



University of Kerala

Discipline	Mathematics				
Course Code	UK3DSCMAT200				
Course Title	Integral Calculus and Foundations of Vector Calculus				
Type of Course	DSC				
Semester	III				
Academic Level	200-299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical	Total Hours per week
	4	4		1	5
Pre-requisites	1.Awareness of Differential Calculus and Integral Calculus				
	2. Knowledge of various co-ordinate systems in 2-dimension				
Course Summary	The course deal with identifying the applications of integration and vector valued functions				

Detailed Syllabus

Module	Unit	Contents	Hrs
I		Integral Calculus I	15
	1	Area between two curves, Volume by Slicing, Volume by cylindrical shells. Chapter 5: Section 5.1, 5.2, 5.3 of Text [1]	
II		Integral Calculus II	15
	2	Length of the plane curve Area of surface of revolution Work(done by constant force in the direction of motion only) Chapter 5: Section 5.4, 5.5, 5.6 of Text [1]	
III		Vector Valued Functions I	15
	3	Rectangular Coordinates In 3-Space; Spheres; Cylindrical Surfaces, Vectors, Dot Product; Projections, Cross Product, Parametric equations of lines, Planes in 3- space, Cylindrical and spherical Coordinates. Chapter 11: Section 11.1 to 11.6, 11.8 of Text [1]	

Module	Unit	Contents	Hrs
IV		Vector Valued Functions II	15
	4	Introduction To Vector-Valued Functions, Calculus Of Vector-Valued Functions, Change Of Parameter; Arc Length, Unit Tangent, Normal, And Binormal Vectors, Curvature, Motion Along A Curve. Chapter 12: Section 12.1 to 12.6 of Text [1]	
Practical		Practical sessions can be given using suitable software like sagemath (not meant for examination purpose)	15

Textbook

1. H Anton, I Bivens, S Davis. Calculus, 10th Edition, John Wiley & Sons, 2012.

References

1. Joel Hass, Maurice D. Weir, Thomas' Calculus Early Transcendentals, 12th Edition, Addison-Weseley Publishing Company, 2004.
2. J Stewart, Calculus with Early Transcendental Functions, 7th Edition, Cengage India Private Limited, 2008.
3. G B Thomas, R L Finney, Calculus, 9th Edition, Addison-Weseley Publishing Company, 2004.

Course Outcomes

CO No.	Upon completion of the course the graduate will be able to	PO/PSO	Cognitive Level	Knowledge Category	Lecture(L) Tutorial (T)	Practical (P)
CO 1	Demonstrate applications of Integration	PSO3, PO1, 2, 3, 4, 5, 6, 7, 8	U,E	F,P	L	
CO 2	Computing area and volume using Integration	PSO2, PO1, 2, 3, 4, 5, 7, 8	U,An	F, P		
CO 3	Analysing geometry of curves and surfaces using Vector Calculus	PSO2, PO1, 2, 3, 4, 5, 6, 7, 8	U, E	F, P		
CO 4	Distinguish cylindrical and spherical co-ordinates	PSO4, PO1, 2, 3, 4, 5, 6, 7, 8	R, An	F, P		

(R-Remember, U-Understand, Ap-Appl, An-Analyse, E-Evaluate, C-Create)
(F-Factual, C-Conceptual, P-Procedural, M-Metacognitive)

Mapping of CO with PSOs and POs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1			3				3	3	2	2	1	2	2	1
CO2		3					3	3	1	1	2		2	1
CO3		3					3	2	1	1	2		2	1
CO4				3			3	2	1	1	1	2	3	1

(- -Nil, 1-Slightly/Low, 2-Moderate/Medium, 3-Substantial/High)

Assessment Rubrics

- Quiz/Assignment/Discussion/Seminar
- Midterm Exam
- Programming Assignments
- Final Exam

Mapping of COs to Assessment Rubrics

	Internal Examination	Assignment	Project Evaluation	End Semester Exam
CO1		✓		
CO2	✓	✓		✓
CO3	✓	✓		✓
CO4	✓	✓		✓