GOVERNMENT COLLEGE ISRANA (PANIPAT)
LESSON PLAN
(1 October 2021 to 26 January 2022)

Name of the Assistant Professor: Prateek Mor

Class: B.A & B.Sc 3rd Semester - 5th

Subject: MATHEMATICS

Paper: Real Analysis

OCTOBER

Week 1

Riemann integral

Week 2

Integrability of continuous and monotonic functions.

Week 3

The Fundamental theorem of integral calculus.

Week 4

Mean value theorems of integral calculus

Week 5

Problems discussion and revision of unit 1. Assignment 1 and Test 1

NOVEMBER

Week 1

Improper integrals and their convergence.

Week 2

Comparison tests, Abel's and Dirichlet's tests.

Week 3

Frullani's integral, Integral as a function of a parameter.

Week 4

Continuity, Differentiability and integrability of an integral of a function of a parameter.

Week 5

Problems discussion and revision of unit 2, Assignment 2 and Test 2.

DECEMBER

Week 1

Definition and examples of metric spaces, neighborhoods, limit points, interior points, open and closed sets.

Week 2

Definition and examples of closure and interior, boundary points, subspace of a metric space, equivalent metrics, Cauchy sequences, completeness.

Week 3

Cantor's intersection theorem, Baire's category theorem, contraction Principle and Continuous functions, uniform continuity, compactness for metric spaces.

Week 4

Sequential compactness, Bolzano-Weierstrass property, total boundedness, finite intersection property.

Week 5

Continuity in relation with compactness, connectedness, components, continuity in relation with connectedness.

JANUARY

Week 1

Problems discussion and revision of unit 3, Assignment 3 and Test 3.

Week 2

Problems discussion and revision of unit 4, Assignment4 and Test 4.

Week 3

Problems discussion and revision of units 1 & 2 and Test 5, Problems discussion and revision of units 3 & 4, and Test 6.

Week 4

Problems discussion and revision of units 1, 2, 3 & 4, and Full Test 7.

Books Recommended:

1. P.K. Jain and Khalil Ahmad: Metric Spaces, 2nd Ed., Narosa, 2004

2. T.M. Apostol: Mathematical Analysis, Narosa Publishing House, New Delhi, 1985

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3. R.R. Goldberg : Real analysis, Oxford & IBH publishing Co., New Delhi, 1970

4. D. Somasundaram and B. Choudhary : A First Course in Mathematical Analysis, Narosa

Publishing House, New Delhi, 1997

5. Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi

6. E.T. Copson. Metric Spaces, Cambridge University Press, 1968.

7. G.F. Simmons : Introduction to Topology and Modern Analysis, McGraw Hill, 1963.

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(1 October 2021 to 26 January 2022)

Name of the Assistant Professor: Prateek Mor

Class: B.A & B.Sc 1st Semester – 1st

Subject: MATHEMATICS

Paper: Algebra

OCTOBER
Week 1
Symmetric, Skew symmetric, Hermitian and skew Hermitian matrices. Elementary Operationson matrices.
Week 2
Rank of a matrices. Inverse of a matrix. Linear dependence and independence ofrows and columns of matrices. Row rank and column rank of a matrix.
Week 3
Eigen values, eigenvectors and the characteristic equation of a matrix.
Week 4
Minimal polynomial of a matrix. Cayley Hamilton theorem and its use in finding the inverse of a matrix.
Week 5
Problems discussion and revision of unit 1, Assignment 1 and Test 1.
NOVEMBER
Week 1
Applications of matrices to a system of linear homogeneous equations.
Week 2
Applications of matrices to a system of linear non-homogeneous equations.
Week 3
Theorems on consistency of a system of linear equations.

Week 4

Unitary Matrices and Orthogonal Matrices, Bilinear and Quadratic forms.

Week 5

Problems discussion and revision of unit 2, Assignment 2 and Test 2.

DECEMBER

Week 1

Relations between the roots and coefficients of general polynomial equation in one variable.

Week 2

Solutions of polynomial equations having conditions on roots.

Week 3

Common roots and multipleroots. Transformation of equations.

Week 4

Nature of the roots of an equation Descarte's rule of signs. Solutions of cubic equations by Cardon's method.

Week 5

Solutions of cubic equations by Biquadratic equations and their solutions.

JANUARY

Week 1

Problems discussion and revision of unit 3, Assignment 3 and Test 3.

Week 2

Problems discussion and revision of unit 4, Assignment 4 and Test 4.
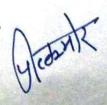
Week 3

Problems discussion and revision of units 1 & 2 and Test 5, Problems discussion and revision of units 3 & 4, and Test 6.

Week 4

Problems discussion and revision of units 1, 2, 3 & 4, and Full Test 7.

Books Recommended:

1. H.S. Hall and S.R. Knight : Higher Algebra, H.M. Publications 1994.

2. Shanti Narayan : A Text Books of Matrices.

3. Chandrika Prasad : Text Book on Algebra and Theory of Equations.

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Name of the Assistant Professor: Prateek Mor
Class: B.A & B.Sc 3rd Semester - 5th
Subject: MATHEMATICS
Paper: Numerical Analysis

OCTOBER
Week 1
Finite Differences operators and their relations. Finding the missing terms and effect of error in a difference tabular values. Interpolation with equal intervals.
Week 2
Newton's forward and Newton's backward interpolation formulae.
Week 3
Interpolation with unequal intervals. Newton's divided difference.
Week 4
Interpolation with unequal intervals. Lagrange's Interpolation formulae, Hermite Formula.
Week 5
Problems discussion and revision of unit 1, Assignment 1 and Test 1.
NOVEMBER
Week 1
Central Differences: Gauss forward and Gauss's backward interpolation formulae.
Week 2
Central Differences: Sterling and Bessel Formula.
Week 3
Probability distribution of random variables, Binomial distribution.
Week 4
Poisson's distribution and Normal distribution: Mean, Variance and Fitting.

Week 5

Problems discussion and revision of unit 2, Assignment 2 and Test 2.

DECEMBER

Week 1

Numerical Differentiation: Derivative of a function using interpolation formulae as studied inSections –I & II.

Week 2

Eigen Value Problems: Power method, Jacobi's method, Given's method, House-Holder's method. QR method, Lanczos method.

Week 3

Numerical Integration: Newton-Cote's Quadrature formula, Trapezoidal rule, Simpson's one-third and three-eighth rule, Chebychev formula, Gauss Quadrature formula.

Week 4

Numerical solution of ordinary differential equations: Single step methods-Picard'smethod. Taylor's series method. Euler's method.

Week 5

Runge-Kutta Methods. Multiple stepmethods; Predictor-corrector method, Modified Euler's method. Milne-Simpson'smethod.

JANUARY

Week 1

Problems discussion and revision of unit 3, Assignment 3 and Test 3.

Week 2

Problems discussion and revision of unit 4, Assignment 4 and Test 4.

Week 3

Problems discussion and revision of units 1 & 2 and Test 5, Problems discussion and revision of units 3 & 4, and Test 6.

Week 4

Problems discussion and revision of units 1, 2, 3 & 4, and Full Test 7.

Books Recommended:

1. Babu Ram: Numerical Methods, Pearson Publication.

2. R.S. Gupta, Elements of Numerical Analysis, Macmillan's India 2010.

3. M.K. Jain, S.R.K.Iyengar, R.K. Jain : Numerical Method, Problems and Solutions, New Age International (P) Ltd., 1996

4. M.K. Jain, S.R.K. Iyengar, R.K. Jain : Numerical Method for Scientific and Engineerin Computation, New Age International (P) Ltd., 1999

5. C.E. Froberg : Introduction to Numerical Analysis (2nd Edition).

6. Melvin J. Maaron : Numerical Analysis-A Practical Approach, Macmillan Publishing Co., Inc., New York.

7. R.Y. Rubinstein : Simulation and the Monte Carlo Methods, John Wiley, 1981

8. Radhey S. Gupta : Elements of Numerical Analysis, Macmillan Publishing Co.