial distribution
L-28	-Continue-
L-29	Theoretical discrete probability distribution: Poison distribution
L-30	-Continue-
L-31	Problems regarding both the distribution
L-32	Theoretical continuous probability distribution: Uniform distribution

L-33	-Continue-
L-34	Theoretical continuous probability distribution: Normal distribution
L-35	-Continue-
L-36	Problems regarding both the distribution
	Surprise test/Quiz/Presentation of third unit
L-37	Correlation, Karl Pearson coefficient of correlation, rank correlation and some more definitions
L-38	Regression, lines of regression, regression curves, regression coefficients and Problems regarding definition
L-39	Angle between two lines of regression, correlation coefficients between observed and estimated value
L-40	Weak law of large number, central limit theorem
L-41	Problem regarding above articles
L-42	T and f as sampling distribution
L-43	Chi-square as sampling distribution and problems regarding above articles
	Surprise test/Quiz/Presentation of fourth unit

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty : Dr. V.P.Tomar

Discipline : M.Sc. Mathematics (Two year)

Semester : 2th Semester.

Subject : Ordinary Differential Equation-2nd- MAT508B

Lesson Plan duration : 40 Lectures (From January 8, 2018 to April 27, 2018).

Lectures	Topic (including assignment and test)
L-1	Linear systems
L-2	Fundamental set and fundamental matrix of a homogeneous system
L-3	-----do-----
L-4	Wronskian of a system
L-5	Method of variation of constants for a non-homogeneous system
L-6	-----do-----
L-7	Reduction of the order of a homogeneous system
L-8	Systems with constant coefficients
L-9	Adjoint systems, periodic solutions
L-10	Floquet theory for periodic systems
	CLASS TEST
L-11	Nonlinear differential equations
L-12	Plane autonomous systems and their critical points
L-13	-----do-----
L-14	Classification of critical points-rotation points
L-15	Foci, nodes, saddle points
L-16	Stability, asymptotical stability and unstability of critical points
L-17	-----do-----
L-18	Almost linear systems
L-19	Perturbations, Simple Critical points, dependence on a parameter
L-20	-----do-----
	CLASSS TEST
L-21	Liapunov function
L-22	Liapunov's method to determine stability for nonlinear systems
L-23	-----do-----

L-24	Limit cycles
L-25	-----do-----
L-26	Bendixson non-existence theorem
L-27	-----do-----
L-28	Statement of Poincare-Bendixson theorem
L-29	-----do-----
L-30	-----do-----
L-31	Index of a critical point
L-32	-----do-----
	CLASS TEST
L-33	General Introduction of linear integral equations Fredholm and Volterra integral equation
L-34	-----do-----
L-35	-----do-----
L-36	Initial value problem and Boundary value problem
L-37	-----do-----
L-38	Solution of homogeneous Fredholm integral equations.
L-39	-----do-----
L-40	-----do-----
	CLASS TEST

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty : Mr. Deepak Jain
Discipline : M.Sc. Mathematics (Two year).
Semester : Second Semester.
Subject : Complex Analysis-MAT510B.
Lesson Plan duration : 40 Lectures (From January 8, 2018 to April 27, 2018).

Lectures	Topic (including assignment and test)
L-1	Introduction of Complex Analysis along with revision.
L-2	Discussion about Differentiability and Continuity.
L-3	Analytic Function
L-4	Continue L-3
L-5	Cauchy Riemann equations.
L-6	Necessary and sufficient conditions for a function to be analytic,
L-7	Continued L-6
L-8	Polar form of Cauchy Riemann equations,
L-9	Numerical Based on L-3 and L-6.
L-10	Introduction to Harmonic function and their numerical.
L-11	Construction of analytical function, Milnes method, Based Numericals
L-12	Continue L-11
L-13	Power series, Radius of convergence of power series,
L-14	Numerical Based on L-13
L-15	Cauchy Hadamard theorem with proof.
L-16	Introduction to Complex Integration, Antiderivatives,
L-17	Cauchy-Goursat Theorem with proof.
L-18	Simply and Multiply connected domains, Cauchy's Integral formula,
L-19	Cauchy's Integral formula for higher Order derivatives.
L-20	Numericals Based on L-18 and L-19.
L-21	Morera's theorem, Cauchy's inequality,
L-22	Liouville's theorem, The fundamental theorem of Algebra with proof
L-23	Numericals Based on L-22

L-24	Maximum Modulus Principle, Minimum Modulus Principle with proof.
L-25	Schwarz Lemma, Poisson's integral formula.
L-26	Introduction to Jacobian Transformation, Conformal Transformation
L-27	Continue L-26
L-28	Conformal Transformation and Based Theorem
L-29	Some general transformations, Bilinear transformations and their properties and classification.
L-30	Continue L-29
L-31	ContinueL-29
L-32	Taylor's Series, Laurent's Series,
L-33	Numerical Based on L-32
L-34	Singularities, Meromorphic functions,
L-35	Continue L-34
L-36	Argument principle, Rouche's theorem, Calculus of residues,
L-37	Continue L-36
L-38	Cauchy's residue theorem, Evaluation of Integrals,
L-39	Continue L-38
L-40	Mittag Leffler's expansion theorem.

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty :	Dr Ravinder Kumar Sahrawat
Discipline :	M.Sc. Mathematics
Semester :	IV th
Subject :	Mechanics of Solid-II (MAT-516B)
Lesson Plan duration:	42 Lectures (From January 8, 2018 to April 27, 2018).

OBJECTIVES:

1. To familiarize the students with basic aspects plane stress and related relations
2. To discuss various viscoelastic models such as Kelvin, Maxwell and SLS.
3. Study the various torsion problems and propagation of different waves.
4. In the last, we will discuss minimum principles and various variational methods.

OUTCOME:

1. Many physical problems regarding the deformation of elastic solids are reducible to two-dimensional elastostatic problems. This facilitates an easy solution
2. By the creep and relaxation phenomenon, we can find the behavior of viscoelastic material.
3. In different type of waves, we will show how disturbance travelling through a medium without permanent displacement of the medium itself such that energy is propagating to distinct points.
4. We shall use minimum principles in deriving the equilibrium and compatibility equations of elasticity.

BOOKS RECOMMENDED:

1. I.S. Sokolnikoff, Mathematical Theory of Elasticity, Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 1977.
2. Shanti Narayan, Text Book of Cartesian Tensors, S. Chand & Co., 1950.
3. S. Timoshenko and N. Goodier, Theory of Elasticity, Mc Graw Hill, New York, 1970.
4. A.E.H.Love, A Treatise on the Mathematical Theory of Elasticity, Cambridge University Press, London, 1963

LECTUREWISE PROGRAMME

Lectures	Topics
L-1	Two-dimensional Problems: Plane Strain deformation
L-2	-continue-
L-3	Plain stress deformation
L-4	Generalized plane stress
L-5	-continue-
L-6	Airy stress function for plane strain problem and plane stress problem
L-7	General solution of bi-harmonic equation
L-8	Stress and displacement in terms of complex potential
L-9	The structure of the complex potential, First and second boundary value problem
L-10	Deformation of thick wall tube under external and internal pressure
Surprise test/Quiz/Presentation of first unit	
L-11	Definition of spring, dashpot and viscoelastic material with their property
L-12	Definition of Kelvin, Maxwell and Standard Linear Solid, Constitutive equation of Kelvin and Maxwell Model
L-13	Constitutive equation for SLS model, Definition of creep and relaxation phenomenon
L-14	Creep and relaxation phenomenon of Kelvin model
L-15	Creep and relaxation phenomenon of Maxwell model
L-16	Creep and relaxation phenomenon of SLS model
L-17	Viscoelastic law, viscoelasticity in three dimension, correspondence principle of linear viscoelasticity
L-18	Deformation of a viscoelastic thick wall tube in plane strain using correspondence principle of linear viscoelasticity: Elastic solution
L-19	-continue-Viscoelastic solution: Kelvin model and Maxwell model
L-20	-continue-Viscoelastic solution: SLS model, One more problem regarding viscoelasticity
Surprise test/Quiz/Presentation second unit	
L-21	Torsion, Torsion rigidity, stress function, lines of shearing stress
L-22	Torsion of cylindrical bars -
L-23	-continue-
L-24	Torsion of elliptic cylinder
L-25	-continue-
L-26	Torsion of beam with triangular cross section of prism
L-27	-continue-, example
L-28	Torsion of circular shaft
L-29	-continue-

L-30	Propagation of wave in an elastic solid medium
L-31	Propagation of S and H wave in one and two dimension
L-32	Wave of dilatation and Distortion
L-33	Plane waves
L-34	Propagation of Rayleigh wave
L-35	-continue-
L-36	-Propagation of Love wave-
L-37	-Continue-
	Surprise test/Quiz/Presentation of third unit
L-38	Theorem of minimum potential energy, theorem of minimum complementary energy
L-39	Reciprocal theorem of Betti and Rayleigh, Deflection of elastic string
L-40	Deflection of central line of a beam, one and two dimensional Ritz method with numerical problem
L-41	One and Two dimensional Galerkin method with numerical problem
L-42	One and two dimensional Kantorovich method with numerical problem
	Surprise test/Quiz/Presentation of fourth unit

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan(Functional Anaiysis)

Name of the Faculty : Dr.Sanjay Kumar
 Discipline : M.Sc. Mathematics (2 years).
 Semester : Second Semester.
 Subject : Functional Analysis (MAT 602B).
 No. of Lesson Plans : 40 Lectures (From January 8, 2018 to April 27, 2018).

Lectures	Topic (including assignment and test)
L-1	Discuss meaning of functional analysis and its utility. What do you mean by abstract spaces? Discuss various abstract spaces. Discuss books related to functional analysis. Give brief of online lecture available at NPTEL.
L-2	How we extend distance function as length of a vector. Relation between metric and normed linear spaces.
L-3	Discuss some useful result to prove Holder's and Minkowski's inequality for n tuples .
L-4	Prove Holder's and Minkowski's inequality for sequence of functions and their significance .
L-5	Discuss convergent, Cauchy sequence and completeness of R. Discuss Proofs of Completeness of $\mathbb{R}^n / \mathbb{C}^n$.
L-6	Discuss completeness of l_p, L^p .
L-7	Continued discussion on completeness of L^p , and $C[a,b]$.
L-8	Discuss quotient spaces ant its utility and Completeness of quotient spaces .
L-9	Discuss characterization of continuous linear transformation, Spaces of bounded linear transformation, Continuous linear functional , conjugate spaces.
L-10	Discuss characterization of bounded linear transformation, Discuss Continuous linear functional and conjugate spaces.
L-11	Some Discussion on useful results and continue detail study of four

	main pillars theorems in functional analysis :Banach theorem(Real and Complex form) , Hahn Banach theorem(extension of linear functional), Hahn Banach theorem (Generalized),Riesz representation theorem for bounded linear functional on L^p and $C [a,b]$, open mapping theorem, closed graph theorem and uniform bounded principle .
L-12	Continued discussion on main theorem of functional analysis
L-13	Continued discussion on main theorem of functional analysis
L-14	Continued discussion on main theorem of functional analysis
L-15	Continued discussion on main theorem of functional analysis.
L-16	Continued discussion on main theorem of functional analysis.
L-17	Discuss applications of main theorem of functional analysis.
L-18	Continued discussion on applications of main theorem of functional analysis.
L-19	Recall conjugate spaces and discuss second conjugate spaces.
L-20	Continued discussion on second conjugate spaces, Reflexive spaces.
	Class test
L-21	Recall dense set, nowhere dense set and discuss Baire's Category theorem .
L-22	Discuss equivalent norm and their utility .
L-23	Recall continuity of a operator, closure of a set, compact set and Compact operators.
L-24	Continued discussion on compact operator and its relation with continuous operators
L-25	Discuss properties of compact operators, compactness of the limit of the sequence of compact operators.
L-26	State Lipschitz condition and derived various contractive conditions from Lipschitz condition and let them know relation among contractive conditions. Give some definitions related to fixed points.
L-27	Continued discussion on fixed points and state famous fixed point theorem known as Banach fixed point theorem and give its proof.

L-28	Continued discussion on Application of Banach fixed point theorem to (i) linear equations (ii) differential equations(iii) integral equations .
L-29	Continued discussion on Application of Banach fixed point theorem to (i) linear equations (ii) differential equations(iii) integral equations.
L-30	Continued discussion on Application of Banach fixed point theorem to (i) linear equations (ii) differential equations(iii) integral equations.
	CLASS TEST
L-31	Discuss Picard's theorem and Picard's Lindeloff theorem .
L-32	Continued discussion on Picard's theorem and Picard's Lindeloff theorem
L-33	Correlate norm linear spaces to Inner product spaces, Discuss completeness of Inner product spaces (Hilbert spaces) . State and prove Schwarz's inequality, Hilbert space as normed linear space.
L-34	Recall convex sets and correlate with Hilbert spaces. State and prove Projection theorem.
L-35	Continue discussion on projection theorem .
L-36	Define orthogonal and orthonormal sets and discuss Gram Schmidt orthogonalization process.
L-37	Discuss various inequalities such as Bessell's inequality, Parseval's identity.
L-38	Continued discussion on Discuss various inequalities such as Bessell's inequality, Parseval's identity.
L-39	Recall conjugate space and discuss Conjugate of a Hilbert space.
L-40	State and prove Riesz representation theorem for continuous linear functional on Hilbert spaces.
	CLASS TEST

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty : Sweety Tushir
Discipline : M.Sc. Mathematics.
Semester : 4th Semester.
Subject : MAT-604B: DATA STRUCTURES
Lesson Plan duration : 40 Lectures (From January 8, 2018 to April 27, 2018).

Lectures	Topic (including assignment and test)
L-1	Introduction, Elementary data organization, data structure, data structure
L-2	Operations Arrays: introduction
L-3	Linear arrays
L-4	Representation of linear arrays in memory
L-5	Traversing linear arrays
L-6	Inserting and deleting
L-7	Sorting (bubble sort), searching (linear search)
L-8	-----DO-----
L-9	Time-space tradeoff
L-10	Complexity of algorithms
L-11	Linked lists: Definition
L-12	Representation of linked lists in memory
L-13	Traversing and searching a linked list
L-14	Memory allocation garbage collection
L-15	Insertion into & deletion from a linked list
L-16	Stacks: definition
L-17	Array and linked representation of stacks
L-18	Polish notation
L-19	Quick sort as an application of stacks
L-20	-----TEST-----
L-21	Trees: Definition
L-22	Binary trees
L-23	Complete binary trees
L-24	Representing binary trees in memory(linked & Sequential representation of binary tress)
L-25	Traversing binary trees
L-26	Traversal algorithms using stack
L-27	Preorder, inorder, postorder
L-28	Binary search trees
L-29	Searching and inserting in binary search Trees
L-30	Heap, heap sort

L-31	Graphs: Graph theory terminology
L-32	Sequential representation of graphs (adjacency matrix, path matrix)
L-33	Warshall's algorithm (shortest paths)
L-34	Linked representation of a graph
L-35	Operation on graphs (searching, insertion, deletion.
L-36	-----DO-----
L-37	Traversing a graph), traversing a graph
L-38	Breadth first search
L-39	Depth first search
L-40	RIVISION

Lesson Plan

Name of the Faculty : Prof. R. C. Nautiyal.

Discipline : B.Tech. Chemical Engg.
 Semester : Second Semester.
 Subject : Mathematics-II.
 Lesson Plan duration : 40 Lectures (From January 2018 to April 2018).

Lectures	Topic (including assignment and test)
L-1	Introduction of Ordinary Differential Equations along with revision.
L-2	Exact Differential Equation.
L-3	EDE continued.
L-4	-----do-----
L-5	Applications of First order Differential Equations.
L-6	Applications continued
L-7	Linear Differential Equations of second and Higher order
L-8	-----Continued-----
L-9	Cauchy's and Legendre's Equations.
L-10	Simultaneous Linear Differential Equations
	CLASS TEST
L-11	Introduction of Transforms and Laplace Transforms.
L-12	Properties of Laplace Transforms.
L-13	-----continued-----
L-14	Laplace Transforms of Derivatives and Integrals.
L-15	-----Continued-----.
L-16	Laplace Transforms of functions multiplied by t^n
L-17	Laplace Transforms of functions divided by t^n
L-18	Laplace Transforms of Unit step and impulse Functions
L-19	Convolution Theorem.
L-20	Application of Laplace Transforms to Linear differential Equations with constant Coefficients.
	CLASS TEST
L-21	Functions of Complex Variable Definitions and introduction
L-22	Exponential, trigonometric, Logarithmic and Hyperbolic functions
L-23	-----Continued-----
L-24	Limits and Continuity of functions
L-25	Differentiability and Analyticity of functions along with C.R. Conditions
L-26	----- Continued-----

L-27	Harmonic functions and their applications to flow problems.
L-28	Integration of Functions of complex variables.
L-29	Cauchy Integral Theorem and Formula.
L-30	Power Series of Macclaurin's and Laurentz's, Residues.
	CLASS TEST
L-31	Euler's Formulae and Conditions for Fourier Expansion
L-32	Change of Interval and applications
L-33	Fourier Expansion of Even and Odd functions
L-34	-----Continued-----
L-35	Fourier expansion of Square Wave and Rectangular wave Functions.
L-36	Introduction of Fourier Integrals.
L-37	Fourier Transforms
L-38	Properties of Fourier Transforms
L-39	Fourier Transforms of Derivatives and Integrals.
L-40	Convolution Theorem and Derac Delta Function.
	CLASS TEST

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty : Suman Panwar

Discipline : M.Sc. Mathematics (2 year)

Semester : Fourth Semester

Subject : Differential Geometry-MAT606B

Lesson Plan duration : 40 Lectures (From January 8, 2018 to April 27, 2018).

Lectures	Topic (including assignment and test)
L-1	Vectors and their properties.
L-2	Space curves and Class of curve.
L-3	Tangent and equation of tangent line.
L-4	Osculating plane
L-5	Rectifying plane
L-6	Curvature.
L-7	Principal normal and Binormal.
L-8	Torsion.
L-9	Serret -Frenet formula.
L-10	Locus of Center of Spherical Curvature.
	CLASS TEST
L-11	Surface and classes of a surface
L-12	Transformation of parameter and curvilinear equation of curve on the surface
L-13	Parametric curve
L-14	Tangent plane and normal.
L-15	Family of surfaces and Characteristics
L-16	Family of surfaces and Characteristics continued
L-17	Edge of Regression
L-18	Properties of edge of regression
L-19	Envelope
L-20	Property of Envelope
	CLASS TEST
L-21	Curvilinear Co-ordinates
L-22	First order magnitudes
L-23	First order magnitudes continued
L-24	-----do-----
L-25	Direction on a surface
L-26	Direction on a surface continued
L-27	Second order magnitudes
L-28	Second order magnitudes continued
L-29	Derivative of unit normal.

L-30	Principal direction and curvature
	CLASS TEST
L-31	Geodesics and its canonical equation
L-32	Normal property of geodesics
L-33	Normal property of geodesics continued
L-34	Torsion of geodesics
L-35	Geodesics tangent
L-36	Geodesics curvature and its formula
L-37	Geodesics curvature and its formula continued
L-38	-----do-----
L-39	Examples based on geodesics
L-40	Examples based on geodesics continued
	CLASS TEST

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty : Prof. Sudhir Batra.

Discipline : M.Sc. (Mathematics)(2 years course).

Semester : Fourth Semester.

Subject : Analytical Number Theory – II (MAT 610B)

Lesson Plan duration : 50 Lectures (From January 8, 2018 to April 27, 2018).

	Topic	No. of lectures required
UNIT-1		
L-1	Introduction and overview of the subject	01
L-2	Definition and basic results related to Riemann Zeta Function	01
L-3	Continued...	01
L-4	Definition of Euler Product and relation with Riemann Zeta Function	01
L-5	Continued...	01
L-6	Concept of Probability for choosing two integers coprime to each other	01
L-7	Continued...	01
L-8	Evaluation of Zeta function at $2k$	01
L-9	Continued...	01
L-10	Meaning of Dirichlet Product and Dirichlet Series and examples	01
L-11	Dirichlet Series and Euler products	01
L-12	Continued ...	01
UNIT II		
	Topic	No. of lectures required
L-14	Meaning of Algebraic Numbers and Integers	1
L-15,16	Gaussian Integers and simple properties	2
L-17,18,19	General Quadratic fields and their units and related results	2
L-20,21	Units in $\mathbb{Q}(w)$ and related results	2
L-22,23	Fundamental Theorem in $\mathbb{Q}(w)$ and proofs of some intermediate results	2
L-24	Primitive Polynomials	1
UNIT III		
	Topic	No. of lectures required
L-25,26	Units of $\mathbb{Q}\sqrt{2}$ and some auxillary results	2
27,28,29	Euclidean Fields Real as well as complex	3

30,31	Fields in which Fundamental theorem of arithmetic is false or true	2
32,33	Primes in $\mathbb{Q}\sqrt{2}$ and $\mathbb{Q}\sqrt{5}$	2
34,35,36	Fermat Theorem in $\mathbb{Q}\sqrt{2}$ and $\mathbb{Q}\sqrt{5}$	2
37,38	Series of Fibonacci and Lucas	1
39,40	Lucas Test for primality of Mersenne numbers	2
UNIT IV		
	Topic	No. of lectures required
L-41	Definition of Arithmetic function and examples of divisors functions Euler's phi function etc.	1
42,43	Simple properties of these functions, multiplicative functions etc.	2
44,45	Perfect Numbers and Mobius Inversion formula and applications	2
46,47	Dirichlet product of functions and group of multiplicative functions	2
48,49,50	Average order of various functions	2
51-55	Prime Number Theorem and auxiliary results	5

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty : Prof. Sudhir Batra.
Discipline : M.Sc. (Mathematics)(2 years course).
Semester : Fourth Semester.
Subject : Algebraic Coding Theory – II(MAT 614B)
Lesson Plan duration : 50 Lectures (From January 8, 2018 to April 27, 2018).

TEACHING PLAN

S. No.	Topic	No. of lectures required
UNIT-1		
L-1	Introduction and overview of the subject	01
L-2	Definition and basic results of cyclic codes	01
L-3	Continued...	01
L-4	Some examples of cyclic codes and cyclic codes as polynomial codes	01
L-5	Continued...	01
L-6	Factorization of polynomials over finite fields and the number of cyclic codes of length n	01
L-7	Continued...	01
L-8	Parity check polynomial and parity check matrix of cyclic codes	01
L-9	Reverse polynomials and dual of a cyclic code	01
L-10	Hamming codes as cyclic codes	01
11	Union, Intersection and product of two cyclic codes	01
12	Some results related to orthogonal cyclic codes	01
13	Golay Codes as cyclic codes	01
14	Error Detection/correction procedure for cyclic codes	01
UNIT II		

	Topic	No. of lectures required
L-15	Definition of QR codes and why it is so called ?	1
16	Distance Properties of QR codes	1
17,18	QR codes and their duals	2
19	Examples, Golay codes as QR codes	1
20,21	Extended QR codes, Binary case	2
22,23,24	Hadamard Matrices and non-linear codes	3
25,26	Product and Concatenated codes	2
UNIT III		
	Topic	No. of lectures required
L-27	Definition of BCH codes	1
28,29	Construction of finite fields with examples	2
30,31	Cyclotomic codes and factorization of polynomials over finite fields	2
32,33	Construction of BCH codes	2
34,35	Simple properties of BCH Codes	2
36	RS Codes	1
37	Majority- Logic decoding	
38	Griesmer bound	1
UNIT IV		
	Topic	No. of lectures required
L-39	Definition of MDS codes with examples	1
40,41,42	Generator and Parity check matrices of MDS Codes	3
43	Weight Distribution of MDS cods	1
44,45,46	Necessary and sufficient conditions for a linear code to be MDS codes	3
47	RS codes as MDS codes	1
48,49,50	Abramson codes, Fire codes	3

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty : Dr. Avinash Chandra Upadhyaya & Ms Manju

Discipline : M.Sc. Mathematics (2 Years).

Semester : Fourth Semester.

Subject : Operations Research-MAT618B

Lesson Plan duration : 40 Lectures (From January 8, 2018 to April 27, 2018).

Lectures	Topic (including assignment and test)
L-1	Introduction of Linear Programming Problems
L-2	Problem Formulation of L.P.P.
L-3	Solution of L.P.P. by Graphical Method
L-4	-----do-----
L-5	Simplex Method for solving L.P.P.
L-6	Numerical on Simplex Method
L-7	-----do-----
L-8	Special cases of simplex method
L-9	Penalty Method to solve L.P.P.
L-10	----do-----
	CLASS TEST
L-11	Dual Simplex Method
L-12	Sensitivity Analysis
L-13	-----do-----
L-14	Concept of Transportation Problem
L-15	Mathematical formulation of problem
L-16	Various methods to find initial basic feasible solution of transportation problem
L-17	Testing of optimality of transportation problem by MODI Method
L-18	Numerical problems Practice
L-19	Special cases of transportation problems
L-20	----do-----
	CLASS TEST
L-21	-----do-----
L-22	Introduction of Assignment Problem & its concept
L-23	Mathematical formulation of Assignment Problem
L-24	Hungarian Method Algorithm
L-25	Numerical Problems
L-26	-----do-----
L-27	Traveling salesman Problem

L-28	-----do-----
L-29	Introduction to Inventory Problem
L-30	Reason for carrying inventory
	CLASS TEST
L-31	Deterministic Models
L-32	-----do-----
L-33	-----do-----
L-34	Classical EOQ Model with shortage
L-35	Concept of Queuing Theory, Queuing process
L-36	Queuing Models (M/M/I:N/FCFS, Etc.)
L-37	Inter Programming Gomory's method
L-38	Branch & Bound Technique to solve I.P.P.
L-39	Nonlinear Programming problem formulation
L-40	Kuhn- Tucker necessary & sufficient conditions for optimality of objective function in a GNLP
	CLASS TEST

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018

Lesson Plan

Name of the Faculty : Dr. Krishan Kumar

Discipline : M.Sc. Mathematics (Two Year).

Semester : Second Semester.

Subject : Numerical Analysis.

Lesson Plan duration : 48 Lectures (From January 2018 to April 2018).

Lectures	Topic (including assignment and test)
L-1	Introduction to numerical analysis
L-2	Numerical errors: round off error, truncation error,
L-3	-----Do-----
L-4	Absolute error, relative error and error propagation
L-5	-----Do-----
L-6	Bisection method
L-7	Regula falsi method
L-8	Fixed point iteration method
L-9	Newton Raphson method
L-10	Convergence analysis
L-11	Bairstow method
L-12	-----Do-----.
L-13	Newton's method for non linear equations.
	Class test
L-14	Difference operators and factorial notation.
L-15	Relation between difference operators
L-16	-----Do-----
L-17	Newton's forward difference formula
L-18	Newton's backward difference formula
L-19	Central difference formulae
L-20	-----Do-----
L-21	Interpolation formula for unequal intervals
L-22	Hermite's interpolation formula
L-23	Cubic spline interpolation
L-24	-----Do-----
	Class test
L-25	Numerical differentiation using forward difference formula
L-26	Numerical differentiation using backward difference formula
L-27	Numerical differentiation using central

	difference formula.
L-28	Numerical integration: newton's cotes formula.
L-29	Trapezoidal method
L-30	Simpson's method
L-31	Romberg integration
L-32	Gaussian quadrature
L-33	-----Do-----
L-34	Richardson extrapolation
L-35	-----Do-----
	Class test
L-36	Introduction to ivp and bvp
L-37	Taylor's series method
L-38	-----Do-----
L-39	Euler's method
L-40	Modified euler's method
L-41	R-k method
L-42	Multistep methods
L-43	Predictor- corrector method
L-44	Accuracy and stability
L-45	Solution for stiff equations
L-46	Shooting method
L-47	Finite difference method
L-48	Finite element method
	Class Test

Minor Tests

1. Minor Test-I Feb. 14-16, 2018
2. Minor Test-II April 4-6, 2018