

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

Course Code :		1BMAC201C	CALCULUS AND NUMERICAL METHODS FOR CV 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, numerical methods and computational tools to solve complex engineering problems.

Course Outcomes

After the completion of the course student will be able to

CO1: Apply the concept of integral calculus to evaluate definite integrals.

CO2: Determine partial differential equations and their solutions for physical interpretations.

CO3: Apply the concept of vector calculus.

CO4: Apply the concept numerical methods to obtain approximate solutions for mathematical problems.

UNIT-I

11 Hrs.

Integral Calculus

Multiple Integrals: Evaluation of double and triple integrals, evaluation of double integrals by change of order of integration, changing into polar coordinates. Applications to find Area and Volume by double integral. Beta and Gamma functions: Definitions, properties, relation between Beta and Gamma functions- simple problems

UNIT-II

10Hrs.

Partial Differential Equations(PDE)

Formation of PDEs by elimination of arbitrary constants and functions. Solution of non-homogeneous PDE by direct integration. Homogeneous PDEs involving derivatives with respect to one independent variable only. Lagrange's equation $Pp + Qq = R$, Method of Separation of variables. Application of PDE: Derivation of one-dimensional heat equation and wave equation.

UNIT-III

11 Hrs.

Vector Calculus

Scalar and vector fields. Gradient, directional derivative, divergence and curl-physical interpretation, solenoidal vector fields, irrotational vector fields and scalar potential. Vector Integration: Line integrals and surface integral, work done by a force and flux, Statements of Green's theorem and Stoke's theorem, problems without the verification.

UNIT-IV

10 Hrs.

Numerical Methods

Solution of algebraic and transcendental equations: Newton-Raphson methods, problems.

Interpolation: Finite differences, Interpolation using Newton's forward and backward difference formulae, Lagrange's interpolation formula.

Numerical Integration: Trapezoidal, Simpson's $1/3^{rd}$ and $3/8^{th}$ rules.

Numerical solution of ordinary differential equations of first order and first degree: Modified Euler's method, Runge-Kutta method of fourth order.

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		

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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 Ho urs /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	SEE		CIE Mar ks	SEE Mar ks	Tota l Mar ks	
1	1BM AC20 1C	Calculus and numeric al methods for CV stream	3(42)	28	0	44	3	3	120	50	50	100	4= 120 /30