University of Kerala

Discipline	Mathematics				
Course Code	UK1DSCMAT101				
Course Title	Differential Calculus and Linear Algebra				
Type of Course	DSC				
Semester	I				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours per week
	4	4	-	1	5
Pre-requisites	1. Derivative of functions 2. Matrices				
Course Summary	This course provides a comprehensive idea of differentiation, its applications and solutions of linear equations				

Detailed Syllabus

Module	Unit	Contents	Hrs
I		**Differentiation**	**18**
	1	Basic concepts and techniques of Differentiation(review only).	
	2	Tangent lines and rate of change, Derivative of a function	
	3	Implicit differentiation	
	4	Rectilinear motion, Rolle's theorem, Mean value theorem	
	5	Derivatives of logarithmic, exponential and inverse trigonometric functions.	
	Chapter 2: Section 2.1, 2.2, 2.7, Chapter 3: 3 section 3.6, chapter 6: section 6.2(differentiation only), 6.3(differentiation only) of Text [2]		
II		**Applications of Differentiation**	**18**
	6	Relative rates	
	7	Analysis of functions - Increasing, Decreasing, concavity	

Module	Unit	Contents	Hrs
	8	Analysis of functions - Relative extrema, Absolute maxima and minima.	
	9	Applied maxima and minima problems.	
	Chapter 2: Section 2.8, chapter 3: section 3.1,3.2(graphing of polynomials is not required), 3.4, 3.5. of Text [2]		
III	**System of Linear equations**		**12**
	10	Linear systems of equations, Coefficient matrix, Augmented matrix, Elementary row operations, Guass elimination	
	11	Rank of a matrix.	
	12	Existence and uniqueness of solutions	
	13	Solving systems of equations using cramer,s rule,.	
	Chapter 7: Section 7.3, 7.4(rank of matrix only), 7.5, 7.7 of Text [1]		
IV	**Eigen values and Diagonalization**		**12**
	14	Eigen values and eigen vectors	
	15	Some applications of eigen value problems	
	16	Diagonalization of Matrices	
	Chapter 8: Section 8.1, 8.2, 8.4(quadratic forms excluded) of Text [1]		
Practical	Practical sessions can be given using suitable software like sagemath (not meant for examination purpose)		**15**

Textbooks

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 10^{th} Edition Wiley, 2011
2. Howard Anton, Irel Bivens, Stephens Davis, *Calculus* 10^{th} Edition Wiley, 2012

References

1. G. B. Thomas, R. L. Finey, *Calculus*, 9^{th} Edition, Addison-Weseley Publishing Company, 2004
2. Joel Hass, Maurice D, Weir, *Thomas Calculus Early Transcendentals* 12^{th} Edition, Addison-Weseley Publishing Company, 2006
3. J. Stewart, *Calculus with Early Transcendentals Functions* 7^{th} Edition, Cengage India, 2008
4. David C Lay, Linear Algebra and its Applications, Pearson, 2003
5. T.S. Blyth, E.F. Robertson, Linear Algebra, Second Edition, Springer, 2013

University of Kerala

Discipline	Mathematics				
Course Code	UK1DSCMAT109				
Course Title	Mathematics for Social Science I				
Type of Course	DSC				
Semester	I				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical	Total Hours per week
	4	4	-	-	4
Pre-requisites	Basic knowledge of Mathematics in Secondary level				
Course Summary	This course includes basic set theory, solutions of linear and quadratic equations, linear programming problems and functions				

Detailed Syllabus

Module	Unit	Contents	Hrs
I		**Theory of sets**	**15**
	1	Finite and infinite sets, set operations	
	2	Ordered pairs, Cartesian products, Relations	
	3	Functional Relations and Functions	
	Chapter 1: Sections 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 1.14, 1.15,1.16, 1.17		
II		**Linear Equations**	**15**
	4	Equations and identities -Linear and quadratic equations	
	5	Solution of equations, Solutions of quadratic equations, Solution of simultaneous equations	
	6	Applications	
	Chapter 3: Section 3.1.		
III		**Linear Programming**	**18**

Module	Unit	Contents	Hrs
	7	Introduction, Basic assumptions, The general linear Programming Problem (For two variables only)	
	8	Geometry of Linear Programming Problem (Graphical Solution)	
	9	Feasible and basic feasible solutions, Concept of degeneracy, multiple optimal solutions, Problems with no feasible solution (simple problems only)	
	Chapter 18: Section 18.1, 18.2, 18.4, 18.5, 18.6		
IV	**Functions and Curves**		**12**
	10	Demand functions and curves	
	11	Total Revenue curve, Cost Curves.	
	Chapter 4: Appendix		

Textbook

1. B.C. Mehta, G.M.K. Madnani, *Mathematics for Economics.* Sultan Chand & Sons, 1976.

References

1. Agarwal B.M, Business Mathematics and Statistics, Vikas Publishing House,New Delhi, 2009.
2. Allen, R.G.D., Mathematical Analysis for Economists. New Delhi: AITBS Publishers, 2008.
3. Yamane, Taro, Mathematics for Economists: An Elementary Survey. New Delhi: Prentice Hall of India, 2012.