

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

Course Code :		1BMAE101C	DIFFERENTIAL CALCULUS AND LINEAR ALGEBRA FOR EEE STREAM	Semester :	I
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:

Ability to analyze and solve engineering problems using calculus, differential equations ,and linear algebra.

Course Outcomes:

After the completion of the course student will be able to

CO1: Apply foundational concepts of calculus for geometric properties of curves,

CO2: Apply the concepts of multivariable calculus to compute the derivatives, optimize the functions

CO3: Apply the concepts of differential calculus to solve first and higher-order ordinary differential equations in science and engineering.

CO4: Employ the principles of linear algebra to solve systems of linear equations, determine eigen values and eigen vectors.

UNIT-I

11 Hrs.

Differential Calculus

Polar curves, angle between the radius vector and the tangent, angle between the polar curves, pedal equations. Curvature and Radius of Curvature in Cartesian, Polar (with proof), Parametric and Pedal forms (without proof) – Problems

UNIT-II

10Hrs.

Multivariable Calculus

Statement and problems on Taylor's and Maclaurin's series expansion for one variable.

Partial Differentiation: Partial differentiation, total derivative- differentiation of composite functions. Jacobian. Maxima and minima for a function of two variables.

UNIT-III

11 Hrs.

Ordinary Differential Equations

Exact and reducible to exact differential equations-Integrating factors $\frac{1}{N} \left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right)$ and $\frac{1}{M} \left(\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} \right)$ only. Linear and Bernoulli's differential equations. Orthogonal trajectories, L-R and C-R circuits.

Higher-order linear ODEs with constant coefficients, homogeneous and non-homogeneous equations- e^{ax} , $\sin(ax+b)$, $\cos(ax+b)$, x^n only. Method of variation of parameters, Cauchy's homogeneous differential equations.

UNIT-IV

10 Hrs.

Linear Algebra

Elementary transformations of a matrix, Echelon form, rank of a matrix, consistency of system of linear equations. Gauss elimination, Gauss –Seidel method to solve system of linear equations. Eigen values and eigen vectors of a matrix, Rayleigh power method to determine the dominant eigen value of a matrix.

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)	2 (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

Sl. N o.	Cours e Code	Cours e Title	Teaching-Learning Scheme				Examina tion Duration (Hrs/Sem .)		Tot al Hou rs	Examination Scheme and Evaluation			Cre dits (C)= Tot al Ho urs /30
			L Hrs/ Week (Hrs/ Sem.)	T Hrs/ Week (Hrs/Se m.)	P Hrs/ Week (Hrs/S em.)	Term Work (TW) and Self Learnin g (SL) (TW+SL) Hrs/ Sem.				CIE Mar ks	SEE Mar ks	Tota l Mar ks	
							CIE	SEE					
1	1BMA E101C	Differ ential calculu s and linear algebra for EEE stream	3(42)	28	0	44	3	3	120	50	50	100	4= 120 /30

Scheme(from 2025-26)