DEPARTMENT OF MATHEMATICS
SAPTHAGIRI COLLEGE OF ENGINEERING
LESSON PLAN FOR THE ACADEMIC YEAR: 2018-19 EVEN Semester
(Faculty)

Course	Advanced Calculus & Numerical Methods				Course code		18MAT21
Faculty					Semester		2
Core/Elective	Contact Hours /week			Total Hours	Assessment		Credits
Core	L	T	P	-	CIE	SEE	4
	3	2	-		40	60	
Prerequisite	1. Infinite series. 2. Differentiation and Integration.						

Course Objectives	
1	To impart the knowledge on vectors, vector differentiation and vector integration using Green's, Stoke's and Gauss divergence theorem.
2	To impart the knowledge on linear ordinary differential equations.
3	To understand the concept of partial differential equations.
4	To impart the knowledge on infinite series and power series solutions.
5	To understand the concepts of numerical techniques to solve the algebraic/transcendental equations, interpolation formulae for equal and unequal intervals and the concept of numerical integration.

Course outcomes	
At the end of this course the students will be	
CO1	Able to find the velocity, acceleration, gradient, curl, divergence and evaluate the integrals using Green's, Stokes and Gauss divergence theorem.
CO2	Able to solve linear ordinary differential equations.
CO3	Able to form solve partial differential equations.
CO4	Able to solve the infinite series and power series solutions.
CO5	Able to solve algebraic and transcendental equations, interpolating polynomials, intermediate values and evaluation of integrals using appropriate numerical techniques.

DEPARTMENT OF MATHEMATICS

SAPTHAGIRI COLLEGE OF ENGINEERING

LESSON PLAN FOR THE ACADEMIC YEAR: 2018-19 EVEN Semester

(Faculty)

Lesson plan

Period	Planned Date	Topic Planned
1		Introduction to vectors, Scalar and vector fields
2		Gradient, directional derivative
3		Curl and divergence problems
4		Solenoidal and Irrotational vector fields problems
5		Vector Integration -Line integrals
6		Green Theorem (without proof) only evaluation problems
7		Gauss Theorem (without proof) only evaluation problems
8		Stokes Theorem (without proof) only evaluation problems
9		Applications to work done by a force and flux
10		REVISION
11		REVISION
12		UNIT TEST-I
13		DIFFERENTIAL EQUATIONS OF HIGHER ORDER Introduction on finding roots
14		Second and higher order linear ODE's with constant coefficients-homogenous DE

15		Inverse differential operator
16		Type1-5 problems
17		Method of variation of parameters
18		Problems
19		Cauchy's differential equations
20		Legendre's differential equations
21		Applications to oscillations of a spring
22		Application to L-C-R circuits
23		REVISION
24		REVISION
25		MODULE – III PARTIAL DIFFERENTIAL EQUATIONS introduction on PDE
26		Formation of PDEs by elimination of arbitrary constants
27		Formation of PDEs by elimination of arbitrary functions
28		Solution of non-homogeneous PDE by direct integration
29		Homogeneous PDEs involving derivative with respect to one independent variable only
30		Solution of Lagrange's linear PDE
31		Derivation of one dimensional heat equation
32		Derivation of one dimensional wave equations
		method of separation of variables functions heat equation & wave

33		equation
34		REVISION
35		REVISION
36		UNIT TEST-II
37		MODULE - IV INFINTE SERIES and introduction
38		Series of positive terms- convergence and divergence.
39		Cauchy's root test (without proof)- Illustrative examples.
40		D'Alembert's ratio test(without proof)- Illustrative examples.
41		POWER SERIES SOLUTIONS introduction
42		Series solution of Legendre's differential equation leading to Pn(x)
43		Series solution of Bessel's differential equation leading to Jn(x)- Bessel's function of first kind
44		Orthogonality
45		Rodrigue's formula (without proof), Legendre polynomials.
46		Problems
47		REVISION
48		REVISION
49		NUMERICAL METHODS Finite differences - Interpolation/ extrapolation
50		Newton's forward and backward difference formulae
		Newton's divided difference

51		
52		Lagrange's formulae.
53		Solution of polynomial and transcendental equations –
54		Newton-Raphson method
55		Regula-Falsi method
56		Numerical integration: Simpson's (1/3)rd and (3/8)th rules
57		Weddle's rule (without proof) –Problems.
58		REVISION
59		REVISION
60		UNIT TEST-III
61		Question paper discussion
62		REVISION

DEPARTMENT OF MATHEMATICS

SAPTHAGIRI COLLEGE OF ENGINEERING

LESSON PLAN FOR THE ACADEMIC YEAR: 2018-19 EVEN Semester

(Faculty)