Teaching Plan

Name of the Faculty : Ms. Rajat Arora

Name of the Course : B.Sc.(H) Mathematics

Semester : VI Sec (if any) :

Title of the Paper : Calculus of Variations and Linear Programming

Month	Topics Covered	References
January	Introduction to LPP, Graphical method of solution, Basic Feasible solutions, Convexity. Theory of Simplex method .	Paul R. Thie and Gerald E. Keough: An introduction to LP and Game Theory, 3rd Edition, John Wiley and Sons, 2008.
February	The simplex tableau ,Artificial variables, Introduction to Duality, Formulation of the Dual problem, Primal-Dual relationship, The Duality Theorem and Complementary Slackness Theorem. **Test 1 and Assignment 1.**	G. Hadley :Linear Programming, Narosa Publishing House 2002. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali : Linear Programming, 4th Edition, John Wiley and Sons, 2010.
March	Transportation Problem and its mathematical formulation, Various methods to solve TPP. Assignment Problem and its mathematical formulation, Hungarian method to solve Assignment Problem. Calculus of Variations: Functionals, some simple variational problems, variation of a function, necessary condition for extremum. **Test 2**	Hamdy.A.Taha: Operations Research:An Introduction, 9th Edition, Prentice Hall, 2011. Lakshmishree Bandopadhyaya: Linear Programming and Theory of Games. F.S. Hillier and G.J. Lieberman: Introduction to Operational Research, 9th Edition, Tata Mc. Graw Hill, Singapore 2009
April	Simplest Variational Problem, Euler's equation and simple variable end-point problem. Revision and doubt-clearance sessions.	I.M.Gelfand and S.V.Fomin: Calculus of Variations, Dover Publications Inc. ,New York 2000. R. Weinstock: Calculus of Variations, Dover Publications Inc. ,New York ,1974.

Note : The tentative date of Assignment/test/Project may also be provided.

The schedule of Practicals may also be provided

Teaching Plan

Name of the Faculty : Ms. Rajat Arora, Dr. Ram Keval, Ms. Vandana Verma

Name of the Course : B.Sc (H) Mathematics

Semester : VI Sec (if any) : N.A.

Title of the Paper : Calculus of variations and Linear Programming

Month	Topics Covered	References
January February March	**Practical with Excel Solver** (1)Formulating and solving linear programming models on a spreadsheet using excel solver. (2)Finding solution by solving its dual using excel solver and giving an interpretation of the dual. (3)Using the excel solver table to find allowable range for each objective function coefficient and the allowable range for each right hand side. (4)Formulating and solving transportation and assignment models on a spreadsheet using solver. (5)Metric Space: Calculate d(x, y) for the following metrics (i) $X = R, d(x,y) = \|x-y\|$, $x: 0, 1, \pi, e$, $y: 1, 2, \frac{1}{2}, \sqrt{2}$ (ii) $X = R^3$, $d(x,y) = (\sum(x_i - y_i)^2)^{\frac{1}{2}}$, $x: (0,1,-1), (1,2,\pi), (2,-3,5)$, $y: (1,2,5), (e,2,4), (-2,-3,5)$ (iii)$X = C[0,1], d(f,g) = \sup\|f(x) - g(x)\|$ $f(x): x^2, Sin\ x, Cos\ x$ $g(x): x, \|x\|, Cos\ x$ Draw open balls of the above metrics with centre and radius of your choice. Find the fixed points for the following functions $f(x) = x^2, g(x) = \sin x, h(x) = Cos\ x,$ $in\ X = [-1,1]$, $f(x,y) = (Sin\ x, Cos\ x), g(x,y) = (x^2, y^2)\ in$	(1) **Hamdy A. Taha,** Operations Research: An Introduction, 9th edition, Prentice Hall, 2011. (2) **Paul R. Thie and Gerard E. Keough,** An introduction to Linear Programming and game theory, Third Edition, John Wiley & Sons, Inc., Hoboken, New Jersey, 2008. (3) **Fredrick S. Hiller and Gerald J. Lieberman,** Introduction to Operations Research, Ninth Edition, McGraw –Hill, Inc, New York, 2010. (4) **Mokhtar S. Bazaraa, John J. Jarvis and Hanif D, Sherali,** Linear Programming and Network Flows, 4th Edition, John Wiley & Sons**,** Inc., Hoboken, New York, 2010.

April	$X = \{(x, y): x^2 + y^2 \leq 1\}$, Under the Euclidean space on R and R^2 respectively. Revision and Moc test	

Note : The tentative date of Assignment/test/Project may also be provided.

The schedule of Practicals may also be provided

Teaching Plan

Name of the Faculty : Vandana Verma

Name of the Course : BSc (H) Mathematics

Semester : VI Sec (if any) : N.A.

Title of the Paper : Algebra V (Rings And Linear algebra II)

Month	Topics Covered	References
January	Dual spaces ,dual basis ,double dual ,transpose of a linear transformation and its matrix in the dual basis, Eigen spaces of a linear operator ,diagonalizability cayley Hamilton Theorem ,The minimal polynomial for a linear operator	Joseph A Gallian Contemporary Abstract Algebra (4^{th} Ed.) Narosa Publishing House 1999
February	Inner product spaces and norms,Gram Schmidt Orthogonal complements ,Least Square approximation ,minimal solutions to systems of linear equation ,Normal and Self adjoint operators ,Orthogonal projections and	Stphen H . Friedberg Arnold J. Insel Lawrence E Spence , Linear Algebra (4^{th} Ed) Prentice Hall of India Ltd ,New Delhi 2004
March	Polynomial rings over commutative rings ,division algorithm and consequences ,P.I.D, factorization of polynomials ,reducibility tests , E.D,irreducibility test ,Eisenstein criterion ,unique factorization in Z[x].,divisibility in integral domain ,U.F.D	
April	Revisions, tests and evaluation of assignments.	

Note : The tentative date of Assignment/test/Project may also be provided.
The schedule of Practicals may also be provided