

Course Code	Course Title							
116U06C108	Applied Mathematics - II							
	TH		P	TUT			Total	
Teaching Scheme(Hrs.)	03		--	01*			04	
Credits Assigned	03		--	01			04	
Examination Scheme	Marks							
	CA		ESE	TW	O	P	P&O	Total
	ISE	IA						
	30	20	50	25	--	--	--	125

* Batch wise Tutorial

Course prerequisites

- Higher secondary level Mathematics
- Applied Mathematics- II

Course Objectives

- Impart the knowledge of solving ordinary differential equations
- Impart the knowledge of Multiple Integral
- Impart the knowledge of Improper Integral
- To expand a real function as Taylor's series and finding successive derivatives of functions

Course Outcomes

- CO1. Identify and solve different types of ordinary differential equations using various methods.
- CO2. Solve problems involving Successive derivatives of real variable functions. Expand a function as an infinite series using Taylor's and Maclaurin's series and use it to solve problems involving indeterminate forms.
- CO3. Apply concept of Beta – Gamma function and DUIS to solve improper integrals
- CO4. Find length of a curve using Cartesian, Polar and Parametric equations of curves
- CO5. Evaluate multiple integrals and use it to find Area, Volume and Mass of Lamina.

Module No.	Unit No.	Details	Hrs.	CO
1	Differential Equation of First Order and First Degree		13	CO 1
	1.1	Differential Equation of first order and first degree- Exact differential equations, Equations reducible to exact equations by integrating factors.		
	1.2	Linear differential equations (Review), Equation reducible to linear form. Applications of Differential Equation of first order and first degree		
	1.3	Linear Differential Equation with constant coefficients: Complimentary function, particular integrals of differential equation of the type $f(D)y=X$, where X is e^{ax} , $\sin(ax+b)$, $\cos(ax+b)$, x^n , $e^{ax}V$		
	1.4	Cauchy's homogeneous linear differential equation		
	1.5	Method of variation of parameters		
		# Self-learning topic: Bernoulli's equation. Equation reducible to Bernoulli's equation.		
2	Successive Differentiation, Expansion Of Functions, Indeterminate Forms		5	CO 2
	2.1	Successive differentiation: nth derivative of standard functions. Leibnitz's Theorem (without proof) and problems.		
	2.2	Taylor's Theorem (only statement) and Taylor's series, Maclaurin's series(only Statement) Expansion of e^x , $\sin x$, $\cos x$, $\tan x$		
		# Self-learning topic: Expansion of $\sinh(x)$, $\cosh(x)$, $\tanh(x)$, $\log(1+x)$, Indeterminate forms, L'Hospital Rule, problems involving series		
3	Integration : Review And Some New Techniques		7	CO 3
	3.1	Beta and Gamma functions with properties		
	3.2	Differentiation under integral sign with constant limits of integration.(without proof)		
		# Self-learning topic: Differentiation under integral sign with variable limits of integration.		
4	Rectification		5	CO4
		Pre-requisite: Idea of Curve tracing in Cartesian, Parametric and polar forms. (Straight lines, Circles, Parabolas, Ellipse, Hyperbola, Catenary, Cissoid, Astroid, Cycloid, Lemniscate of Bernoulli, Cardioid).		
	4.1	Rectification of plane curves in Cartesian form		
	4.2	Problems of Rectification in parametric and polar forms		
5	Multiple Integration: Double Integration, Triple Integration and their Applications		15	CO5
	5.1	Double integration- Introduction, Evaluation of Double Integrals with given limits and over the given region.		
	5.2	Change of order of integration, Evaluation of double integrals by changing order of integration		
	5.3	Application of double integrals to compute Area, Mass of Lamina.		
	5.4	Triple integration- Introduction and evaluation of integral in Cartesian form		

	5.5	Problems of Triple integration using cylindrical and spherical Polar coordinates		
	5.6	Application of triple integral to compute volume.		
Total			45	

Textbooks:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1.	B. S. Grewal	<i>Higher Engineering Mathematics</i>	Khanna Publications, India	43 rd Edition 2014
2.	P. N. Wartikar and J. N. Wartikar	<i>A text book of Applied Mathematics Vol I & II</i>	Pune VidyarthiGruha, India	6 th Edition 2012

Reference Books:

Sr. No.	Name/s of Author/s	Title of Book	Name of Publisher with country	Edition and Year of Publication
1.	Erwin Kreyszig	<i>Advanced Engineering Mathematics</i>	Wiley Eastern Limited, India	10 th Edition 2015
2.	Dennis G. Zill and Michael R. Cullen	<i>Advanced Engineering Mathematics</i>	Narosa Publication India	3 rd Edition 2010
3.	Shanti Narayan, <u>Mittal P.K.</u>	<i>Integral Calculus</i>	S. Chand , India	10 th Edition 2005
4.	Ramana B.V.	<i>Higher Engineering Mathematics</i>	Tata Mcgraw Hill New Delhi, India	34 th Edition (reprint) 2019
5	Dr.M.D.Raisinghania	Ordinary and Partial Differential Equations	S. Chand, India	18 th Edition 2013

Students should prepare all self-learning topics on their own. Self-learning topics will enable students to gain extended knowledge of the topic. Assessment of these topics may be included in Tutorials.

Term-Work will consist of Tutorials covering entire syllabus. Students will be graded based on continuous assessment of their term work.