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## Teaching Plan

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### Generic Elective: Differential Equation

(20<sup>th</sup> July- 17<sup>th</sup> Dec 2016)

Department of Mathematics  
SGTB Khalsa College, University of Delhi

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#### Course Description:

Total Marks: 100

Theory: 75

Internal Assessment: 25

5 Lecture, 1 Tutorial per week per student

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**Instructor:**

**Dharmendra Kumar, Assistant Professor**

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**Text Books:**

1. Advanced Engineering Mathematics, 9<sup>th</sup> Edition by Ervin Kreyszig, John Wiley & Sons. Inc.

#### 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

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## Teaching Plan

Date	Topics: ODE First Order	L	T	P	Test/Pres
JULY	First order ordinary differential equations: Basic concepts and ideas, Exact differential equations, Integrating factors,	1	1		
	Bernoulli equations	2	1		
	Orthogonal trajectories of curves	1	1	2	
	Existence and uniqueness of solutions	1	1		
August	Homogenous linear equations of second order,	1	1		
	Second order homogenous equations with constant coefficients,	2	1	2	Test 1:ODE
	Differential operator, Euler-Cauchy equation.	2	1		

Date	Topics: ODE Second Order	L	T	P	Test/Pres
August	Existence and uniqueness theory,	1	1		
	Wronskian,	1	1	2	
	Nonhomogenous ordinary differential equations,	1	1		
September	Solution by undetermined coefficients	1	1	2	
	Solution by variation of parameters	1	1		
	Higher order homogenous equations with constant coefficients, System of differential equations,	2	1	2	Test 2: Second order ODE
	System of differential equations, Conversion of $n^{\text{th}}$ order ODEs to a system,	2	1		
	Basic concepts and ideas, Homogenous system with constant coefficients.	2	1	2	

Date	Topics: Power Series Solutions	L	T	P	Test/Pres
Sept	Power series method: Theory of power series methods, ,	1	1		
	Legendre's equation, Legendre polynomial,	1			
	Partial differential equations: Basic Concepts and definitions, Mathematical problems,	1	1		
Oct	First order equations: Classification, Construction, Geometrical interpretation,	1			Test 3: Simulation
	Method of characteristics, General solutions of first order partial differential equations,	1	1		
	Canonical forms and method of separation of variables for first order partial differential equations,	1			
	Classification of second order partial differential equations,	1	1		
	Reduction to canonical forms	1			
	Second order partial differential equations with constant coefficients, General solutions.	1	1		
Examples on second order PDEs	1			Test 4:Graph theory	

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

**Dharmendra Kumar**  
**Department of Mathematics**