18UMAO675	Applied Mathematics	(3 - 0 - 0) 3

Contact Hours: 39

Course Learning Objectives (CLOs):

The students are expected to learn about mathematical modelling, use of numerical techniques to deal with engineering systems. Further, they need to learn LPP and statistical tools for interpretation. They are also expected to carry out sampling distribution analysis and use of graph theory for engineering problems.

Course Outcomes (COs):

Description of the Course Outcome: At the end of the course the student will be able to:		**Mapping to POs(1-12)**		
		Substantial Level (3)	**Moderate Level (2)**	**Slight Level (1)**
CO-1	Obtain Mathematical model of Engineering Systems using different domains.		1,2	
CO-2	Formulate LPP and obtain optimal solutions using different tools.		1,2	
CO-3	Apply statistical tools to Interpret the data using different tools.		1,2	
CO-4	Determine Type errors and test for goodness of fit using different methods.		1,2	
CO-5	Use graph theory to obtain solution for engineering problems.		1,2	

POs	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Mapping Level	2	2	-	-	-	-	-	-		-	-	-

Pre-requisites:

A basic course on the concepts of algebra, geometry, calculus, trigonometry and laws of physics, statistical averages and probability theory.

Contents:

Unit I

Introduction to Mathematical Modelling and Numerical Techniques: Introduction, Modelling technique, classification and characteristics. Mathematical modelling through algebra, geometry, calculus, trigonometry. Mathematical model of engineering system. 8Hrs.

Unit II

Linear and Non-Linear programming

Introduction, Mathematical formulation of a L.P.P, basic solution. Geometric (or graphical) method, Simplex method. Assignment problem. Non Linear Programming –Constrained extremal problems-Lagrange's multiplier method- Kuhn- Tucker conditionsandsolutions. 8Hrs.

Unit III

Statistical Techniques

Co-efficient of Variation, Skewness, Karl Pearson's co-efficient of Skewness, Moments, Pearson's Beta and Gamma co-efficients, Kurtosis. Time series and Forecasting. 7Hrs.

Unit IV

Sampling distribution: Introduction, population and samples. Type-I and Type- II errors.Test of hypothesis for means, student's t-distribution, Chi-square Distribution as a test of goodnessoffit. 8Hrs.

Unit V

Graph Theory:

Definition of a graph theory, incidence and degree, walks, paths, circuits, Connectedness, Eulerian and Hamiltonian graphs, Trees, basic properties of trees, Binary trees, Preorder and post order traversals, Spanning and Minimal spanning trees, Connectivity and Separability, fundamental circuits and cut sets Isomorphism of graphs, Matrix representation of graphs, adjacency and incidence matrix Graph theoretical algorithms: Dijkstra, Prims and Kruskal. 8 Hrs.

Reference Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers,44th edition,2017.
2. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons,10 edition.2016.
3. Srimanta Pal et al, Engineering Mathematics, Oxford UniversityPress,3rd edition, 2016.
4. Dougas B. West, Introduction to Graph Theory, second edition ,PH Learnig Private Limited,2009.