SWARNANDHRA
COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
Accredited by NBA, AICTE, NEW DELHI • Accredited by NAAC with "A" Grade – 3.32/4.00 CGPA
Recognized by UGC Under Sections 2(f) & 12 (B) of UGC Act 1956
Approved by AICTE, New Delhi, Permanent Affiliated to JNTU K, Kakinada
Seetharampuram, NARSAPUR-534 280, W.G-Dist., Andhra Pradesh

DEPARTMENT OF MATHEMATICS

TEACHING PLAN

Course Code	Course Title	Year/ Semester	Branches	Contact Periods/ Week	Academic Year	Date of Commencement of Semester
20MA3T03	VECTOR CALCULUS AND LAPLACE TRANSFORMS	II/III	ME & RBT	60/6	2021-22	25-10-2021

Course Outcomes: *After successful completion of this course, students should be able to:*

1	CO1: interpret the physical meaning of scalar and vector point functions different operators such as del, gradient, curl and divergence (K3)
2	CO2: estimate the work done against a field, circulation and flux using vector calculus and familiarize vector integral theorems. (K3)
3	CO3: solve many problems in engineering with the knowledge of Laplace (K3)
4	CO4:apply the inverse Laplace transforms for different types of functions (K3)
5	CO5 :know the fundamentals of the theory of analytic functions (K3)

Unit	Outcome/ Bloom's Level	Topics No.	Topics/Activity	Text Book/ Reference	Contact Hour		Delivery Method
		UNIT I: Vector Differentiation					
1	CO 1: Students are able to interpret the physical meaning of scalar and vector point functions different operators such as del, gradient, curl and divergence (K3)	1.1	Introduction	T_1,R_1,R_2	1	12	PPT,BB
		1.2	Scalar and vector point functions	T_1,R_1,R_2	1		PPT,BB
		1.3	vector operator del and related problems	T_1,R_1,R_2	1		PPT,BB
		1.4	del applied to scalar point functions	T_1,R_1,R_2	1		PPT,BB
		1.5	Gradient –definition and related problems	T_1,R_1,R_2	1		PPT,BB
		1.6	del applied to vector point functions	T_1,R_1,R_2	1		PPT,BB
		1.7	Divergence- definition and related problems	T_1,R_1,R_2	1		PPT,BB
				T_1,R_1,R_2	1		PPT,BB
		1.8	Curl – definition and related problems	T_1,R_1,R_2	1		PPT,BB
				T_1,R_1,R_2	1		PPT,BB
		1.9	physical interpretations of div F and curlF and related problems	T_1,R_1,R_2	1		PPT,BB
				T_1,R_1,R_2	1		PPT,BB
2	CO 2: Students areabletoestimate the work done against a field, circulation and flux using vector calculus and	UnitII: Vector Integration					
		2.1	Integration of Vectors-Introduction	T_1,R_1,R_2	1	13	PPT,BB
		2.2	Line integral - circulation	T_1,R_1,R_2	1		PPT,BB
		2.3	work done and related problems	T_1,R_1,R_2	1		PPT,BB
		2.4	surface integral related problems	T_1,R_1,R_2	1		PPT,BB
		2.5	flux and related problems	T_1,R_1,R_2	1		PPT,BB

	familiarize vector integral theorems. (K3)	2.6	Green's theorem in the plane (without proof) and related problems	T_1,R_1,R_2	1			PPT,
		2.7		T_1,R_1,R_2	1			PPT,BB
		2.8	Stoke's theorem (without proof) and related problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		2.9	volume integral -introduction ahd related problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		2.10	Divergence theorem (without proof)and related problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		Unit III: Laplace Transforms						
3	CO 3: Students are able to solve many problems in engineering with the knowledge of Laplace (K3)	3.1	Introduction	T_1,R_1,R_2	1	12		PPT,BB
		3.2	definition – conditions for the existence	T_1,R_1,R_2	1			PPT,BB
		3.3	Laplace transforms of elementary functions	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		3.4	properties of Laplace transforms	T_1,R_1,R_2	1			PPT,BB
		3.5	Laplace Transforms of derivatives and integrals -problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		3.6	Multiplication by t^n and related problems	T_1,R_1,R_2	1			PPT,BB
		3.7	division by t- and related problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		3.8	Evaluation of integrals by Laplace transforms	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		Unit IV: Inverse Laplace Transforms						
4	CO 4 :Students are able to apply the inverse Laplace transforms for different types of functions (K3)	4.1	Introduction	T_1,R_1,R_2	1	11		PPT,BB
		4.2	definition of Inverse Laplace Transforms	T_1,R_1,R_2	1			PPT,BB
		4.3	method of partial fractions-problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		4.4	other methods of finding inverse transforms - problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		4.5	Convolution theorem - problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		4.6	Application to differential equations- problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		Unit V: Calculus of complex functions						
5	CO 5 :Students are able to know the fundamentals of the theory of analytic functions (K3)	5.1	Introduction	T_1,R_1,R_2	1	12		PPT,BB
		5.2	Limit and continuity of f(z)	T_1,R_1,R_2	1			PPT,BB
		5.3	Derivative of f(z)	T_1,R_1,R_2	1			PPT,BB
		5.4	Cauchy – Riemann equations	T_1,R_1,R_2	1			PPT,BB
		5.5	Analyticfunctions-problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB
		5.6	Harmonic functions-problems	T_1,R_1,R_2	1			PPT,BB
				T_1,R_1,R_2	1			PPT,BB

		5.7	Orthogonal system-problems	T_1,R_1,R_2	1		PPT,BB
				T_1,R_1,R_2	1		PPT,BB
		5.8	Applications to flow problems	T_1,R_1,R_2	1		PPT,BB
				T_1,R_1,R_2	1		PPT,BB
			Cumulative Proposed Periods		60		

Text Books:

S. No.	Authors, Book Title, Edition, Publisher, Year of Publication
1	B. S. Grewal, Higher Engineering Mathematics, 43/e, Khanna Publishers, 2015.

Reference Books:

S. No	Authors, Book Title, Edition, Publisher, Year of Publication
1	Erwin Kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2013
2	B.V. Ramana, Higher Engineering Mathematics, Tata McGraw Hill, 2007.
3	

Web Details

1	https://youtu.be/tcB-aA6Ahxo(Vector differentiation)
2	https://youtu.be/9LqzrAHrSS0(Vector integration)
3	https://youtu.be/OiNh2DswFt4 (Laplace Transforms)
4	https://youtu.be/TJgBEI3drUc (Inverse Laplace Transforms)
5	https://youtu.be/iUhwCfz18os(Calculus of complex functions)

		Name	Signature with Date
i.	Faculty I	DR.P.PREM DELPHY (ROBOTICS)	
ii.	Faculty II	R.VENKATA LAKSHMI (MECH-A)	
iii.	Faculty III	T.V.LAKSHMANA RAO (MECH-B)	
iv.	Course Coordinator	DR.PREM DELPHY	
v.	Module Coordinator	CH.PEDDI RAJU	
vi.	HOD of Mathematics	DR.S.DHARAJADEVI	

Principal