Unit	Content	Specific objective	List of Tutorial Activity	Marks and question format	Content Coverage of question
Unit I: Limit Continuity and Derivatives(5h rs) Total hours: 8 hours (5+ hours Lecture + 3 hours Tutorial) Unit II: Applications of Derivatives (8hrs) Total hours: 16 hours (8 hours Lectures + 8 hours Tutorial)	1.1 Introduction 1.2 Limit, continuity and differentiability 1.3 Higher order derivatives by Leibniz method. 2.1 Mean value theorems: Rolle's theorem, Lagrange's Theorem (Geometrical interpretation and verification) and applications 2.2 Higher order mean value theorem: Taylor's Series, Maclaurin's Series expansion of function. 2.3 Asymptotes to Cartesian curves up to four degrees. 2.4 Curve tracing in Cartesian form and parametric form 2.5 Curvature	Explain the importance of limit and continuity in differential problems and use Leibnitz theorem to evaluate higher derivatives. Apply derivatives in mean value theorem, series expansion, asymptotes and trace curve for the given function.	1.1 Problems on Limit and continuity (1 hr) 1.2 Show that differentiability implies continuity but the converse may not be true (1hr) 1.3 Evaluation of higher order derivatives by Leibnitz method (1 hr) 2.1 Problems in Mean value theorems: Rolle's theorem, Lagrange's Theorem (1 hr) 2.2 Expand the functions through Taylor's Series, and Maclaurin's Series (2 hrs) 2.3 Evaluation of Asymptotes to Cartesian curves. (2 hrs) 2.4 Trace Curve for the equations in Cartesian form and parametric	Rormat 8 Marks Question Number 1 (with two subquestions: a) 22(Marks) = (7+7+8) Number 1 (with two subquestions: b) Question Number 2 (with two subquestions: a, b)	1(a)- From 1.3 1(b)- from 2.1 Compulsory (OR question) from 2.2 2(a)- from 2.3 2(b)- from 2.5
Unit III: Integral Calculus (6hrs) Total hours: 10 hours (6 hours Lecture +	3.1 Introduction 3.2 Review on Indefinite Integral and fundamental theorem of integral calculus. 3.3 Definite integral and its properties 3.4 Improper Integrals; comparison test.	Evaluate Proper and improper integrals.	form (2 hrs) 2.5 Problems in Curvature (1 hr) 3.1 Evaluation of Indefinite Integrals, Definite integrals, Improper Integrals; (2 hrs) 3.2 Deduce Reduction formula, and solve	15 Marks = [5+5+5] Question Number 3 (with four, subquestions: a, b, c, d)	Any three from four 3(a) from 3.2 3(b) from 3.3 3(c) from 3.4 3(d) from 3.5

4 hours	3.5 Reduction formula, Beta		problems related to Beta		
Tutorial)	Gamma functions		Gamma functions(2hrs)		
Unit IV:	4.1 Application of integrals for	Evaluate arc length,	4.1 Evaluation of area,	8 Marks	4(a)- from 4.2
Application of	finding area beneath a curve and	area, and volume	arc length, Surface and	Question	
Integral(6hrs)	between two curves and arc	through integration.	volume of solid of	Number 4	
Total hours: 9	length		revolution in the plane	(with two sub-	
hours	4.2 Surface and volume of solid		for Cartesian and	questions: a)	
(6 hours	of revolution in the plane for		parametric curves.		
Lectures +	Cartesian and parametric curves.		(3 hrs)		
3 hours					
Tutorial)					
Unit V: Partial	5.1 Introduction	Understand and	5.1 Prove Euler's	7 Marks	4(b)from 5.2,
Differentiation	5.2 Partial Derivatives	compute partial	theorem for the function	Question	5.3 and 5.4
Total hours: 5	5.3 Homogeneous function and	derivatives with the	of two and three	Number 4	
hours	Euler's theorem for the function	concept of total	variables (1 hr)	(with two sub-	
(3 hours	of two and three variables	differentials.	5.2Calculate total	questions: b)	
Lectures +	5.4 Total Derivatives and		derivatives and		
2 hours	Differentiation of Implicit		differentiation of		
Tutorial)	functions.		Implicit functions (1 hr)		
Unit VI:	6.1 Extrema of functions of two	Define extreme value	6.1Evaluation of	7 Marks	5(a) from 6.1
Application of	and three variables.	and compute its value	Extrema of functions of	Question	and 6.2
Partial	6.2 Lagrange's method of	for two and three	two and three variables	Number 5	
Differentiation	undetermined Multipliers (up to	variables through	and Lagrange's method	(with two sub-	
(4hrs)	2 multipliers	partial derivatives	of undetermined	questions: a)	
Total hours: 6			Multipliers (up to 2		
hours			multipliers) (2 hrs)		
(4 hours					
Lectures +					
2 hours					
Tutorial)					
Unit VII: First	7.1 Review of separable,	Able to solve first	7.1 Solution of	8 Marks	
Order Ordinary	homogeneous and exact	order differential	separable, homogeneous	Question	5(b) from 7.2
Differential	differential equation with	equations.	and exact differential	Number 5	Compulsory
Equations(6hrs	engineering applications		equation Linear,	(with two sub-	(OR question)
)	7.2 Linear, Bernoulli equation		Bernoulli equation and	questions: b)	from 7.3
Total hours: 9	and Riccati's equation with		Riccati's equation with		
hours	engineering application.		engineering applications (2hrs)		

3 hours Tutorial) Unit VIII: Second Order Ordinary Differential Equations (7 hrs) Total hours: (7 hours ODE. (7 hours ODE. (7 hours ODE. Second Order equation. Solve the second order differential equations in relation to engineering problems. Ordinary Solve the second order differential equations in relation to engineering problems. Ordinary ODE with constant and variable coefficients, Euler-Cauchy equation. (8.1 Solve second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solutions ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solutions ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solutions ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order on the problems or the pr	(6 hours	7.3 Mathematical modeling of		7.2 Mathematical		
Tutorial) Unit VIII: Second Order Gode officients, Euler-Cauchy Differential equations (7 hrs) Solve in relation to engineering problems. Solve the second order differential equations in relation to engineering problems. Solve the second order differential equations in relation to engineering problems. Solve the second order differential equations in relation to engineering problems. Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve in relation to engineering problems. Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve in relation to engineering problems. Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve in relation to engineering problems. Solve the second order homogeneous ODE with constant and variable coefficients, Euler-Cauchy equation. (1 hr) Solve in relation to engineering problems. Solve in relation to engineering problems. Solve in relation to engineering problems. Solve in relation to engineering coefficients, Euler-Cauchy equation. (1 hr) Solve in relation to engineering coefficients, Euler-Cauchy equation. (1 hr) Solve in relation to engineering coefficients, Euler-Cauchy equation. (1 hr) Solve in relation to engineering opplication. Solve in homogeneous cond over in loop opplication. Solve in relation to engineering opplication. Solve in relation to engineerin	Lectures +	engineering problems using first		modeling of engineering		
Unit VIII: Second Order ODE with constant and variable coefficients, Euler-Cauchy equation. Selutions, Wronskian and general solutions for solving ODE. (7 hours 12 hours Tutorial)	3 hours	order equation.		problems using first		
Second Order ODE with constant and variable coefficients, Euler-Cauchy equation. Equations (7 hrs) Solutions, Wronskian and general solutions for solving ODE. (7 hours Lectures + 5 hours Tutorial) Solutions of parameters and engineering application Solutions of parameters and engineering application Solutions on the solution of parameters and engineering application Solutions and variable coefficients, Euler-Cauchy equation. (1hr) 8.2 Solve non-homogeneous second order ODE by undetermined coefficients and variation of parameters in engineering application Solution of parameters in engineering application Solution of parameters in long questions with no repetition in the solutions of the constant and variable coefficients, Euler-Cauchy equation. (1hr) 8.2 Solve non-homogeneous second order ODE by undetermined coefficients and variation of parameters in engineering application Solution of parameters in engineering application Solution of parameters in long questions with no repetition in the solutions of the constant and variable coefficients, Euler-Cauchy equation. (1hr) 8.2 Solve non-homogeneous second order ODE by undetermined coefficients and variation of parameters in engineering application Solutions of parameters in engineering application Solutions of parameters in long questions with no repetition in the solutions of the properties of the coefficients, Euler-Cauchy equation. (1hr) 8.2 Solve non-homogeneous second order ODE by undetermined coefficients and variation of parameters in engineering application Solutions or parameters and engineering application Solutions or parameters and engineering application Solutions or parameters and engineering appli	Tutorial)	-		order equation. (1 hr)		
Ordinary Differential Equations (7 hrs) Solutions, Wronskian and general solutions for solving ODE. (7 hours 10 hours 11 hours Total hours	Unit VIII:	8.1 Second order Homogeneous	Solve the second order	8.1 Solve second order	15=7+8	6(a) from 8.1
Differential equation. Equations 8.2 Existence and uniqueness of (7 hrs) solutions, Wronskian and general solutions for solving ODE. (7 hours 8.3 Non-homogeneous second order ODE by undetermined coefficients and variation of parameters and engineering application on the meaning application on the more of the properties of the proper	Second Order	ODE with constant and variable	differential equations	homogeneous ODE with	~	6(b) from 8.3
Equations Equations (7 hrs) Solutions, Wronskian and general solutions for solving ODE. (8.3 Non-homogeneous second lectures + order ODE and Solution by undetermined coefficients and variation of parameters and engineering application Tutorial) Equation: 8.2 Existence and uniqueness of Solutions of Solving ODE. 8.3 Non-homogeneous second order ODE by undetermined coefficients and variation of parameters in engineering application Tutorial) Tutorial	Ordinary	coefficients, Euler-Cauchy	in relation to	constant and variable		
Cauchy equation: (111) Cauchy equation: (1	Differential	equation.	engineering problems.	coefficients, Euler-	,	
Total hours: 12 hours ODE. (7 hours	Equations	8.2 Existence and uniqueness of		Cauchy equation. (1hr)	questions: a, b)	
12 hours (7 hours (8.3 Non-homogeneous second Lectures + order ODE and Solution by to hours (7 hours (7 hours (1 hours (1 hours (1 hours (1 hours (2 hours (3 hours (1 hours ((7 hrs)	solutions, Wronskian and		8.2 Solve non-		
(7 hours 8.3 Non-homogeneous second undetermined coefficients and variation of parameters in engineering application 10=4*(2.5) From sections not covered in long questions with no repetition in the repetition in the	Total hours:	general solutions for solving		homogeneous second		
Lectures + order ODE and Solution by undetermined coefficients and variation of parameters in engineering application Tutorial) coefficients and variation of parameters and engineering application in engineering application 10=4*(2.5) From sections not covered in long questions with no repetition in the	12 hours	ODE.		order ODE by		
Tutorial) undetermined coefficients and variation of parameters in engineering application in engineering application 10=4*(2.5) From sections not covered in long questions with no question: a, b, repetition in the	(7 hours	8.3 Non-homogeneous second				
Tutorial) variation of parameters and engineering application in engineering application 10=4*(2.5) From sections not covered in Number 7 long questions with no question: a, b, repetition in the	Lectures +	order ODE and Solution by		coefficients and		
engineering application application 10=4*(2.5) From sections Question not covered in Number 7 long questions (With four subquestion: a, b, repetition in the	5 hours	undetermined coefficients and		variation of parameters		
10=4*(2.5) From sections Question not covered in Number 7 long questions (With four subquestion: a, b, repetition in the	Tutorial)			in engineering		
Question Number 7 long questions (With four subquestion: a, b, repetition in the		engineering application		application		
Number 7 (With four subquestion: a, b, repetition in the					` ′	
(With four subquestion: a, b, with no repetition in the					~	
question: a, b, repetition in the						
					,	
c, d) concepts.					_	_
					c, u)	concepts.