GANPAT UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

Programme	Bachelor of Technology	Branch/Spec.	All
Semester	I	Version	1.0.0.0
Effective from Academic Year	2026-27	Effective from the batch admitted in	July 2026
Course Code	2BSC1101	Course Name	Mathematics - I
Course Category	Basic Science Courses (BSC)		

Teaching Scheme						Examination scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	1	0	0	4	Theory	50	50	100
Hours	3	1	0	0	4	Practical	0	0	0

Pre-requisites:

Basic knowledge of Differentiation and Integration

Course Outcomes

COs	Description
CO1	Demonstrate mathematical basic preliminaries.
CO2	Interpret physical phenomenon in mathematical formulation.
CO3	Develop Differential and Integral Calculus in formal representation of various computing constructs.
CO4	Identify the importance of Mathematics for analysis of engineering problems.

Theory Syllabus

Unit	Content	Hours
1	**Differential Calculus:** Review of the prerequisites such as limits of sequences and functions, continuity, uniform continuity and differentiability. Successive differentiation, Leibniz's theorem (without proof), Taylor's & Maclaurin's expansions of single variable, Rolle's theorem, Mean value theorems, Indeterminate forms.	11
2	**Partial differentiation and its applications:** Partial and total differential coefficient, Euler's theorem, Transformations, Geometrical interpretation of partial derivatives, Tangent plane and Normal line, Jacobians, Taylor's expansion for two variables, Errors and approximations, Maxima and Minima of functions of two variables ,Lagrange method of undetermined multipliers to determine stationary values.	11
3	**Integral Calculus:** Reduction Formulae: Reduction formulae of the type $\int \sin^n x\,dx$, $\int \cos^n x\,dx$, $\int \sin^m x \cos^n x\,dx$, $\int \tan^n x\,dx$ and $\int \cot^n x\,dx$. Beta & Gamma function, Error function, Elliptic integrals. Application of integration- Length of a curve, Area of a bounded region, volume & surface area of a solid of revolution for Cartesian, parametric & polar form.	11
4	**Multiple integrals:** Double integral, change of order of integration, transformation of variables by Jacobian only for double integration, change into polar co-ordinates in double integrals only, Triple integral, Application of multiple integration to find areas, volumes, C.G., M.I. and mean values.	12

Practical and Self Learning Content

Tutorials in this course are based on above syllabus.

Text Books	
1	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 44th Edition, 2020
2	G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson
Reference Books	
1	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, 5th Edition New Delhi
2	Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill,11th Reprint New Delhi
3	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 11th Edition
ICT/MOOCs Reference	
1	https://www.youtube.com/watch?v=XJOIJDp69FU
2	https://www.youtube.com/watch?v=LT_10p_eu88
3	https://www.youtube.com/watch?v=5xif7SUyiz4
4	https://www.youtube.com/watch?v=w7P0IFVf-NY
5	https://www.youtube.com/watch?v=gLWUrF_cOwQ
6	https://www.youtube.com/watch?v=GTzKio88-Ho
7	https://www.youtube.com/watch?v=IKzfjS7Hgck
8	https://www.youtube.com/watch?v=tp0HiqJPhE

Mapping of COs, POs, and PSOs														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	2	0	1	1	2	1	2	2	3	2	3	2	2
CO2	3	2	1	2	1	1	1	2	2	1	2	1	2	1
CO3	3	2	1	1	1	2	1	2	3	2	2	2	2	2
CO4	3	2	3	2	3	3	2	3	2	2	3	2	3	1

Bloom's Taxonomy Level				
Unit	**Unit Title**	**Aligned COs**	**Learning Hours**	**BTL Level**
1	Differential Calculus	CO1,CO3	11	R,U,A,E
2	Partial differentiation and its applications	CO1,CO2	11	U,A,N
3	Integral Calculus	CO2,CO3, CO4	11	R,A,N,E
4	Multiple integrals	CO2,CO3, CO4	12	U,A,E,C

Note:

- Version 1.0.0.0 (First Digit= New syllabus/Revision in Full Syllabus, Second Digit=Revision in Teaching Scheme, Third Digit=Revision in Exam Scheme, Forth Digit= Content Revision)
- 1 Hour Lecture = 1 Credit, 1 Hour Tutorial = 1 Credit, 2 Hours Practical = 1 Credit, 2 Hours Internship/Project/Seminar = 1 Credit
- Bloom's Taxonomy Level (BTL) : R: Remember, U: Understand, A: Apply, N: Analyze, E: Evaluate, and C: Create