FOURTH YEAR UNDER GRADUATE PROGRAM(NEP-2020)

Program: Bachelor of Science (2024-28) DISCIPLINE— MATHEMATICS

Session-2024- 25

DS	SC -01 to08	DSE-01to12		DGE-01&02	
Code	Title	Code	1		
MASC-01	Elementary Calculus			Code	Title
MASC-02	Algebra	MASE-01	Advanced Calculus	MAGE-01	Elementary Calculus
MASC-03	Differential Equations	MASE-02	Mechanics	MAGE-02	Algebra
		MASE-03	Numerical Methods		
MASC-04	Abstract Algebra	MASE-04	Number Theory	SEC	-
MASC-05	Real Analysis	MASE-05	Integral Transforms		Tark and the
MASC-06	Metric Spaces	MASE-06	Topology	MASEC-01	Introduction to Later
MASC-07	Advanced Real Analysis		Complex Analysis - I	MASEC-02	Python
MASC-08	Advanced Abstract Algebra	MASE-08	Discrete Mathematics	VAC	
•			Measure Theory	MAVAC-01	Basic Mathematics and Logic
		MASE-10	General and Algebraic Topology		and Logic
		MASE-11	Complex Analysis - II		
		MASE-12	Graph Theory		

Program Outcomes(PO):

PO1: Ability to develop scientific temper and acquire in-depth knowledge of algebra, calculus, real analysis, complex analysis, topology and several other branches of mathematics. This program helps learners in building a solid foundation for higher studies in mathematics.

PO2:Utilize mathematics to solve theoretical and applied problems by critical thinking, understanding, analysis and synthesis.

PO3. The skills and knowledge gained has intrinsic beauty, which also leads to proficiency in analytical reasoning. This can be utilized in modeling and solving real life problems.

PO4. Ability to apply mathematical tools in Physics, Economics, Optimization and other subjects it will also develop understanding the architecture of curves and surfaces in plane and spaces etc.

Officer-leading (Academic)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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PO5. This program will also enable the learners to join teaching profession in schools and this will help the students to enhance their employability for government jobs, jobs in banking insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

aya, Raigarh (C.G

Cincer-la-Charge ('scale and) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

FOUR YEAR UNDER GRADUATE PROGRAM (2024-28) DEPARTMENT OF MATHEMATICS

Par	rt A	: Introduction	COURSE CURRICUL	UM			
P	rog	ram: Bachelor in Cair					
·1		cate/Diploma/Degree/Honors) urse Code	Semester - I	Session:2024	-2025		
2		urse Title		MASC-01			
3		urse Type	Eler	nentary Calculus			
4	Pre	e-requisite(if any)	DSC				
5	Co	urse Learning Outcome	Knowledge of basic Differential and Integral calculus				
	(C)	LO)	This Course will enable the students to: > Know about ancient Indian Mathematicians and their contribution > Calculate the limit and				
			Know about ancient India	an Mathematicians and the	ir contribution		
		1	outodiate the minit and e	xamine the continuity and	rrndameter 1 41		
			geometrical interpretation	1 Of differentiability Appl	ly various tests		
			TO GOLDLING COTTACL RELICE	: .			
			> Understand the consequer	nces of various mean value	theorems.		
			State of Curvature and Asymptotes				
			Draw curves in Cartesian and polar coordinate syntages				
			Understand the elementary integration of transcendental formation				
6	Cr	edit Value	and understand applications of reduction formulae.				
7		otal Marks	4 C 1Credit = 15 hours- Learning and observation				
Par		B: Content of the Course Maximum Marks: 100 Minimum Passing Marks: 40					
Tota	al no	of teaching learning					
UN	IIT	of teaching – learning per	iod =60 Periods (60 Hours)				
	-	Contributions and Biogra	Topics phy of Indian Mathematicia		No of Periods		
		Domayan, Abasinamn	Katuayan Mahassanala	ya, Brahmagupta and			
_		Duaskarachaya in special co	ontext of Leelavati	:			
I		Sequences. Continuity and	1d Differentiability.				
		Notion of convergence of	Sequences and series of real				
limit and continuity of a real valued function; Differential interpretation. Elementary Differentiation.				bility and its geometrical	•		
		Expansion of Functions:	Jinerentiation.	-			
**		Rolle's Theorem, Lagrange	's mean value theorem, Cauch				
i and their goometrical i			TIDICIADORS SUCCECCION ALLE	********	15		
		theorem, who allu I	aylul S theorems for expansion	on of a function	13		
		Cuivature, Asymptones, t	Urve Tracings				
444	,	Curvature: Asymptotes of	of general algebraic au-	s, Parallel asymptotes			
m	١.	- which the state of the state	CS. AVIIIIDEITY L'AMOGRATIC AL	nd	15		
		minouton, rangonio at on	gur Mulliple bolbte bysitio	n and makeur . P. s. s.	13		
		pounts, Tracing of Cartesian	, polar and parametric curves.				

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Officer-In-Charge (Academic)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

	IV	Integration: Elementary integration L.			
		Elementary integration, Integration of Transcendental formulae, Definite integral.	function,	Reduction	15
ſ	D/ C				^5

Text Books, Reference Books, Other Resources Text Books Recommended- 1. Howard Anton, I. Bivens& Stephan Davis (2016). Calculus (10th edition). Wiley India. 2. Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag. 3. Wieslaw Krawcewicz & BindhyachalRai (2003). Calculus with Maple Labs. Narosa. 4. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd. Reference Books Recommended- 5. George B. Thomas Jr., Joel Hass, Christopher Heil& Maurice D. Weir (2018). Thomas' Calculus (14th edition). Pearson Education. 6. Jerrold Marsden, Anthony J. Tromba& Alan Weinstein (2009). Basic Multivariable Calculus, Springer India Pvt. Limited. 7. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage. 8. Monty J. Strauss, Gerald L. Bradley & Karl J. Smith (2011). Calculus (3rd edition). Pearson Education. Dorling Kindersley (India) Pvt. Ltd. F-resources: https://onlinecourses.nptel.ac.in
Text Books, Reference Books, Other Resources 1. Howard Anton, I. Bivens& Stephan Davis (2016). Calculus (10th edition). Wiley India. 2. Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag. 3. Wieslaw Krawcewicz & BindhyachalRai (2003). Calculus with Maple Labs. Narosa. 4. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd. Reference Books Recommended- 5. George B. Thomas Jr., Joel Hass, Christopher Heil& Maurice D. Weir (2018). Thomas' Calculus (14th edition). Pearson Education. 6. Jerrold Marsden, Anthony J. Tromba& Alan Weinstein (2009). Basic Multivariable Calculus, Springer India Pvt. Limited. 7. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage. 8. Monty J. Strauss, Gerald L. Bradley & Karl J. Smith (2011). Calculus (3rd edition). Pearson Education. Dorling Kindersley (India) Pvt. Ltd. F-resources: https://onlinecourses.nptel.ac.in https://onlinecourses.nptel.ac.in https://onlinecourses.nptel.ac.in https://www.mooc.org Part D: Assessment and Evaluation Suggested Continuous Evaluation
 Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag. Wieslaw Krawcewicz & BindhyachalRai (2003). Calculus with Maple Labs. Narosa. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd. George B. Thomas Jr., Joel Hass, Christopher Heil& Maurice D. Weir (2018). Thomas' Calculus (14th edition). Pearson Education. Jerrold Marsden, Anthony J. Tromba& Alan Weinstein (2009). Basic Multivariable Calculus, Springer India Pvt. Limited. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage. Monty J. Strauss, Gerald L. Bradley & Karl J. Smith (2011). Calculus (3rd edition). Pearson Education. Dorling Kindersley (India) Pvt. Ltd. https://onlinecourses.nptel.ac.in https://onlinecourses.nptel.ac.in https://www.mooc.org Part D: Assessment and Evaluation
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Part D: Assessment and Evaluation Suggested Continuous Evaluation
Suggested Continuous Evaluation Mark
Suggested Continuous Evaluation No. 1
Tonting 70 Marks
1 est /Quiz — 20+20 Marks Potton
Assignment/Seminar-10 Marks Conducted by course teacher) Assignment/Seminar-10 Marks Obtained marks in Assignment shall
End Semester Two Section-A&B be considered against 30 marks
Examination Section-A: Ol Objective 10x1-10 modes 00 G
(ESE) Section-B: Descriptive answer type question, 1 out of 2 from each unit- 10x4= 40 Marks
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Name and signature of convener & members of CBOS-

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Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)



FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)

DEPARTMENT OF MATHEMATICS

COURSE CURRICULUM

Part A	: Introduction	- COLUMN	DECIV	
Program (Cert	m: Bachelor in Science ificate/Diploma/Degree/Honors) Course Code	Semester - II	Session:2024-2025	
3	Course Title	MASC-02		
4	Course Type Pre requisite	Algebra Discipline Specific Course (DSC)		
	Course Learning Outcome (CLO)	Knowledge of basic algebra, determinants and matrices. This Course will enable the students to: Learn about the Matrix algebra. Understand Set theory, Function and Relation Learn about the theory of equations. Learn about the fundamental concepts of groups, Subgroups. Understand cosets and normal subgroups		
6	Credit Value	4 C	10-12-161	
7	Total Marks	Maximum Marks : 10	1Credit = 15 hours- Learning and Observation	
		Tarana Marks . 10	Minimum Passing Marks:40	

Part B:	Content of the Course	
Total no	of teaching – learning period =60 Periods (60 Hours)	<u> </u>
UNIT	Tonics	·
I	Matrix Algebra: Introduction, elementary operations of matrices, Inverse of a matrix. Special types of matrices: Transpose of a matrix, Symmetric and Skew symmetric matrices, Hermitian and Skew Hermitian matrix, Rank of a matrix, Echelon form of a matrix, Normal form, Application of matrices to a system of linear (both homogeneous and non-homogeneous) equations, Theorems on consistency of a system of linear equations. Eigen values and Eigen vectors, relation between Eigen values and Eigen vectors. Process of finding Eigen values and Eigen vectors, Cayley Hamilton theorem, and its use in finding inverse of	No of Periods
п	Sets Theory & Functions: Sets, subsets Set operations and the laws of set theory and Venn diagrams. Examples of finite and infinite sets. Finite sets and counting principle. Empty set, properties of empty set. Standard set operations. Classes of a set. Power set of a set. Difference and symmetric difference of two sets. Set identities, Generalized union and intersection. Relations and Functions: Product set, Composition of relations, Types of relations, Partitions.	15
	Partial ordering relations. Function, Types of Function, Inverse Function, Composite	airman es

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Officer-in-Charge (Adademic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

m	Theory of equations: Symmetric functions of the roots of an equation Root of a multiplicity, Synthetic division, Greatest common Divisors, Relation between the roots and coefficients of general polynomial equations in one variable. Transformation of equations. Descarte's rule of signs. Solutions of cubic equations (Cardon method), Biquadrate equation.	
, IV	Group Theory: Definition and properties of a group, Abelian groups, Examples of groups, Subgroups and examples, Cosets and their properties, Lagrange's theorem and its applications, Normal subgroups and their properties, Simple groups, Factors groups.	
		15

				15				
Part C - Learnin	g Resource			,				
	Text Books Reference Pooks Office Po							
Text Books Recomm	toxt books recommended-							
1. RamjiLal (20	1. RamjiLal (2017). Algebra 1: Groups, Rings, Fields and Arithmetic. Springer. 2. Nathan Jacobson (2000). Paris Alexander Lord.							
3. John B. Frale	3. John B. Fraleigh (2007). A First Course in Abstract Algebra (7th edition). Pearson							
Defended in Abstract Algebra (7 th edition). Pearson								
Reference Books Re	ecommended	-						
4. Michael Arti	n (2014). Alg	ebra (2 nd edition). Pearson.						
J. Stephen H. F.	riedberg, Arn	old I Incel & Lawrence E Compa (2)	03). Linear Algebra (4thedi	tion				
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o. Joseph A. Ga	illian (2017).	Contemporary Abstract Algebra (9th	edition). Cengage.					
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o. i. iv. Heistell	1 (2006). 10p	ics in Algebra (2nd edition). Wiley Inc	lia.					
E-resources: https://onlinecourses.nptel.ac.in								
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	//swayam.gov							
	//www.mooc							
Part D: Assessn								
Suggested Continu	uous Evaluat	ion Methods:	The state of the s					
Maximum Marks:	•	100 Mar	ks	1				
Continuous Interr			S					
End Semester Ex								
Continuous Internal		Test/Quiz - 20+20 Marks	Better marks out of two te	st/quiz+				
Assessment (CIA)		Assignment/Seminar- 10 Marks	obtained marks in Assignm	ent shall				
(Conducted by course			be considered against 30 m	arks				
End Semester	Two Section							
Examination	Section-A:	Q1.Objective- 10x1=10 marks Q2. St	ort answer type question-5x	4=20marks				
(ESE)	Section-B: I	Descriptive answer type question, 1 o	ut of 2 from each unit- 10x4	= 40 Marks				

Name and signature of convener & members of CBOS-

(Dr. P. K. Sahu) 6

Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

Chairman

Studies ed Nandkumar Patel yalaya, Raigarh (C.G

FOUR YEAR UNDER GRADUATE PROGRAM (2024-28) DEPARTMENT OF MATHEMATICS

COURSE CURRICULUM

Part A: Introduction						
-				**************************************		
F	rogram: Bachelor in Science	Semester - I	G 1 200	1 1 2 2 2		
(Ce	rtilicate/Diploma/Degree/Honore	Semester - 1	Session:202	4-2025		
1	Course Code		AGE-01			
2	Course Title		ary Calculus			
3	Course Type		Elective (GE)			
4	Pre-requisite(if any)		Knowledge of basic Differential and Integral calculus			
5	Course Learning Outcome		This Course will enable the students to:			
	(CLO)	 Know about ancient Indian Mathematicians and their contribution 				
		Calculate the limit and examine the continuity and understand the				
		geometrical interpretation of	differentiability An	niv vorious tests		
		to determine convergence.	amerendability. App	pry various tests		
		➤ Understand the consequences of	of various mean valu	e theorems		
		> Understand concepts of Curvat	ture and Asymptotes	i meorenis.		
	a a	Draw curves in Cartesian and polar coordinate systems				
	> Understand the elementary integration of transcendental function					
	*	and understand applications of reduction formulae.				
6	Credit Value	4 C 1Credit = 15 hours- Learning and observation				
7	Total Marks Maximum Marks: 100 Minimum Passing Marks: 40					
Par	Part B: Content of the Course					
Tota	al no of teaching – learning per		Y			
UN	O C C	Topics		No of Periods		
	Bodhayan, Apasthamb,	phy of Indian Mathematicians:	D Y			
	Bhaskarachaya in special co	Katyayan, Mahaveeracharya,	Brahmagupta and	1		
1	Sequences, Continuity and	Differentiability:		15		
	Notion of convergence of	sequences and series of real num	bers. Definition of	15		
	limit and continuity of a rea	valued function; Differentiability	and its geometrical			
	interpretation. Elementary D	ifferentiation.				
	Expansion of Functions:	s mean value theorem, Cauchy's n				
П	and their geometrical inter	pretations. Successive differentia	nean value theorem	15		
	theorem, Maclaurin's and Ta	terpretations, Successive differentiation and Leibnitz Taylor's theorems for expansion of a function.				
	Curvature, Asymptotes, C	Curve Tracing				
777	Curvature; Asymptotes of	curvature; Asymptotes of general algebraic curves, Parallel asymptotes,				
Ш	Asymptotes parallel to axe	S; Symmetry, Concavity and cor	nverity Doints of	15		
	points: Tracing of Cartesian	inflection, Tangents at origin, Multiple points, Position and nature of double points; Tracing of Cartesian, polar and parametric curves.				
	Integration:	pour and parametric curves.				
· IV	Elementary integration, Int	egration of Transcendental func	tion, Reduction	12		
-	formulae, Definite integral.	A		15		
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Officer-In-Charge (Aundemic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)



Part C - Learning Resource Text Books, Reference Books, Other Resources Text Books Recommended-1. Howard Anton, I. Bivens & Stephan Davis (2016). Calculus (10th edition). Wiley India. 2. Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag. 3. Wieslaw Krawcewicz & BindhyachalRai (2003). Calculus with Maple Labs. Narosa. 4. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd. Reference Books Recommended-5. George B. Thomas Jr., Joel Hass, Christopher Heil& Maurice D. Weir (2018). Thomas' Calculus (14th edition). Pearson Education. 6. Jerrold Marsden, Anthony J. Tromba& Alan Weinstein (2009). Basic Multivariable Calculus, Springer India Pvt. Limited. 7. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage. 8. Monty J. Strauss, Gerald L. Bradley & Karl J. Smith (2011). Calculus (3rd edition). Pearson Education. Dorling Kindersley (India) Pvt. Ltd. E-resources: https://onlinecourses.nptel.ac.in https://epqp.inflibnet.aci.in https://swayam.gov.in https://www.mooc.org Part D: Assessment and Evaluation Suggested Continuous Evaluation Methods; Maximum Marks: 100 Marks Continuous Internal Assessment (CIA): 30 Marks End Semester Examination (ESE): 70 Marks Continuous Internal Test /Quiz -20+20 Marks Better marks out of two test/quiz + Assessment (CIA) Assignment/Seminar- 10 Marks obtained marks in Assignment shall (Conducted by course teacher) be considered against 30 marks **End Semester** Two Section-A&B Section-A: Q1.Objective- 10x1=10 marks Q2. Short answer type question-5x4=20marks Examination

Name and signature of convener & members of CBOS-

of spashpur Dr. Omlan Wishivantin

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Section-B: Descriptive answer type question, 1 out of 2 from each unit- 10x4= 40 Marks

Officer-In-Charge (Academic) Shahood Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.) Chairman f Studies Ged Nandkumar Patel Byalaya, Raigarh (C.G

In

FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)

DEPARTMENT OF MATHEMATICS

Part A:	Introduction	COURSE CURR	ICULUM	1
Program	Program: Bachelor in Science (Certificate/Diploma/Degree/Honors) 1		Session:2024-2025 MAGE-02 Algebra ic Elective (GE) , determinants and matrices. e students to: gebra. unction and Relation equations.	
6	Credit Value	Subgroups. > Understand cosets and normal subgroups		
7		4 C 1Credit = 15 hours- Learning and Observation		Observation
'	Total Marks	Maximum Marks	: 100	Minimum Passing Marks:40

Part B: Content of the Course							
Total no	Total no of teaching – learning period =60 Periods (60 Hours)						
UNIT	Topics	No of Periods					
Ĩ	Matrix Algebra: Introduction, elementary operations of matrices, Inverse of a matrix. Special types of matrices: Transpose of a matrix, Symmetric and Skew symmetric matrices, Hermitian and Skew Hermitian matrix, Rank of a matrix, Echelon form of a matrix, Normal form, Application of matrices to a system of linear (both homogeneous and non-homogeneous) equations, Theorems on consistency of a system of linear equations. Eigen values and Eigen vectors, relation between Eigen values and Eigen vectors. Process of finding Eigen values and Eigen vectors, Cayley Hamilton theorem, and its use to finding inverse of a matrix.						
п	Sets Theory & Functions: Sets, subsets Set operations and the laws of set theory and Venn diagrams. Examples of finite and infinite sets. Finite sets and counting principle. Empty set, properties of empty set. Standard set operations. Classes of a set. Power set of a set. Difference and symmetric difference of two sets. Set identities, Generalized union and intersection. Relations and Functions: Product set, Composition of relations, Types of relations, Partitions, Equivalence Relations with example of congruence modulo relation, Partial ordering relations. Function, Types of Function, Inverse Function, Composite of functions, Modular arithmetic and basic properties of congruences	15					

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Officer-In-Charge (Academic) Shahcod Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.) Chairman f Studies sed Nandkumar Patel dyalaya, Raigarh (C.G Sh

m	Theory of equations: Symmetric functions of the roots of an equation Root of a multiplicity, Synthetic division, Greatest common Divisors, Relation between the roots and coefficients of general polynomial equations in one variable. Transformation of equations. Descarte's rule of signs. Solutions of cubic equations (Cardon method), Biquadrate equation.	15
īv	Group Theory: Definition and properties of a group, Abelian groups, Examples of groups, Subgroups and examples, Cosets and their properties, Lagrange's theorem and its applications, Normal subgroups and their properties, Simple groups, Factors groups.	15

Part C - Learning	g Resource		*	
		Reference Book	s, Other Resource	es
Nathan Jacob	17). Algebra : son (2009). B	asic Algebra I (2	, Fields and Arithm nd edition). Dover F Abstract Algebra (7	netic. Springer. Publications th edition). Pearson
 Stephen H. Fr Prentice-Hall of 6. Joseph A. Ga Kenneth Hoff 	i (2014). <i>Alge</i> riedberg, Arno of India Pvt. I Ilian (2017). iman & Ray F	bra (2 nd edition). old J.Insel& Law t Contemporary Ab Sunze (2015). Lin	rence E. Spence (20 ostract Algebra (9th	003). Linear Algebra (4 th edition). edition). Cengage. lition). Prentice-Hall. dia.
https:/ https:/ https:/	//epqp.inflibn //swayam.gov //www.mooc	.in org		
Part D: Assessn			· · · · · · · · · · · · · · · · · · ·	
Suggested Continu Maximum Marks: Continuous Intern End Semester Exa	al Assessmer	ıt (CIA):	100 Mar 30 Mark 70 Mark	S
Continuous Internal Test /Quiz - 20+20 Marks Assessment (CIA) Assignment/Seminar- 10 Marks obtained marks in Assignment shall be considered against 30 marks				
End Semester Examination (ESE)	Two Section Section-A:	21.Objective- 10x		nort answer type question-5x4=20marks ut of 2 from each unit- 10x4= 40 Marks

Name and signature of convener & members of CBOS-

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Officer-In-Charge (Academic) Shahced Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

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FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)

DEPARTMENT OF MATHEMATICS COURSE CURRICULUM -2024-25

Port	A. Tedan I	CORRECTION	1-2024-2.)	
D.	A: Introduction				
(Certif	am: Bachelor in Science ficate/Diploma/Degree/Honors)	SEMESTER-II	/IV/V/VI	Session: 2024-2025	
1	Course Code		MASEC-1		
2	Course Title	Introduction to			
3	Course Type	Skil	l Enhancen	nent Course (SEC)	
4	Pre-requisite (if, any)	Basic understanding of document editing, familiarity with markup languages, and willingness to learn LaTeX syntax and formatting conventions.			
5	Course Learning Outcome (CLO)	 and formatting conventions. This Course will enable the students to: Make different Alignments in a document and an Application for a job. Generate Bio-Data, and Table Structures. Create Mathematical Statements using LaTex. Prepare Articles and Inserting Pictures. Prepare Question paper and PowerPoint presentation in LaTex format. 			
6	Credit Value	2 Credits Credit = 15 Hours – Theoretical (1C + 1C) learning and = 30 Hours Laboratory or Field learning/Training		learning and Hours Laboratory or Field learning/Training	
7	Total Marks	Max. Marks:	50	Min Passing Marks: 20	

Theory	Total No. of Teaching-learning Periods; - 15 Periods (15 Hrs) and Lab. or Field learning/Training 30 Periods (30 Hours)	
Unit	Topics (Course contents)	No. of Period
I	Basics: Introduction to LaTeX, Text, Symbols and Commands, Document layout and organization, displayed text. Mathematical formulas, Graphics inclusion and color. Floating tables and figures, User customizations. Beyond the Basics: Document management, Postscript and PDF, Beamer, Frames, Bibliographic data bases and BiBTeX, Presentation material.	15
п	Practicals Based on- 1.Introduction to TeX and LaTeX- Creating and typesetting a simple LaTeX document, 2.Adding basic information to documents- Environments, Footnotes, Sectioning, Displayed material. 3.Accents and symbols- Mathematical typesetting (elementary and advanced): Subscript/ Supersoript, Fractions, Roots, Ellipsis,	30

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4.Mathematical symbols - Arrays, Delimiters, Multiline formulas, 5. Putting one thing above another-Spacing and changing style in math mode. 6. Pictures and graphics in LaTeX-Simple pictures using PSTricks, Plotting of functions. 7.Beamer, Frames-Setting up beamer document, Enhancing beamer presentation 8.Bibliographic data bases and BiBTeX-Create and manage bibliographic references using BiBTeX

Part C - Learn	ing Resource					
	Text Books, Reference Books, Other Resources					
	Text Books Recommended-					
1. Murugan Sw	raminathan, Latex For Beginners, Publisher: Notion Pr	ress				
Reference Books						
2. Dilip Datta,L	atex in 24 Hours A Practical Guide for Scientific Writ	ing,Springer				
E-resources:						
Free Online Lal	TeX Editor- https://www.overleaf.com/					
PART -D: As	sessment and Evaluation					
Suggested Continu	uous Evaluation Methods:	¥				
Maximum Marks:						
Continuous Intern	al Assessment (CIA): 15 Marks	· ·				
End Semester Exa						
Continuous	Internal Test / Quiz-(2): 10 & 10	Better marks out of the				
Internal	Assignment/Seminar +Attendance - 05	two Test / Quiz				
Assessment	Total Marks - 15	+ obtained marks in				
(CIA):	4	Assignment shall be				
(By Course		considered against 15				
Coordinator)		Marks				
End Semester	Laboratory / Field Skill Performance: On spot	Managed by Coordinator				
Exam (ESE):	Assessment	as per skilling				
	A. Performed the Task based on learned skill - 20 Marks					
	B. Spotting based on tools (written)					
	- 10 Marks					
	C. Viva-voce (based on principle/technology) -					
	05 Marks					

Name and signature of convener & members of CBOS-

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Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

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FOUR YEAR UNDER GRADUATE PROGRAM(2024-25)

DEPARTMENT OF MATHEMATICS COURSE CURRICULUM

Par	Part A: Introduction				
Pro	Program: Bachelor in Saturday				
(Cer 1 2 3 4	Course Title Course Type Pre-requisite (if, any) Course Learning Outcome (CLO)	Python Skill Enhancement Course (SEC) Basic understanding of programming concepts, familiarity with syntax. This Course will enable the students to: To write python programs, develop a small application and logic for problem solving. To be familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc. To be familiar with string and its operation. To develop basic concepts of function and terminology. To determine the methods to create and develop Python programs by Utilizing the data structures like lists and tuples.			
6	Credit Value	2 Credits Credit = 15 Hours - Theoretical learning and (1C + 1C) = 30 Hours Laboratory or Field learning/Training			
7	Total Marks	Max, Marks: 50 Min Passing Marks: 20			

Part B: Content of the Course			
UNI T	Topics	No. of Hours	
1	(A) Python Basic and IDE: Introduction of Python, Installing Python, Running Simple Program, Removing Keys, Traversing a Dictionary. Basic of Python: Data type of Python., Variable declaration rule, Python Identifier and reserved words, Input Output Function Operator of Python, Advanced Python operator (Membership and identity), Comments in Python, Line and Indentation, (B) Conditional structure: if Statements, if else and statement, Nested if, if-elif- else ladder Loop Control Structure, While loop, For loop, Nested loop, Break Statement, Continue Statement, Pass Statement - Practical 6,7& 8 (C) String and Function String Basics, Accessing and updating String, Built-in String Methods Function in Python, Declaration and Calling function, Function Argument, Anonymous Functions Python Lists, Accessing and updating List, Basic List Operation, Built-in List Methods, Python Tuple, Accessing and updating tuple, Basic tuple operation, Built-in tuple Method.	15	

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Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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II List of practicals based on Python:-

- Practical 1 Write a Python program that asks the user for their name and age, then prints a message greeting the user with their name and mentioning their age.
- Practical 2 Define a list with at least three elements of different data types and print the list.
- Practical 3- Writeaprogram thattakestwonumberandprint thesumof thesenumbers.
- Practical 4 -Writeaprogramtocheckwhethertheinputnumberiseven orodd.
- Practical 5- Write a program to compare three numbers and print the largest one.
- Practical 6- Writeaprogramtoprintfactors of agivennumber.
- Practical 7-Writeaprogram toprint tableusingwhileLoop.
- Practical 8 Writeaprogramtocreatethe following Pattern
- Practical 9- Write a Python program that takes a lowercase string from the user and converts it to uppercase.
- Practical 10- Write a function that takes a string input and checks if it is a palindrome or not,
- Practical 11- Write a Python program that defines a function to calculate the sum of two numbers.
- Practical 12- Create a tuple representing the days of the week and update the last element with "Sunday". Print the updated tuple.
- Practical 13- Write a Python program that concatenates two tuples and prints the concatenated tuple,
- Practical 14- WAP to create a list of numbers and sort the list in ascending order.
- Practical 15- Write a list function to convert a string into a list, as in list (-abc) gives [a, b, c].

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Text Books Recommended-

- 1. Fundamentals of Python first programs, 2nd Edition, Kenneth A. Lambert.
- 2. Beginning Python from Novice to Professional, Third Edition, Magnus Lie Hetland

Reference Books Recommended-

- 3. Python for Science and Engineering, Hans-PetterHalvorsen.
- 4. Python Programming: An Introduction to Computer Science, Third Edition, John Zelle.
- 5. Introduction to Scientific Computing in Python, Continuum Analytics and Robert Johansson.

E-Recourses:

https://onlinecourses.nptel.ac.in https://epqp.inflibnet.aci.in https://swayam.gov.in https://www.mooc.org

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:

50 Marks

Continuous Internal Assessment (CIA): 15 Marks

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End Semester Exam (ESE):

35 Marks

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Continuous Internal Assessment (CIA):	Internal Test / Quiz-(2): 10 & 10	
(By Course Coordinator)	Total Marks -	Better marks out of the two Test / Quiz
	15	+ obtained marks in Assignment shall be
End Semester Exam	Laboratory / Rield Chiu P. C	considered against 15 Marks
(ESE):	Laboratory / Field Skill Performance: On spot	Managed by Coordinator as per skilling
	A. Performed the Task based on learned skill - 20 Marks	
	B. Spotting based on tools (written) −10 Marks	
	C. Viva-voce (based on principle/technology) - 05 Marks	

Name and signature of convener & members of CBOS-

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Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

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FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)

DEPARTMENT OF MATHEMATICS
COURSE CURRICULUM

Part	Part A: Introduction				
P	rogram: Bachelor in Science	Class: B.Sc. I/III/V Sem Session:2024-2025			
(Cer	rtificate/Diploma/Degree/Honors)	GMSS, B.SC. I/III/ V Sciii Bessioii.2024-2025			
1	Course Code	MAVAC-1			
2	Course Title	Basic Mathematics and Logic			
3	Course Type	Value Addition Course			
4	Course Learning Outcome	This Course will enable the students-			
	(CLO)	To orient them towards life-long learning, to develop power of concentration and to overcome the fear of mathematics from their mind.			
		To cultivate scientific temper through systematic, critical and lateral thinking.			
		> To enhance their logical, analytical and reasoning skills useful for competitive exams.			
		To make understand the relevance and need of quantitative methods for making business decisions.			
5	Credit Value	2 Credits Credit = 15 Hours - learning & Observation			
6	Total Marks	Max. Marks: 50 Min Passing Marks: 20			

PART	PART -B: Content of the Course			
	Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30 Hours)			
Unit	Topics (Course contents)	No. of Period		
	Basic Mathematics			
I	Brief history of Vedic Mathematics (In Indian Knowledge Tradition), Sanskrit terminology involved in 16 Sutras and 13 Sub-Sutras and their meaning, Addition, Subtraction, Multiplication & Division using different techniques of Vedic Mathematics, Squaring numbers, Square roots of perfect squares, Cube roots of perfect cubes, Methods of quick verification of answers through Digit Sum Method	8		
П	Problem based on Numbers, Decimal Fractions, Average, Simple Interest, Percentage, Clocks	8		
ш	Problems on Profit & Loss, Discount, Ages, Speed, Time & Distance, Train, Ratio & Proportion, Mixture	8		

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Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.) **5**4

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īv	Logical Ability:	
	Problems on Series Completion, Coding- Decoding, Inserting the Missing Character, Problems on Mirror Image & Water Image	O
	Problems on Blood relations, Direction Sense Tests, Cubes & Dice, Logical Deductions based on Universal, Particular, Affermative & Negative Premises.	

	Part C - Learning Resource	
	Text Books, Reference Books, Other Reso	urces
Text Books Recomme	nded-	nd and an amount the land and reduction and but and but a second reduction with the reduction and the safety
2. AbhijitGu Limited.,Ne 3. Dr. R.S. A New Delhi	ggarwal, Verbal & Non -Verbal Reasoning, S.	blishing Company
Reference Books Reco	mmended-	بالمرافق فيالو في فيتمانيك والمعامل والمواقية والمنافقة في المارة والمارة والمعارفة والمعارفة والمعاملة والمعاملة
5. Govind Pr Competitive 6. Vedic Math	mar Singh, Tricky Mathematics, Success Mantra asad Singh &Rakesh Kumar, Text Book of Quick Examinations) nematics Made Easy Published by Dhaval Bhatia	a Publications, Patna kest Mathematics (For all
PART -D: Asses	sment and Evaluation	
Suggested Continuous	Evaluation Methods:	No.
Maximum Marks:	50 Marks	
Continuous Internal As	sessment (CIA): 15 Marks	*
End Semester Exam (E. Continuous Internal Assessment (CIA): (By Course Teacher)	SE): 35 Marks Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar + Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
Section (ESE).	wo section — A & B tion A; Q1. Objective — 05 x1= 05 Mark; Q2. Short tion B: Descriptive answer type qts., lout of 2 from e	answer type- 5x2 =10 Marks ach unit- 4x05 =20 Marks

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Name and signature of convener & members of CBOS-

Officer-In-Charge (Academic)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

शहीद नंदकुमार पटेल विश्वविद्यालय, रायगढ़ (छ.ग.)

(छत्तीसगढ़ विश्वविद्यालय अधिनियम 1973 द्वारा स्थापित राजकीय विश्वविद्यालय)



राष्ट्रीय शिक्षा नीति – 2020 के तहत तृतीय एवं चतुर्थ सेमेस्टर नवीन पाठ्यक्रम (सत्र 2025–26)

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FOURTH YEAR UNDER GRADUATE PROGRAM(NEP-2020)

Program: Bachelor of Science (2024-28)

DISCIPLINE MATHEMATICS

Session-2024-25

D:	SC -01 to08	DSE-01to12		DGE-0	DGE-01&02	
Code	Title	Code	Title	Code	Title	
MASC-01	Elementary Calculus	MASE-01	Advanced Calculus	MAGE-01	Elementary Calculus	
MASC-02	Algebra	MASE-02	Mechanics	MAGE-02	Algebra	
MASC-03	Differential Equations		Numerical Methods	1 (02 02		
MASC-04	Abstract Algebra	MASE-04	Number Theory	SEC	 	
MASC-05	Real Analysis	MASE-05	Integral Transforms	MASEC-01	Introduction to Latex	
MASC-06	Metric Spaces	MASE-06	Topology	MASEC-02	Python	
MASC-07	Advanced Real Analysis	MASE-07	Complex Analysis - I	111102002		
MASC-08	Advanced Abstract Algebra	MASE-08	Discrete Mathematics	VAC	1	
		MASE-09	Measure Theory	MAVAC-01	Basic Mathematics and Logic	
			General and Algebraic Topology	4 .		
		MASE-11	Complex Analysis - II			
		MASE-12	Graph Theory			

Program Outcomes(PO):

PO1: Ability to develop scientific temper and acquire in-depth knowledge of algebra, calculus, real analysis, complex analysis, topology and several other branches of mathematics. This program helps learners in building a solid foundation for higher studies in mathematics.

PO2:Utilize mathematics to solve theoretical and applied problems by critical thinking, understanding, analysis and synthesis.

PO3. The skills and knowledge gained has intrinsic beauty, which also leads to proficiency in analytical reasoning. This can be utilized in modeling and solving real life problems.

PO4. Ability to apply mathematical tools in Physics, Economics, Optimization and other subjects it will also develop understanding the architecture of curves and surfaces in plane and spaces etc.

Officer-leading (Auademic)
Shahood Nandkumar Patel

Vishwavidyalaya, Raigarh (C.G.)

PO5. This program will also enable the learners to join teaching profession in schools and this will help the students to enhance their employability for government jobs, jobs in banking insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

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FOUR YEAR UNDER GRADUATE PROGRAM (2024-28)

DEPARTMENT OF MATHEMATICS COURSE CURRICULUM

Do	mt A. T. C.	COOKSE COKK	ICULUM		
10	rt A: Introduction				
11	ogram: Bachelor in Science ploma/Degree/Honors) Course Code	Semester - III	Session:2024-2025		
-2	Course Title		MASC-03		
3	Course Type		Differential Equations		
4	Pre-requisite(if any)	Di	scipline Specific Course (DSC)		
5	Knowledge of basic Differential and Integral calculus and diffe				
3	Course Learning Outcome (CLO) This Course will enable the students to: Learn various techniques of getting exact solutions of cerearch.				
	en aller in de la companya de la com	solvable first order differential equations and linear differential equations of second order.			
7		Understand differential ed	the genesis of ordinary as well as partial pations.		
		 Learn about solution of first order linear partial differential equations using Lagrange's method. Know how to solve second order linear partial differential equations with constant coefficients. 			
	7.12				
6	Credit Value				
7	7 Total Marks Maximum Marks: 100 Minimum Passing Marks: 40				

LINITE	f teaching — learning period =60 Periods (60 Hours)	
UNIT	Tonias	- AV - C-
	Contributions and Biography of Indian Mathematicians:	No of Period
	First Order and higher degree Different Land Parmeshwar.	
Ţ	variables are separable. Homogeneous and first degree, Equations in which	15
	Integrating factor, First order higher degree equations solvable for x, y and p,	
īī	Linear differential equations with constant coefficients, Homogeneous linear ordinary differential equations. Linear differential equations of second order. Transformation of the equation by changing the dependent variable/the independent variable. Method of variation of parameters. Ordinary	15.
ш	First order Partial differential equations: Lagrange's solution, Some special types of equation which can be solved by methods other than general method, Charpit's general method of solution.	15

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Second and higher order Partial differential equations:

Classification of Linear partial differential equation of second order,
Homogeneous and non-homogeneous equation with constant coefficients,
Partial differential equation reducible to equation with constant coefficients.

Monge's Method.

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Part C - Les	irning Re	source			
	·	Tank Duck to	ther Degrees		
Text Books Re	ecommende				
1. Dr. M. D	. Rajsingha	nia, Ordinary and partial Differential	Equation ,S. Chand and company Pvt.Ltd.		
2. A.H. Sid	diqi and P. 1	Manchanda, A first course in Differential	ential Fountiers with A 11		
Macmilla	in Îndia Ltd	, at anot od moo in Billere	ential Equations with Applications,		
Reference Boo	ks Recomm	ended-			
3. Erwin K	reyszig (20)	1). Advanced Engineering Mathema	tion (10th adition) I William B. Com		
4. B. Rai&	D. P. Choud	hury (2006). Ordinary Differential B	tics (10 ^{at} edition), J. Wiley & Sons Equations - An Introduction, Narosa		
Publishin	g House Pv	Ltd. New Delhi.	quations - Mit Introduction, Indiosa		
2. Suchie I	- Ross (200	7). Differential Fountions and - 122	n) Wiley		
			pplications and Historical Notes (3rd		
edition).	CRC Press.	Taylor & Francis.	epineanons and itistorical typies (3.4		
7. Ian N. Sn	eddon (2006). Elements of Partial Differential Ed	quations Dover Publications		
			gamens, 20 vol 1 honeations,		
E-resources: h	ttps://onlin	ecourses.nptel.ac.in			
<u>]</u>	ttps://epap.	inflibnet.aci.in	3 ·		
<u>1</u>	ttps://swaya	m.gov.in			
	ttps://www.				
Suggested Co	ssment a	nd Evaluation			
Maximum Ma	tinuous Ev	aluation Methods:			
Continuous In	rks: tomal Asset		Marks		
Continuous Internal Assessment (CIA): End Semester Examination (ESE): 70 Marks					
Onlinitous Internal					
Assessment (CLA	()	Test/Quiz — 20+20 Marks	Better marks out of two test/quiz+		
Conducted by cou	rse tëacher)	Assignment/Seminar- 10 Marks	obtained marks in Assignment shall be		
End Semester	Two Secti	on-A&R	considered against 30 marks		
Examination	Section-A	Ol Objective 10v1=10 mode on a			
(ESE)	Section-R	Descriptive appropriate to the state of the	Short answer type question-5x4=20marks		
	- 4011VII-10	2000 per ve answer type question, 1	out of 2 from each unit- 10x4= 40 Marks		

Name and signature of convener & members of CBOS
Denker & Physical Charles and Charles a

FOUR YEAR UNDER GRADUATE PROGRAM(2024-25) DEPARTMENT OF MATHEMATICS COURSE CURRICULUM

Part A: Introduction Program: Bachelor in Science (Diploma/Degree/Honors) 1 Course Code 2 Course Title 3 Course Type 4 Pre-requisite(if any) 5 Course Learning Outcome (CLO) 5 Understand of Homomorphism, Isomorphism of Group 5 Understand Cyclic and Permutation Groups. 6 Learn about properties of linear transformation and isomorphism theorems. 7 Total Marks 8 Maximum Marks: 100 Part B: Content of the Course Total no of teaching — learning period = 60 Periods (60 Hours) UNIT 1 Isomorphism Theorems, Cyclic and Permutation Groups: Group homomorphism and isomorphism with properties; First, second and third isomorphism theorems for groups. Cyclic groups and properties, Classifications of subspoup of cyclic groups, Permutation group and properties, Even and odd permutations, Cayley's theorem. Ring, Field and Integral Domain, Ideals: Definition and properties of a ring, example of rings, Subrings, Integral domain and fileds, characteristic of ring and field. Ring Homomorphism, Ideals and Quotient Rings. Field of Quotients of an Integral Domain, Euclidean Rings, Polynomial Rings, Polynomial Rings, Optynomial Rings, Optynomial Rings, Unique factorization domain. R unique factorization domain implies so is R [x1, x2]. 11 Isomorphism Cherens of vector spaces. Subspaces. Sum and direct sum of subspaces, Linear span. Linear dependence, independence and their basic properties. Basis. Finite dimensional vector spaces. Existence theorem for bases. Invariance of the number of elements of a fainte dimension. Existence of complementary subspace of a subspace of a finite dimension. Existence of complementary subspaces. Quotient space and its dimension.			COURSECTI	DICTILIDA		
Program: Bachelor in Science Semester - IV Session; 2024-2025	Part A	A: Introduction		CALCULUM		
Course Code	Progra	m: Bachelorin Cain	o Court			
Course Title	(Diplon	na/Degree/Honors)	Semester - IV	Session:2024-	2025	
2 Course Title Abstract Algebra Abstract Algebra Abstract Algebra Abstract Algebra Abstract Algebra Discipline Specific Course (DSC) Knowledge of algebra, vector space and inner product space. Course Learning Outcome (CLO) Understand of Homomorphism, Isomorphism of Group Understand Cyclic and Permutation Groups. Understand vector spaces, subspaces, basis, dimension and their properties. Learn about properties of linear transformation and isomorphism theorems. Understand the concept of linear transformation and isomorphism theorems. Understand the concept of linear transformation and isomorphism theorems. Credit Value 4 C 1Credit = 15 hours - Learning and Observation Total Marks Maximum Marks; 100 Minimum Passing Marks; 40 Part B: Content of the Course Total no of teaching - learning period =60 Periods (60 Hours) UNIT Somorphism Theorems, Cyclic and Permutation Groups: Group homomorphism and isomorphism with properties; First, second and third isomorphism theorems for groups, Cyclic groups and properties, Classifications of subgroup of cyclic groups, Permutation group and properties, Even and odd permutations, Cayley's theorem. Ring, Field and Integral Domain, Ideals: Definition and properties of a ring, example of rings, Subrings, Integral domain and fields, characteristic of ring and field. Ring Homomorphism, Ideals and Quotient Rings, Field of Quotients of an Integral Domain, Euclidean Rings, Polynomial Rings over Commutative Rings, Unique factorization domain. R unique factorization domain implies so is R [x1, x2xn]. Vector Spaces: Definition and examples of vector spaces. Subspaces. Sum and direct sum of subspaces, Linear span. Linear dependence, independence and their basic properties. Basis. Finite dimensional vector spaces. Existence theorem for bases. Invariance of the number of elements of a basis set. Dimension. Existence of complementary subspace of a finite dimensional vector space of a finite dimensional vector spaces.	1	Course Code				
A Pre-requisite(if any) Knowledge of algebra, vector space and inner product space.						
Pre-requisite(if any) Knowledge of algebra, vector space and inner product space.				Abstract Algebra		
Course Learning Outcome (CLO) Vinderstand of Homomorphism, Isomorphism of Group Vinderstand Cyclic and Permutation Groups. Vinderstand Vector spaces, subspaces, basis, dimension and their properties. Learn about properties of linear transformation and isomorphism theorems. Vinderstand the concept of linear transformation. Credit Value			Knowledge - C-1 (iscipline Specific Course (DSC)		
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Learn about properties of linear transformation and isomorphism theorems. Understand the concept of linear transformations.			> Understand wester	d Permutation Groups.		
Default properties of linear transformation and isomorphism theorems.			properties	spaces, subspaces, basis, dir	nension and their	
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Substant the concept of linear transformations.			theorems	thes of imear transformation	and isomorphism	
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and its dimension.	7	Joe Spa	ce. Dimension of sums of	f subspace of a finite		
		and its dimension.		Louispaces, Quotient space		

IV L	near Transfo	rmation				
1.1	Linear transformations and their representation as matrices. The Algebra of linear transformations. The rank nullity theorem. Change of hearing Durch					
lir	ear transform	ations and their representation as ations. The rank nullity theorem. Ch ad natural isomorphism. Adjoint of a	matrices. The Algebra of	15		
			ange of basis. Dual space			
Part C - Le	arning D	d natural isomorphism. Adjoint of a	linear transformation			
	Resc					
Text Books R		Text Books, Reference Books, Ot	har Dasaurass			
1 1	ecommended	-	aci Resources			
2, 19	atnan Jacobso	n (2009), Basic Algebra I (2 nd edition n (2009), Basic Algebra II (2 nd edition	Davier Dubling			
Reference D	athan Jacobso	n (2009). Basic Algebra I (2 nd edition n (2009). Basic Algebra II (2 nd edition anded-	n) Dover Publications,			
Reference Bo	ks Recomme	nded-	il). Dover Publications.			
3. (1,	M. Gel'fand (1989). Lectures on Linear Algebra. I	Joyce Dublingti	_		
4. K	enneth Hoffma	an & Ray Kunze (2015), Linear Algebra, I S), Introduction to Linear Algebra (bra (2nd oddien) B	_		
5, Se	rge Lang (200	2014), Linear Algebra and its Anglice 2014), Linear Algebra and its Anglice	ora (2 edition). Prentice-Hal	L		
6. G	lbert Strang (2	2014). Linear Algebra and its Applica	edition), Springer India.			
-resources:	https://online	8-94 mile ile Tippiici	mons (2 edition). Elsevier			
,	heart/	courses.nptel.ac.in		-		
	https://epqp.ir	iflibnet,aci,in				
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	https://www.n	100¢.org				
Part D: Ass	essment an	d Evaluation		·		
Suggested Co	Itinuous Eval	luation Methods:				
TATUTUM TAT	irks:	4.55	Montes			
Continuous I	iternal Assess	ment (CTA).				
Enu Semeste	[•] Examination	- More				
Continuous Internal Test (Ovig 20120 25)						
ontinuous Int	CIMAL		Deller marke out of two tool	disin !		
ssessment (CI	A)	Assignment/Seminar- 10 Marks	Better marks out of two test	quiz +		
ssessment (CI conducted by co	A) urse teacher)	Assignment/Seminar- 10 Marks	obtained marks in Assignmen	quiz+ it shall be		
ssessment (CI Conducted by co End Semester	A) use teacher) Two Sect	Assignment/Seminar- 10 Marks	obtained marks in Assignment considered against 30 marks	it shall be		
ssessment (Cl Conducted by co End Semester Examination	A) use teacher) Two Section-A	Assignment/Seminar- 10 Marks on-A&B : Q1.Objective- 10x1=10 marks O2	obtained marks in Assignment considered against 30 marks	nt shall be		
ssessment (CI Conducted by co End Semester	A) use teacher) Two Section-A	Assignment/Seminar- 10 Marks	obtained marks in Assignment considered against 30 marks	nt shall be		

Name and signature of convener & members of CBOS-

Dr. Ornkan Kuls

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FOUR YEAR UNDER GRADUATE PROGRAM(2024-28) DEPARTMENT OF MATHEMATICS

Par	t A	Introduction	COURSE CU	RRICULUM	
Ţ	rogi	cam: Bachelor in	Semester - III		
1	Olploi Cor	Science ma/Degree/Honors) arso Codo		Session:2024-2025	g Perg
2	Cor	urse Title MASE-01			
3	Cor	irse Typo		Advanced Calculus	
4	bla	-requisite (if any)	Basic idea of standard	scipline Specific Elective (DSE)	
5	Cot	urse Learning	This Courses will an	ry differential and integral calculus	
	Out	This Course will enable the students to: Calculate the limit and examine the continuity and understand the concepts of limit, continuity and differentiability of functions of more than one variable with geometrical interpretation. To Understand the concepts of mean value theorems with their applications. To understand the concept of maxima and minima for functions of two and there are also because the students to:			of functions of on. oms with their
	two thick three variables with their uses and techniques				g from one
7		edit Value	4 C	1Credit = 15 hours- Learning and	observation
		otal Marks	Maximum Marks : 100	Minimum Passing Marks:40	C S I
Par	t B:	Content of the Cou	rse		
Tot	al no	of teaching - learni	ing period =60 Periods	(60 Hours)	
-UI	TIV	* '	Topics		No of Periods
Limit and continuity of function of two and three variables. Mean value theorems of function of two variables- First mean value theorem and taylor's theorem. Partial Differentiation and Euler's theorem on homogeneous functions, Change of variables.		15			
Partial Derivation and differentiability of function of two variables. Schwartz's theorem, Young's theorem, Implicit function theorem. Fourier series, Fourier expansion of piece wise monotonic function.		15			
11	I	Lagrange's multiplic	ers method. Envelopes,	points of function of two variables. Evolutes	15
, n	Beta and Gamma function. Double and triple integrals Dirichelet's integrals. Change of order of integration.		15		
			ON ICENS	yland	

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Part C - Learning Resource Text Books, Reference Books, Other Resources Text Books Recommended-1. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd. 2. Mathematical Analysis, S.C. malik and S. Arora, New age international, Delhi 3. Howard Anton, I. Bivens & Stephan Davis (2016). Calculus (10th edition). Wiley India. 4. Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag. 5. Wieslaw Krawcewicz & Bindhyachal Rai (2003). Calculus with Maple Labs. 6.Principles of Mathematical analysis, W.Rudin, McGraw Hill Publication 7. Jerrold Marsden, Anthony J. Tromba & Alan Weinstein (2009). Basic 8. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage. E-resources: https://onlinecourses.nptel.ac.in https://epop.inflibnet.aci.in https://swavam.gov.inhttps://www.mooc.org Part D: Assessment and Evaluation Suggested Continuous Evaluation Methods: Maximum Marks: 100 Marks Continuous Internal Assessment (CIA): 30 Marks End Semester Examination (ESE): 70 Marks Continuous Internal Test /Quiz -20+20 Marks Better marks out of two test/quiz + Assessment (CIA) Assignment/Seminar-10 Marks obtained marks in Assignment shall (Conducted by course teacher) be considered against 30 marks Two Section-A&B End Semester Examination Section-A: Q1.Objective- 10x1=10 marks Q2. Short answer type question-5x4=20marks (ESE) Section-B: Descriptive answer type question, 1 out of 2 from each unit- 10x4=40 Marks

Name and signature of convener & members of CBOS-

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FOUR YEAR UNDER GRADUATE PROGRAM (2024-28) DEPARTMENT OF MATHEMATICS

Pa	Part A: Introduction COURSE CURRICULUM				
Pr	Ograms Back Notice on				
1	ogram: Bachelor in Science	Semester - IV	Carrie Contact		
1	(Diploma/Degree/Honors) Course Code		Session:2024-2025		
2	Course Titl	M	IASE-02		
3	Course Title		CHANICS		
4	Course Type	Discipline Spe	ecific Elective (DSE)		
5	Pre-requisite(if any)	Basic idea of Statics and Dynan	nice		
٥	Course Learning	This Course will enable the stu	identa to		
İ.	Outcome (CLO)	The object of the paper	s to give students knowledge of basic		
		mechanics such as simple	c harmonic motion, motion under other		
		laws and forces.	mainte motion, motion under other		
			a nul line, and a nul plane with respect		
		to a system of forces act	ing on a rigid body together with the		
l		idea of central axis.	ing on a rigid body together with the		
i			conditions for the equilibrium of		
1		particles acted upon by va	rious forces and learn the principle of		
1		virtual work for a system	of coplanar forces acting on a rigid		
		body. Determine the cen	tre of gravity of some materialistic		
	*	systems and discuss the ed	quilibrium of a uniform cable hanging		
i	ŀ	ifeely under its own weigh	nt.		
		Deal with the kinematics	and kinetics of the rectilinear and		
		planar motions of a	particle including the constrained		
		oscillatory motions of pa	rticles. Learn that a narticle moving		
	-	under a central force des	scribes a plane curve and know the		
	-	Repier's laws of the plane	tary motions, which were deduced by		
	, a	nim long before the mather	matical theory given by Newton		
		Understand the reduction	of force system in three dimensions		
		to a resultant force acting a	at a base point and a resultant counte		
_	G CATA	which is independent of the	choice of base of reduction.		
6	Credit Value	4 C 1Credit =	15 hours-Learning and Observation		
7	Total Marks	Maximum Marks: 100 Minimum	n Passing Marks:40		

Part B:	Content of the Course	
Total no	of teaching - learning period =60 Periods (60 Hours)	
UNIT	Topics	No of Periods
I	Analytical conditions of equilibrium of Coplanar Forces. Forces in three dimensions, Poinsot's central axis, Wrenches, Null lines and planes.	15
II	Virtual work, Stable and Unstable equilibrium, Catenary	. 15
m	Velocities and accelerations along and transverse directions, and along tangential and normal directions, Simple harmonic motion, Motion under other law of forces. Elastic strings.	

(Dr. S. Dichputa) 2

Motion in resisting medium, Constrained motion, Motion on smooth and rough plane curves. Motion of particles of varying mass, Central orbit, Keplers laws of motion, Rocket motion, Motion of particle in three dimensions.

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Part C - Learning Resource

Text Books, Reference Books, Other Resources

Text Books Recommended-

- 1.R.S. Verma (1962), a text books of statics Pothishala Pyt. Ltd.
- P.L. Shrivastava (1964). Elementary dynamics. Ram Narayan Lal, Beni Prasad Publishers Allahabad

Reference Books Recommended-

- 3. A.S. Ramsey (2009), Statics, Cambridge University Press
- 4. A.S. Ramsey (2009), Dynamics, Cambridge University Press
- 5. S.L. Loney (2006), An Elementary Treatise on the dynamics of a partical and of rigid bodies.
- 6. J.L. Synge an Griffith (1949). Principal of Mechanics, McGraw-Hill.

E-Recourses:

IV

https://onlinecourses.nptel.ac.in https://epgp.inflibnet.aci.in

https://swayam.gov.in https://www.mooc.org

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:

Continuous Internal Assessment (CIA):

End Semester Examination (ESE):

Test/Quiz - 20+20 Marks Be

Continuous Internal
Assessment (CIA)
(Conducted by course teacher)

Assignment/Seminar- 10 Marks

Better marks out of two test/quiz+ obtained marks in Assignment shall be considered against 30 marks

End Semester

Two Section-A&B

Examination (ESE)

Section-A: Q1.Objective- 10x1=10 marks Q2. Short answer type question-5x4=20marks Section-B: Descriptive answer type question, 1 out of 2 from each unit- 10x4=40 Marks

100 Marks

30 Marks

Name and signature of convener & members of CBOS-

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FOUR YEAR UNDER GRADUATE PROGRAM(2024-28) DEPARTMENT OF MATHEMATICS COURSE CURRICULUM -2024-25

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(Certi	ami Dachelor in Belence Aente/Diploma/Degree/Honors)	BRWRELLING II	/IV/V/VI	Bession: 2024-2025
2	Course Code		RA A	BICC-I
2	Course Title	Introduction to	LATICX	
3	Соцтво Туро	tikli	l Unhangen	nent Course (BUC)
4	Pro-requisite (il; any)	Dasic understanding of document editing, familiarity with markup languages, and willingness to learn LaTeX syntax and formatting conventions. This Course will emble the students to:		ngness to learn LaTeX syntax
5	Course Learning Outcome (CLO)	> Make diffe Application > Generate > Create Mate > Prepare Ar	orent Allgan n for a jol Blo-Data, a thematical E ticles and In testion pape ormat,	nents in a document and an o, and Table Structures, Statements using LaTex, ascrting Pictures, ar and PowerPoint presentation
6	Crodit Valuo	2 Credits (1C + 1C)	1.	II = 15 Hours - Theoretical learning and Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks:	50	Min Passing Marks; 20

Part	B: Content of the Course	
****	Total No. of Teaching—learning Periods; — 15 Periods (15 Hrs) and Lab. or Field learning/Transing 30 Periods (30 Hears)	
	Topics (Course contents)	No. of Period
Unit	Basics: Introduction to LaTeX, Text, Symbols and Commands, Document layout and organization, displayed text. Mathematical formulas, Graphics inclusion and color. Ploating tables and figures, User customizations. Beyond the Basics: Document management, Postscript and PDP, Beamer, Frames, Bibliographic data bases and BiBTeX, Presentation material.	15
II	Practicals Based on- 1.Introduction to TeX and LaTeX- Creating and typosetting a simple LaTeX document, 2.Adding basic information to documents- Environments, Pootnotes, Sectioning, Displayed material. 3.Accents and symbols- Mathematical typosetting (elementary and advanced): Subscript/ Supersoript, Practions, Roots, Ellipsis,	30

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4. Mathematical symbols - Arrays, Delimiters, Multiline formulas, 5. Putting one thing above another-Spacing and changing style in math 6.Pictures and graphics in LaTeX-Simple pictures using PSTricks, Plotting of functions. 7.Beamer, Frames-Setting up beamer document, Enhancing beamer 8.Bibliographic data bases and BiBTeX-Create and manage bibliographic references using BiBTeX

Part C - Learn	ling Rosaumas					
	Toy Dooles Defen	wage				
Text Books Reco	IIIMended-					
1. Murugan Sw	aminuthan, Latex For Beginners, Publisher: Notion P.	ragg				
Reference Books	Recommended					
2. Dilip Datta, L	ntex in 24 Hours A Practical Guide for Scientific Writ	ing Springer				
Lai esourtes;						
Free Online La	TeX Editor- https://www.overleaf.com/					
PART -D: As	sessment and Evaluation	10 1 2 1 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1				
Suggested Continu	uous Evaluation Methods;	manufacture and the second sec				
Maximum Marks:	50 Marks					
Continuous Intern	al Assessment (CIA): 15 Marks					
End Semester Exa	m (ESE): 35 Marks					
Continuous	Internal Test / Quiz-(2); 10 & 10	Better marks out of the				
Internal	Assignment/Seminar +Attendance - 05	two Test / Quiz				
Assessment	Total Marks - 15	+ obtained marks in				
(CIA):	The second secon	Assignment shall be				
(By Course		considered against 15				
Coordinator)		Marks				
End Semester	Laboratory/Field Skill Performance: On spot	Managed by Coordinator				
Exam (ESE):	Exam (ESE): Assessment as per skilling					
	A. Performed the Task based on learned skill - 20 Marks					
	B. Spotting based on tools (written)	100				
	- 10 Marks					
	C. Viva-voce (based on principle/technology)					
n de la companya dela companya dela companya dela companya de la companya de la companya de la companya dela company	05 Marks					

Name and signature of convener & members of CBOS-

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FOUR YEAR UNDER GRADUATE PROGRAM(2024-25) DEPARTMENT OF MATHEMATICS COURSE CURRICH VIA

Par	+ A . Inter I	COURSE CURRICULUM
Lai	t A: Introduction	
(CE	gram: Bachelor in Science tificate/Diploma/Degree/Honors)	Class: B.Sc. II/IV/V/VI Session: 2024-2025 Semester
1	Course Code	
2	Course Title	MASEC-2
3	Course Type	Python
4	Pre-requisite (if, any)	Skill Enhancement Course (SEC)
	Tro requisite (ii, any)	Basic understanding of programming concepts, familiarity with
5	C	Synfax
	Course Learning Outcome (CLO)	This Course will enable the students to: To write python programs, develop a small application and logic for problem solving. To be familiar about the basic constructs of programming such as data, operations, conditions, loops, functions etc. To be familiar with string and its operation. To develop basic concepts of function and terminology. To determine the methods to create and develop Python programs by Utilizing the data structures like lists and tuples.
6	Credit Value	2 Credits Credit = 15 Hours - Theoretical learning and (1C÷1C) = 30 Hours Laboratory or Field learning Training
7	Total Marks	Max. Marks: 50 Min Passing Marks: 20

Part B: Content of the Course		
UNI	Topics	No. of Home
Ī	(A) Python Basic and IDE: Introduction of Python, Installing Python, Running Simple Program, Removing Keys, Traversing a Dictionary. Basic of Python: Data type of Python, Variable declaration rule, Python Identifier and reserved words, Input Output Function Operator of Python, Advanced Python operator (Membership and identity), Comments in Python, Line and Indentation, (B) Conditional structure: if Statements, if else and statement, Nested if, if-elif- else ladder Loop Control Structure, While loop, For loop, Nested loop, Break Statement, Continue Statement, Pass Statement - Practical 6.7& 8 (C) String and Function String Basics, Accessing and updating String, Built-in String Methods Functions Python Lists, Accessing and updating List, Basic List Operation, Built-in List Methods, Python Tuple, Accessing and updating tuple, Basic tuple operation, Built-in tuple Method.	15

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List of practicals based on Python:-

- Practical 1 Write a Python program that asks the user for their name and age, then prints a message greeting the user with their name and mentioning their age.
- Practical 2 Define a list with at least three elements of different data types and print the list.
- Practical 3- Writeaprogram thattakestwonumberandprint thesumof thesenumbers.
- Practical 4 Writeaprogramtocheckwhethertheinputnumberiseven orodd.
- Practical 5- Write a program to compare three numbers and print the largest one.
- Practical 6- Writeaprogramtoprintfactors of agivennumber.
- Practical 7-Writeaprogram toprint tableusingwhileLoop.
- Practical 8 Writeaprogramtocreatethe following Pattern
- Practical 9- Write a Python program that takes a lowercase string from the user and converts it to uppercase.
- Practical 10- Write a function that takes a string input and checks if it is a palindrome or not.
- Practical 11- Write a Python program that defines a function to calculate the sum of two numbers.
- Practical 12- Create a tuple representing the days of the week and update the last element with "Sunday". Print the updated tuple.
- Practical 13- Write a Python program that concatenates two tuples and prints the concatenated tuple.
- Practical 14- WAP to create a list of numbers and sort the list in ascending order.
- Practical 15- Write a list function to convert a string into a list, as in list (-abc) gives [a, b, c].

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Text Books Recommended-

- 1. Fundamentals of Python first programs, 2nd Edition, Kenneth A. Lambert.
- Beginning Python from Novice to Professional, Third Edition, Magnus Lie Hetland

Reference Books Recommended-

- 3. Python for Science and Engineering, Hans-PetterHalvorsen.
- 4. Python Programming: An Introduction to Computer Science, Third Edition, John Zelle.
- 5. Introduction to Scientific Computing in Python, Continuum Analytics and Robert Johansson.

E-Recourses:

https://onlinecourses.nptel.ac.in https://epqp.inflibnet.aci.in https://swayam.gov.in https://www.mooc.org

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks:

50 Marks

15 Marks Continuous Internal Assessment (CIA):

End Semester Exam (ESE):

35 Marks

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Continuous Internal Assessment (CIA); (By Course Coordinator)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar + Attendance - 05 Total Marks -	Better marks out of the
(1018tor)	Total Marks - 15	two Test / Quiz + obtained marks in Assignment shall be
End Semester Exam	Lohani	considered against 15 Marks
(ESE):	Laboratory / Field Skill Performance: On spot Assessment	Managed by Coordinator as per skilling
	A. Performed the Task based on learned skill - 20 Marks	
i.	B. Spotting based on tools (written) -10 Marks	
	C. Viva-voce (based on principle/technology) - 05 Marks	

Name and signature of convener & members of CBOS-

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Officer-In-Charge (Academic) Shaheed Nandkumar Patel Vishwavidyalaya, Raigarh (C.G.)

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DEPARTMENT OF MATHEMATICS

		TOTAL OF MATHEMATICS		
Part	A: Introduction	COURSE CURRICULUM		
r	Malam. Burker			
(Cer	tilicate/Diploma/Degree/Honors)	Class: B.Sc. I/III/V Sem Session:2024-2025		
1	Course Code	50331011.2024-2023		
2	Course Title	MAVAC-1		
3				
	Course Type	Basic Mathematics and Logic		
4	Course Learning Outcome	Value Addition Course		
	(CLO)	This Course will enable the students-		
	(020)	To orient them towards life-long learning, to		
		develop power of concentration and to overcome the		
		fear of mathematics from their mind.		
	N	> To cultivate scientific temper through systematic,		
		critical and lateral thinking.		
		> To enhance their logical, analytical and reasoning		
	•	skills useful for competitive exams.		
		> To make understand the relevance and need of		
		quantitative methods for making business decisions.		
5	Credit Value	2 Credits Credit = 15 Hours -		
		learning & Observation		
6	Total Marks	Max. Marks: 50 Min Passing Marks: 20		

PART	-B: Content of the Course	w.
	Total No. of Teaching-learning Periods (01 Hr. per period) - 30 Periods (30	Hours)
Unit	Topics (Course contents)	No. of Period
	Basic Mathematics	
I	Brief history of Vedic Mathematics (In Indian Knowledge Tradition), Sanskrit terminology involved in 16 Sutras and 13 Sub-Sutras and their meaning, Addition, Subtraction, Multiplication & Division using different techniques of Vedic Mathematics, Squaring numbers, Square roots of perfect squares, Cube roots of perfect cubes, Methods of quick verification of answers through Digit Sum Method	8
П	Problem based on Numbers, Decimal Fractions, Average, Simple Interest, Percentage, Clocks	8
ш	Problems on Profit & Loss, Discount, Ages, Speed, Time & Distance, Train, Ratio & Proportion, Mixture	8

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Officer-In-Charge (Arademic)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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IV	Logical Ability:	
	Problems on Series Completion, Coding- Decoding, Inserting the Missing	6
	Problems on Blood relations, Direction Sense Tests, Cubes & Dice, Logical Deductions based on Universal, Particular, Affermative & Negative Premises.	

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Text Books Recon		Towe Deal To a	rces
TOWN DOOKS KECOH	imend	ed-	
Limited.	New I S. Agg Ihi	garwal, Verbal & Non -Verbal Reasoning, S. (lishing Company
1		الله الله الله الله الله الله الله الله	special with the time of the property desired and the special
5. Govin Competi	d Prasa tive Ex	ar Singh, Tricky Mathematics, Success Mantra ad Singh & Rakesh Kumar, Text Book of Quick aminations) natics Made Easy Published by Dhaval Bhatia	Publications , Patna test Mathematics (For all
PART -D: As	sess	ment and Evaluation	
Suggested Continu	ous Ev	aluation Methods:	
Maximum Marks:		50 Marks	
Continuous Interna			
End Semester Exar			
Continuous Inter		Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar +Attendance - 05	Better marks out of the two Test / Quiz
Assessment (CIA):		Total Marks - 15	+ obtained marks in
(By Course Teacher)		1001.174110	Assignment shall be
			considered against 15 Marks
End Semester Exam (ESE):	,,	o section – A & B ion A: Q1. Objective – 05 x1= 05 Mark; Q2. Short	answer type- 5x2 =10 Marks

Name and signature of convener & members of CBOS-Officer-In-Charge (Academic)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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