
Teaching Plan

5.1 Differential Equation and Mathematical Modeling – III

(20th July- 17th Dec 2016)

Department of Mathematics
SGTB Khalsa College, University of Delhi

Course Description:

Total Marks: 150

Theory: 75

Practical: 50

Internal Assessment: 25

5 Lecture, 2 Practical, 1 Tutorial per week per student

Instructor:

Dharmendra Kumar, Assistant Professor

Text Books:

1. Elementary Differential Equation, 6th Edition by C. Henry Edwards , Penny & Calvis, Pearson PH
2. Graphs and Applications: An Introductory Approach, **Aldous**, Joan M., **Wilson**, Robin J., 2000, Springer-Verlag London
3. Linear Partial Differential Equations for Scientists and Engineers, Tyn –Mint U and Loknath Debnath, Birkhäuser; 4th ed. 2007 edition (29 December 2006)
4. A First Course in Mathematical Modeling, Frank. R. Giordano, M.D. Weir and William P. Fox, Thomson Learning, London and New York, 2003

Meeting hours for Students

Day	Time slot
Monday	02:45PM to 04:30PM
Tuesday	02:45PM to 04:30PM
Wednesday	12:45PM to 04:30PM
Friday	02:45PM to 04:30PM

Teaching Plan

Date	Topics: Power Series	L	T	P	Test/Pres
JULY	Review of Power Series	1	1		
	Series Solutions near Ordinary Points	2	1		
	Regular Singular Points	1	1	2	
	Method of Frobenius	1	1		
	Bessel's Equation & its Applications	2	1	2	

August	Legendre's Equation	1	1		
	Laplace Transform & Inverse Transform	2	1	2	Test 1: Power Series Solutions
	Application to initial value problem up to second order.	2	1		

Date	Topics: Simulation	L	T	P	Test/Pres
August	Monte Carlo Simulation Modeling	1	1		
	Deterministic Behaviour (Area under a curve, Volume under a surface)	1	1	2	
	Generating Random Numbers: Middle square method, linear congruence	1	1		
September	Queuing Models: Harbor System, Morning Rush Hour,	1	1	2	
	Overview of Optimization modeling	1	1		
	Linear Programming Model: Geometric Solution, Algebraic Solution,	2	1	2	Test 2: Laplace Equations
	Simplex method	2	1		
	Sensitivity analysis	2	1	2	

Date	Topics: Graph Theory	L	T	P	Test/Pres
Sept	Graphs and Digraphs	1	1		
	Networks and subgraphs	1			
	Vertex Degree, Paths and cycles	1	1		
Oct	Regular and bipartite graphs	1			Test 3: Simulation
	Four cube problem, social networks	1	1		
	Exploring and traveling	1			
	Eulerian and Hamiltonian graphs	1	1		
	Applications to dominoes	1			
	Diagram tracing puzzles	1	1		
	Knight's tour problem	1			Test 4: Graph theory
Gray codes	2	1			

Revision classes in November. It includes power point presentations by group of students.

Dharmendra Kumar
Department of Mathematics