

Syllabus Template (First year of 25-26 entry Batch and second year of 24-25 entry Batch)

Course Code :		1BMAE201C	CALCULUS, LAPLACE TRANSFORM AND NUMERICAL TECHNIQUES FOR EEE STREAM	Semester :	II
L:T:P :		3 : 1 : 0		Course Type :	BSC
Hours/Sem.	Teaching :	42+28Hrs		CIE Marks :	50
	Learning (TW+SL) :	44Hrs		SEE Marks :	50
	Exam :	6Hrs		Total Marks :	100
	Total Hrs. :	120Hrs		Credits :	04

Professional Competency:

Apply calculus, Laplace transforms and numerical methods to solve complex engineering problems.

Course Outcomes

After the completion of the course student will be able to
CO1: Apply the concepts of integral calculus and solve problems in engineering applications.
CO2: Apply the concepts of vector calculus for application of electrical field.
CO3: Apply the concepts of numerical methods to obtain approximate solutions for mathematical problems.
CO4: Employ Laplace transforms technique for time domain, wave forms, periodic function and solving differential equations.

UNIT-I

11 Hrs.

Integral Calculus

Multiple Integrals: Evaluation of double and triple integrals, change of order of integration, changing to polar coordinates. Area and volume using double and triple integrals.
 Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions

UNIT-II

10Hrs.

Vector Calculus

Vector Differentiation: Scalar and vector fields, gradient of a scalar field, directional derivatives, divergence of a vector field, solenoidal vector, curl of a vector field, irrotational vector, physical interpretation of gradient, divergence and curl and scalar potential.
 Vector Integration: Line integrals, Statement of Green's and Stokes' theorem without verification problems.

UNIT-III

11 Hrs.

Numerical Methods

Solution of algebraic and transcendental equations: Newton-Raphson method.
 Finite Differences and Interpolation: Forward and backward differences, Interpolation, Newton forward and backward interpolation formulae, Lagrange's interpolation formula.
 Numerical Integration: Trapezoidal rule, Simpson's 1/3rd rule and Simpson's 3/8th rule.
 Numerical solution of ordinary differential equations of first order and first degree: Modified Euler's method, Runge-Kutta method of fourth order.

UNIT-IV

10 Hrs.

Laplace Transforms

Laplace Transform (LT): Definition of Laplace Transform, Laplace Transform of elementary functions. Properties- linearity, scaling, shifting property, differentiation in these domain, division by t. Laplace Transform of periodic functions, Heaviside Unit step function.
 Inverse Laplace Transforms: Definition, properties, evaluation using different methods and applications to solve ordinary differential equations.

Text Books

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Ed., 2021.
2. E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed., 2018.
3. Gilbert Strang, Linear Algebra and its Applications, Cengage Publications, 4th Ed., 2022.

Reference Books

1. B.V. Ramana, Higher Engineering Mathematics, McGraw-Hill Education, 11th Ed., 2017
2. Srimanta Pal & Subodh C. Bhunia, Engineering Mathematics, Oxford University Press, 3rd Ed., 2016.
3. N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, 10th Ed., 2022
4. H.K. Dass and Er. Rajnish Verma, Higher Engineering Mathematics, S.Chand Publication, 3rd Ed., 2014.
5. David C Lay, Linear Algebra and its Applications, Pearson Publishers, 4th Ed., 2018.

Web Links and Video Lectures:

<https://drive.google.com/file/d/1KtCtZmnJnOvV1S68wXS9FZPXUFvRktBQ/view?usp=sharing>

Table: Matrix to describe the mapping of COs with POs (considering WKs) and PSOs

Course Outcomes (COs)	Program Outcomes and (WKs)											Program Specific Outcomes (PSOs)	
	1	2	3	4	5	6	7	8	9	10	11	1	2
CO1	3 (WK1, WK2, WK3, and WK4)	2 (WK1, WK2 and WK3)						1			1		
CO2	3 (WK1, WK2, WK3, and WK4)	(WK1, WK2 and WK3)						1			1		
CO3	3 (WK1, WK2, WK3, and WK4)	2 (WK1, WK2 and WK3)						1			1		
CO4	3 (WK1, WK2, WK3, and WK4)	2 (WK1, WK2 and WK3)						1			1		

Sri B.V.V.S.
Basaveshwar Engineering College, Bagalkote
Scheme (from 2025-26)

Sl. N o.	Cour se Code	Course Title	Teaching-Learning Scheme				Examina tion Duration (Hrs/Se m.)		Tot al Hou rs	Examination Scheme and Evaluation			Cre dits (C)= Tot al Hou rs /30
			L Hrs/ Wee k (Hrs/ Sem.)	T Hrs/ Week (Hrs/Se m.)	P Hrs/ Week (Hrs/Se m.)	Term Work (TW) and Self Learnin g (SL) (TW+SL) Hrs/ Sem.				CIE Marks	SEE Marks	Tota l Marks	
							CIE	SEE					
1	1BM AE20 1C	Calculus, Laplace transform and numerical techniques for EEE stream	3(42)	28	0	44	3	3	120	50	50	100	4= 120 /30