

Institute Code & Name: 0078 - K. K. Wagh Polytechnic, Nashik

Semester: First

Programme & Code: Information Technology (IT)

Course Index: IF101

Course and code: Basic Mathematics

Course Code & Abbr.: 311302 - BMS

Scheme: K

Allocated Hrs: 60

Name of Faculty: Ms. D. M. Jori

Class: FYF (PARAM)

COURSE LEVEL LEARNING OUTCOMES (COS)

- CO1 - Apply the concepts of algebra to solve engineering (discipline) related problems.
- CO2 - Utilize trigonometry to solve branch specific engineering problems.
- CO3 - Solve area specific engineering problems under given conditions of straight lines.
- CO4 - Apply differential calculus to solve discipline specific problems.
- CO5 - Use techniques and methods of statistics to crack discipline specific problems.

TEACHING LEARNING & ASSESSMENT SCHEME

Course Code	Course Title	Abbr	Course Category	Learning Scheme							Assessment Scheme											Total Marks
				Actual Contact Hrs/ Week			N	L	C	D	P	Theory				Based on LL & TSL Practical				Based on SL		
				C	T	L						FA	SA	Total		FA PR		SA PR		SLA		
												TH	TH									
				CL	TL	LL					Max	Max	Max	Min	Max	Min	Max	Min	Max	Min		
311302	Basic Mathematics	BMS	AEC	4	2	-	2	8	4	3	30	70	100	40	-	-	-	-	25	10	125	

Total IKS Hrs for Sem: 6 Hrs

Abbreviations: CL- Class Room Learning, TL- Tutorial Learning, LL- Laboratory Learning, SLH- Self Learning Hours, NLH- Notional Learning Hours, FA- Formative Assessment, SA- Summative assessment, IKS - Indian Knowledge System, SLA- Self Learning Assessment. Legends: @Internal Assessment, # External Assessment, *# Online Examination, @\$ Internal Online Examination

SUGGESTED COS - POS MATRIX FORM

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)	
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/ Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2
CO1	3	1	-	1	-	1	1	1	-
CO2	3	1	-	-	1	1	1	1	-
CO3	3	-	-	-	-	-	-	-	-
CO4	3	1	1	1	-	1	-	1	-
CO5	3	2	1	1	1	1	1	1	-

Course Outcomes (COs) and Theory Learning Outcomes (TLOs)

By learning course Basic Mathematics, First Year students will be able to

CO No.	TLO No.	Course Outcomes (COs) and Theory Learning Outcomes (TLOs)
CO101.1		Apply the concepts of algebra to solve engineering (discipline) related problems.
	1.1	Solve the given simple problem based on laws of logarithm
	1.2	Solve given system of linear equations using matrix inversion method
	1.3	Obtain the proper and improper partial fraction for the given simple rational function
	1.4	Solve simultaneous equations by using concept given in Ancient Indian Mathematics.
CO101.2		Utilize trigonometry to solve branch specific engineering problems.
	2.1	Apply the concept of Compound angle, allied angle and multiple angles to solve the given simple engineering problem(s).
	2.2	Apply the concept of Sub- multiple angle to solve the given simple engineering related problem(s).
	2.3	Apply concept of factorization and de-factorization for formulae to solve the given simple engineering problem(s).
	2.4	Investigate given simple problems by utilizing inverse trigonometric ratios.
	2.5	Use concept given in Ancient Indian Mathematics for trigonometry to solve given problems.
CO101.3		Solve area specific engineering problems under given conditions of straight lines.
	3.1	Calculate angle between given two straight lines.
	3.2	Formulate equation of straight lines related to given engineering problems.
	3.3	Identify perpendicular distance from the given point to the line.
	3.4	Calculate perpendicular distance between the given two parallel lines.
	3.5	Use geometry given in Sulabha sutras to solve the given problems.
CO101.4		Apply differential calculus to solve discipline specific problems.
	4.1	Solve the given simple problems based on functions.
	4.2	Solve the given simple problems based on rules of differentiation
	4.3	Obtain the derivatives of composite, implicit, parametric, inverse, logarithmic, exponential functions.
	4.4	Apply the concept of differentiation to find given equation of tangent and normal.
	4.5	Apply the concept of differentiation to calculate maxima, minima and radius of curvature for given function
	4.6	Familiar with concept of calculus given in Indian Mathematics.
CO101.5		Use techniques and methods of statistics to crack discipline specific problems.
	5.1	Obtain the range and coefficient of range of the given grouped and ungrouped data
	5.2	Calculate mean and standard deviation of ungrouped and grouped data related to the given simple engineering problem(s).
	5.3	Determine the variance and coefficient of variance of given grouped and ungrouped data
	5.4	Justify the consistency of given simple sets of data.

TEACHING PLAN (TP)

Academic Year: 2026-2027

Institute Code: 0078

Program Information Technology

Course Code: 311302

Course: Basic Mathematics (BMS)

Semester: First [IF-1K]

Name of Faculty: Ms. D M Jori

Class: FYF - PARAM

Chap No. (Alotted Hrs.)	CO	TLO	Unit Name and Learning Content Title/ Details	No. of Lecture	Plan (From To)	Actual Execution (From To)	Teaching method/ Media	Remark
01 (12)	CO-1	I	Algebra	12				
		TLO-1.1	1.1 Logarithm Concept and laws of logarithm Examples based on laws of logarithm	02	03/08/26 To 03/08/26		Chalk & Black Board ppt., Video, LMS.	Ex.
		TLO-1.2	1.2 Matrices: Matrices, algebra of matrices, transpose, value of determinant of matrix of order 3X3, Adjoint and inverse of matrices. 1.3 Matrices: Solution of simultaneous equations by matrix inversion method.	06	04/08/26 To 11/08/26			
		TLO-1.3	1.4 Partial Fraction: Types of partial fraction based on nature of factors and related problems.	03	12/08/26 To 17/08/26			
		TLO-1.4	1.5 Algebra in Indian Knowledge System Solution of simultaneous equations (Indian Mathematics).	01	17/08/26 To 17/08/26			
02 (16)	CO-2	II	Trigonometry	16				
		TLO-2.1	2.1 Trigonometric ratios of Compound, allied multiple and sub-multiple angles with simple examples (without proofs)	05	18/08/26 To 24/08/26		Chalk & Black Board ppt., Video, LMS.	Ex.
		TLO-2.2	2.2 Factorization and De-factorization formulae with simple examples (without proofs)	03	25/08/26 To 27/08/26			
		TLO-2.3	2.3 Inverse trigonometric ratios and related problems. 2.4 Principle values and relation between trigonometric and inverse trigonometric ratios.	04	31/08/26 To 02/09/26			

		TLO-2.5	2.5 Trigonometry in Indian Knowledge System The Evolution of Sine Function in India. 2.6 Indian Trigonometry: Basic Indian Trigonometry- Introduction and Terminology (From Ancient Beginnings to Nilakant ha). 2.7 Trigonometry in Indian Knowledge System Pythagorean triples in Sulbasutras.	03	03/09/26 To 07/09/26			
		III	Straight line	06				
03 (06)	CO-3	TLO-3.1	3.1 Straight line and slope of straight line: Angle between two lines, Condition of parallel and perpendicular lines.	02	08/09/26 To 09/09/26		Chalk & Black Board ppt., Video, LMS.	Ex.
		TLO-3.2	3.2 Various forms of straight lines: Slope point form two point form Double intercept form General form	01	10/09/26 To 15/09/26			
		TLO-3.3	3.3 Perpendicular distance from a point on the line.	01	16/09/26 To 16/09/26			
		TLO-3.4	3.4 Perpendicular distance between two parallel lines.	01	17/09/26 To 17/09/26			
		TLO-3.5	3.5 Geometry in Sulbasutras in Indian Knowledge System (construction of square, circling the square). (Indian Mathematics).	01	21/09/26 To 21/09/26			
04 (16)	CO-4	IV	Differential Calculus	16			Chalk & Black Board ppt., Video, LMS.	Ex.
		TLO-4.1	4.1 Function and Limits: Concept of function and simple examples.	02	21/09/26 To 23/09/26			
		TLO-4.1	4.2 Concept of limits without examples.					
		TLO-4.2	4.3 Rules of derivatives such as sum product, quotient of function	04	24/09/26 To 29/09/26			
		TLO-4.3	4.4 Derivative of composite functions (chain Rule), implicit and parametric functions.	04	30/09/26 To 05/10/26			
		TLO-4.3	4.5 Derivatives of inverse logarithmic and exponential functions.					
		TLO-4.4	4.6 Applications of Derivative: Second Order Derivative without examples, Equation of tangent and normal, Maxima and Minima, Radius of curvature.	04	06/10/26 To 12/10/26			
		TLO-4.5		02	13/10/26 To			

		TLO-4.6	4.7 Calculus in Indian Knowledge System The Discovery of Calculus by Indian Astronomers. (Indian Mathematics).		14/10/25			
		V	Statistics	10				
05 (10)	CO-5	TLO-5.1	5.1 Range, coefficient of range of discrete and grouped data.	02	15/10/26 To 19/10/26		Chalk & Black Board ppt., Video LMS.	Ex.
		TLO-5.2	5.2 Mean deviation and standard deviation from mean of grouped and ungrouped data, weighted means		19/10/26 To 22/10/26			
		TLO-5.3	5.3 Variance and coefficient of variance.	02	26/10/26 To 26/10/26			
		TLO-5.4	5.4 Comparison of two sets of observation	02	27/10/26 To 29/10/26			

ASSESSMENT METHODOLOGIES/ TOOLS

A For native assessment (Assessment for Learning) (FA TH)

- Tests
- Self-learning
- Continuous assessment based on process and product related performance indicators.
- Each assignment will be assessed considering
 - 60 % weightage is to process
 - 40 % weightage to product

B Summative Assessment (Assessment of Learning) (SA TH)

- End Term Exam

SUGGESTED LEARNING MATERIALS / BOOKS

Sr. no	Author	Title	Publisher with ISBN Number
01	Grewal B S	Higher Engineering Mathematics	Khanna publication New Delhi, 2013 ISBN 8174091955
02	Dutta D	A text book of Engineering Mathematics	New age publication New Delhi, 2006 ISBN 978-81-224-1689-3
03	Kreyszig Ervin	Advance Engineering Mathematics	Wiley publication New Delhi 2016 ISBN 978-81-265-5423-2
04	Das H K	Advance Engineering Mathematics	S Chand publication New Delhi 2008 ISBN 9788121903455
05	Marvin L. Bittinger David J. Ellenbogen Scott A. Surgent	Calculus and Its Applications	Addison- Wesley 10th Edition ISBN-13: 978-0-321-69433-1
06	C S Seshadri	Studies in the History of Indian Mathematics	Hindustan Book Agency, New Delhi 110016 ISBN 978-93-80250-06-9

07	George Cheverghese Joseph	Indian Mathematics Engaging with the World from Ancient to Modern Times	World Scientific Publishing Europe Ltd 57 ISBN 978-17-86340-61-0
08	Deepak Singh	Mathematics-I	Khanna Book Publishing Co. (P) Ltd ISBN 978-93-91505-42-4
09	Gari ma Singh	Mathematics-II	Khanna Book Publishing Co. (P) Ltd ISBN 978-93-91505-52-3
10	Gareth James, Daniela Witten, Trevor Hastie Robert and Tibshirani	An Introduction to Statistical Learning with Applications in R	Springer New York Heidelberg Dordrecht London ISBN 978-1-4614-7137-0 ISBN 978-1-4614-7138-7 (eBook)
11	Gunakar Miley	Sansar Ke Mahan Ganitagya	First Edition, Rajkamal Prakashan, ISBN-10. 8126703571, ISBN-13.
12	T. S. Bhanumurthy	A Modern introduction to Ancient Indian Mathematics	New Age International Private Limited, 1 January 2008 ISBN-10. 812242600X ISBN-13. 978-8122426007
13	M. P. Trivedi and P. Y. Trivedi	Consider Dimension and Replace It	Notion Press; 1st edition (2018), ISBN-978-1644291795

LEARNING WEBSITES & PORTALS

Sr. No	Link/ Portal	Description
1	http://nptel.ac.in/courses/106102064/1	Online Learning Initiatives by IITs and IISc
2	www.scilab.org/ -SCI Lab	Signal processing statistical analysis, image enhancement.
3	www.mathworks.com/product/matlab/ - MATLAB	Applications of concepts of Mathematics to coding
4	Spreadsheet Applications	Use of Microsoft Excel, Apple Numbers, Google Sheets.
5	https://ocw.mit.edu/	MIT Course ware
6	https://www.khanacademy.org/math?gclid=CNqHuaBcys4CFdOJaddHoPg	Concept of Mathematics through video lectures and notes
7	http://ocwabu.edu.ng/courses/mathematics/	List of Mathematical Courses.
8	https://libguides.furman.edu/oer/subject/mathematics	Open Education Resources (OER) in Mathematics.
9	https://phet.colorado.edu/en/simulations/?filters=subjects=math&type=html,prototype	Phet Simulation for Mathematics
10	https://libguides.cmu.edu/OER/mathematics	Mathematics with OER

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