

FOURTH YEAR UNDER GRADUATE PROGRAM(NEP-2020)

Program: Bachelor of Science (2024-28)

DISCIPLINE- MATHEMATICS

Session-2024- 25

DSC -01 to08		DSE-01to12		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	MASE-03	Numerical Methods		
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		
MASC-08	Advanced Abstract Algebra	MASE-08	Discrete Mathematics	VAC	
		MASE-09	Measure Theory	MAVAC-01	Basic Mathematics and Logic
		MASE-10	General and Algebraic Topology		
		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.

Dr. S. Dashputra

Dr. S. Khan

Dr. P. K. Sahu

Officer-in-charge (Academic)
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

Chairman
Studies
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.

Dr. Omikant Shrivastava

Dr. Prakash

Dr. K

Dr. Madhusmita

Dr. S. Dashputra

Dr. P. K. Sahu

Dr. C. S. Patra

Dr. S. Khan

Dr. S. Khan

Dr. Anil Kumar Sharma

Chairman
of Studies
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

Under-in-Charge (Public Area)
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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

Part A: Introduction

Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Semester - I	Session:2024-2025
1	Course Code	MASC-01	
2	Course Title	Elementary Calculus	
3	Course Type	DSC	
4	Pre-requisite(if any)	Knowledge of basic Differential and Integral calculus	
5	Course Learning Outcome (CLO)	This Course will enable the students to: ➤ Know about ancient Indian Mathematicians and their contribution ➤ Calculate the limit and examine the continuity and understand the geometrical interpretation of differentiability. Apply various tests to determine convergence. ➤ Understand the consequences of various mean value theorems. ➤ Understand concepts of Curvature and Asymptotes . ➤ 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

Part B: Content of the Course

Total no of teaching – learning period =60 Periods (60 Hours)

UNIT	Topics	No of Periods
I	Contributions and Biography of Indian Mathematicians: Bodhayan, Apasthamb, Katyayan, Mahaveeracharya, Brahmagupta and Bhaskarachaya in special context of Leelavati. Sequences, Continuity and Differentiability : Notion of convergence of sequences and series of real numbers, Definition of limit and continuity of a real valued function; Differentiability and its geometrical interpretation. Elementary Differentiation.	15
II	Expansion of Functions: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem and their geometrical interpretations, Successive differentiation and Leibnitz theorem, Maclaurin's and Taylor's theorems for expansion of a function.	15
III	Curvature, Asymptotes , Curve Tracing: Curvature; Asymptotes of general algebraic curves, Parallel asymptotes, Asymptotes parallel to axes; Symmetry, Concavity and convexity, Points of inflection, Tangents at origin, Multiple points, Position and nature of double points; Tracing of Cartesian, polar and parametric curves.	15

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(Dr. P. K. Sahu)

Dr. Omkar Chhivarkar

Dr. S. Khan

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

IV	Integration: Elementary integration, Integration of Transcendental function, Reduction formulae, Definite integral.	15
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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 & Bindhyachal Rai (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:

Continuous Internal Assessment (CIA):

100 Marks

End Semester Examination (ESE):

30 Marks

70 Marks

Continuous Internal Assessment (CIA)

(Conducted by course teacher)

Test/Quiz - 20+20 Marks
Assignment/Seminar- 10 Marks

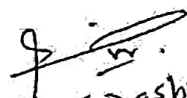
Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks

End Semester Examination (ESE)

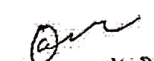
Two Section-A&B

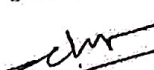
Section-A: Q1. Objective- 10x1=10 marks Q2. Short answer type question-5x4=20marks
Section-B: Descriptive answer type question, 1 out of 2 from each unit- 10x4= 40 Marks

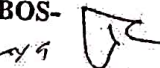
Name and signature of convener & members of CBOS-

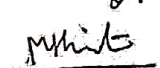

Dr. S. Dashputra


(Dr. P. K. Sahu)


Dr. Omkar H. Shivastava


Dr. S. Khan


Dr. S. Khan


Dr. S. Khan


Dr. S. Khan

Chairman
Studies
and Nandkumar Patel
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FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)
DEPARTMENT OF MATHEMATICS
COURSE CURRICULUM

Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Semester - II	Session:2024-2025
1	Course Code	MASC-02	
2	Course Title	Algebra	
3	Course Type	Discipline Specific Course (DSC)	
4	Pre requisite	Knowledge of basic algebra , determinants and matrices.	
5	Course Learning Outcome (CLO)	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	1Credit = 15 hours- Learning and Observation
7	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	Topics	No of Periods
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 a matrix.	15
II	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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III	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. Descartes's rule of signs. Solutions of cubic equations (Cardon method), Biquadrate equation.	15
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

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Text Books Recommended-

1. Ramji Lal (2017). *Algebra 1: Groups, Rings, Fields and Arithmetic*. Springer.
2. Nathan Jacobson (2009). *Basic Algebra I* (2nd edition). Dover Publications
3. John B. Fraleigh (2007). *A First Course in Abstract Algebra* (7th edition). Pearson

Reference Books Recommended-

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Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

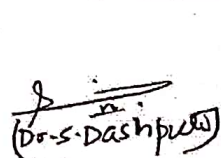
Maximum Marks: 100 Marks

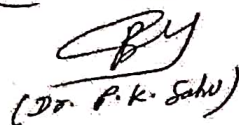
Continuous Internal Assessment (CIA): 30 Marks

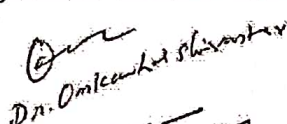
End Semester Examination (ESE): 70 Marks

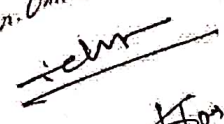
Continuous Internal Assessment (CIA) (Conducted by course teacher)	Test / Quiz – 20+20 Marks Assignment/Seminar- 10 Marks	Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks
End Semester Examination (ESE)	Two Section-A&B Section-A: Q1. Objective- 10x1=10 marks Q2. Short answer type question-5x4=20marks Section-B: Descriptive answer type question, 1 out of 2 from each unit- 10x4= 40 Marks	

Name and signature of convener & members of CBOS-

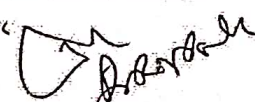

(Dr. S. Dashputra)


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Dr. Omkar Shrivastava

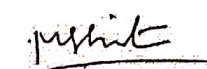

Dr. Anil Kumar


Dr. Anil Kumar


Dr. Anil Kumar


Dr. Anil Kumar


Dr. Anil Kumar


Dr. Anil Kumar

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

Part A: Introduction

Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Semester - I	Session:2024-2025
1	Course Code	MAGE-01	
2	Course Title	Elementary Calculus	
3	Course Type	Generic Elective (GE)	
4	Pre-requisite(if any)	Knowledge of basic Differential and Integral calculus	
5	Course Learning Outcome (CLO)	This Course will enable the students to: ➤ Know about ancient Indian Mathematicians and their contribution ➤ Calculate the limit and examine the continuity and understand the geometrical interpretation of differentiability. Apply various tests to determine convergence. ➤ Understand the consequences of various mean value theorems. ➤ Understand concepts of Curvature and Asymptotes . ➤ 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

Part B: Content of the Course

Total no of teaching – learning period =60 Periods (60 Hours)

UNIT	Topics	No of Periods
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II	Expansion of Functions: Rolle's Theorem, Lagrange's mean value theorem, Cauchy's mean value theorem and their geometrical interpretations, Successive differentiation and Leibnitz theorem, Maclaurin's and Taylor's theorems for expansion of a function.	15
III	Curvature, Asymptotes , Curve Tracing: Curvature; Asymptotes of general algebraic curves, Parallel asymptotes, Asymptotes parallel to axes; Symmetry, Concavity and convexity, Points of inflection, Tangents at origin, Multiple points, Position and nature of double points; Tracing of Cartesian, polar and parametric curves.	15
IV	Integration: Elementary integration, Integration of Transcendental function, Reduction formulae, Definite integral.	15

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Dr.

Part C - Learning Resource

Text Books, Reference Books, Other Resources

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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 Assessment (CIA) (Conducted by course teacher)	Test / Quiz – 20+20 Marks Assignment/Seminar- 10 Marks	Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks
End Semester Examination (ESE)	Two Section-A&B 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	

Name and signature of convener & members of CBOS-

Dr. S. Pasupur
 Dr. Omkar Lal Shrivastava
 Dr. P. K. Sahu
 Dr. Anshu
 Dr. Anshu
 Dr. Anshu
 Dr. Anshu
 Dr. Anshu
 Dr. Anshu

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 Shahood Nandkumar Patel
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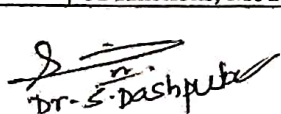
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 Studies
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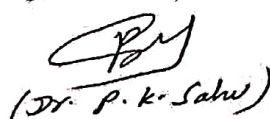
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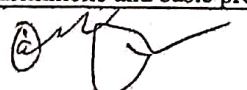
FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)
DEPARTMENT OF MATHEMATICS
COURSE CURRICULUM

Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Semester - II	Session:2024-2025
1	Course Code	MAGE-02	
2	Course Title	Algebra	
3	Course Type	Generic Elective (GE)	
4	Pre requisite	Knowledge of basic algebra , determinants and matrices.	
5	Course Learning Outcome (CLO)	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	1Credit = 15 hours- Learning and Observation
7	Total Marks	Maximum Marks : 100	Minimum Passing Marks:40

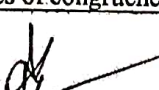
Part B: Content of the Course		
Total no of teaching – learning period =60 Periods (60 Hours)		
UNIT	Topics	No of Periods
I	Matrix Algebra : Introduction, elementary operations of matrices, Inverse of a matrix. Special types of matrices: Transpose of a matrix, Symmetric and Skew symmetric matrices, Hermitian 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 to finding inverse of a matrix.	15
II	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


 Dr. S. Dashputra

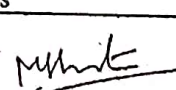

 (Dr. P. K. Sahu)



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III	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. Descartes's rule of signs. Solutions of cubic equations (Cardan method), Biquadrate equation.	15
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

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Text Books, Reference Books, Other Resources

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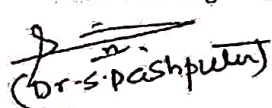
Part D: Assessment and Evaluation

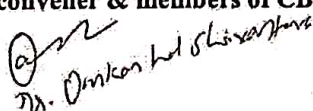
Suggested Continuous Evaluation Methods:

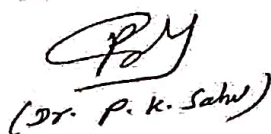
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Name and signature of convener & members of CBOS-


(Dr. S. Pashputat)

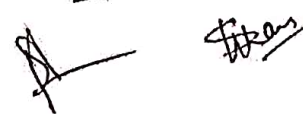

Dr. Dinkar Lal Shrivastava


(Dr. P. K. Sahu)






M. H. K.



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Vishwavidyalaya, Raigarh (C.G.)

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Studies
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)



FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)

DEPARTMENT OF MATHEMATICS

COURSE CURRICULUM -2024-25

Part A: Introduction				
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		SEMESTER-II/IV/V/VI		Session: 2024-2025
1	Course Code	MASEC-1		
2	Course Title	Introduction to LATEX		
3	Course Type	Skill Enhancement 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)	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 (1C + 1C)	Credit = 15 Hours – Theoretical learning and = 30 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;		
Theory – 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
II	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/ Superscript, Fractions, Roots, Ellipsis,	30

(Dr. P. K. Sahu)

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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	
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Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Text Books Recommended-		
1. Murugan Swaminathan, Latex For Beginners, Publisher: Notion Press		
Reference Books Recommended		
2. Dilip Datta, Latex in 24 Hours A Practical Guide for Scientific Writing, Springer		
E-resources:		
Free Online LaTeX Editor- https://www.overleaf.com/		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50 Marks		
Continuous Internal Assessment (CIA): 15 Marks		
End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): (By Course Coordinator)	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
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment 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	Managed by Coordinator as per skilling

Name and signature of convener & members of CBOS-

Dr. S. Dashpreet
10/6/2024
Dr. Dinkar W. Shivankar
Dr. P. K. Sahu
50
Chairman
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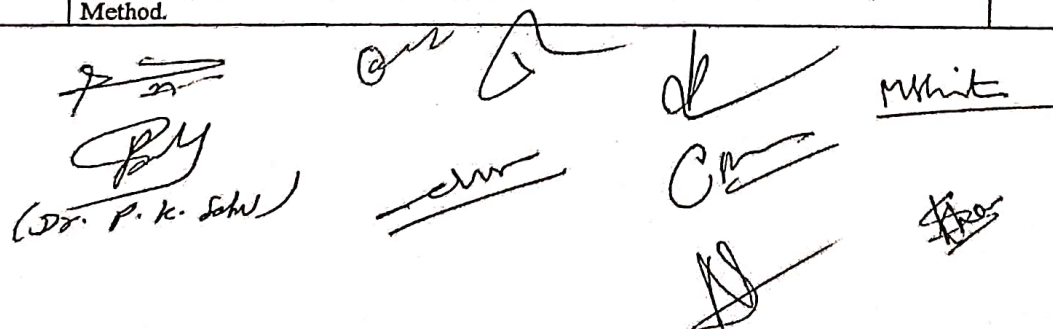
FOUR YEAR UNDER GRADUATE PROGRAM(2024-25)
DEPARTMENT OF MATHEMATICS
COURSE CURRICULUM

Part A: Introduction

Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Class: B.Sc. II/IV/V/VI Semester	Session: 2024-2025
1	Course Code		
2	Course Title	MASEC-2	
3	Course Type	Python	
4	Pre-requisite (if, any)	Skill Enhancement Course (SEC)	
5	Course Learning Outcome (CLO)	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 (1C + 1C)	Credit = 15 Hours – Theoretical learning and = 30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

Part B: Content of the Course

UNIT	Topics	No. of Hours
I	(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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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- Write a program that takes two numbers and prints the sum of these numbers. ▪ Practical 4 - Write a program to check whether the input number is even or odd. ▪ Practical 5- Write a program to compare three numbers and print the largest one. ▪ Practical 6- Write a program to print factors of a given number. ▪ Practical 7- Write a program to print table using while Loop. ▪ Practical 8 - Write a program to create the 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].	30
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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-Petter Halvorsen.
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:

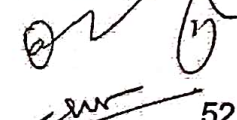
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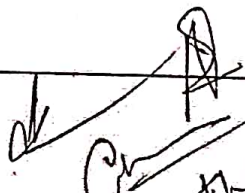
PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks
 Continuous Internal Assessment (CIA): 15 Marks
 End Semester Exam (ESE): 35 Marks


 (Dr. P. K. Sharma)


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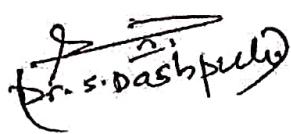

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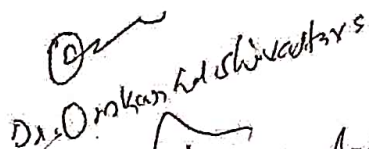
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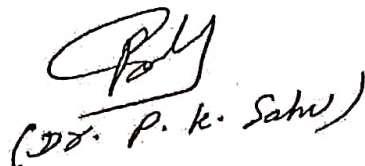
Continuous Internal Assessment (CIA): (By Course Coordinator)	Internal Test / Quiz-(2): 10 & 10 Assignment/Seminar + Attendance - 05 Total Marks - 15	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 15 Marks
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment 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	Managed by Coordinator as per skilling

Name and signature of convener & members of CBOS-


Dr. S. Dashpuri


Dr. Omkar Kulkarni


Dr. White


Dr. P. K. Sahu


Dr. Ch


Dr. Ch


Dr. Ch


Dr. Ch


Dr. Ch

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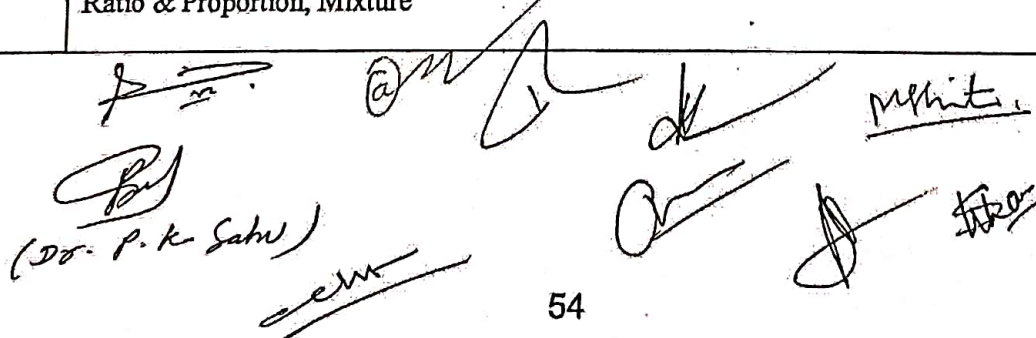

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FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)
DEPARTMENT OF MATHEMATICS
COURSE CURRICULUM

Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Class: B.Sc. I/III/V Sem	Session:2024-2025
1	Course Code	MAVAC-1	
2	Course Title	Basic Mathematics and Logic	
3	Course Type	Value Addition Course	
4	Course Learning Outcome (CLO)	This Course will enable the students- ➤ 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 -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
II	Problem based on Numbers, Decimal Fractions, Average, Simple Interest , Percentage ,Clocks	8
III	Problems on Profit & Loss , Discount, Ages, Speed, Time & Distance, Train , Ratio & Proportion, Mixture	8



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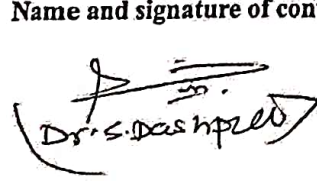
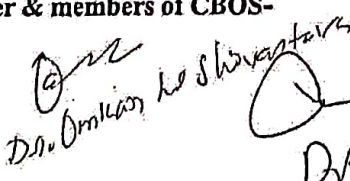
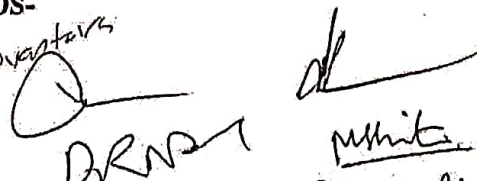
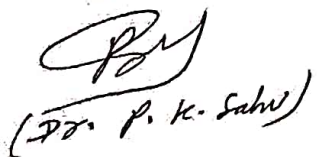
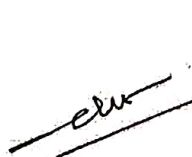
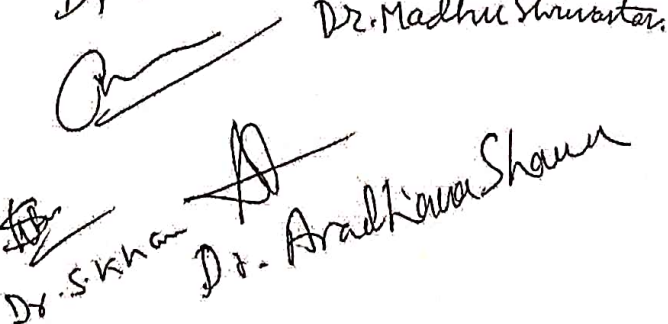
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IV	Logical Ability: Problems on Series Completion , Coding- Decoding , Inserting the Missing Character , Problems on Mirror Image & Water Image Problems on Blood relations , Direction Sense Tests , Cubes & Dice , Logical Deductions based on Universal, Particular, Affermative & Negative Premises.	6
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Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Text Books Recommended-		
1. Dr. R.S. Aggarwal, Quantitative Aptitude, S. Chand and Company Ltd., New Delhi. 2. Abhijit Guha, Quantitative Aptitude, Tata McGraw Hill Publishing Company Limited, New Delhi. 3. Dr. R.S. Aggarwal, Verbal & Non - Verbal Reasoning , S. Chand and Company Ltd., New Delhi		
Reference Books Recommended-		
4. Rajesh Kumar Singh , Tricky Mathematics , Success Mantra Publications , Patna 5. Govind Prasad Singh & Rakesh Kumar , Text Book of Quickest Mathematics (For all Competitive Examinations) 6. Vedic Mathematics Made Easy Published by Dhaval Bhatia		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50 Marks		
Continuous Internal Assessment (CIA): 15 Marks		
End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): (By Course Teacher)	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
End Semester Exam (ESE):	Two section - A & B Section A: Q1. Objective - 05 x 1 = 05 Mark; Q2. Short answer type- 5x2 = 10 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit- 4x05 = 20 Marks	

Name and signature of convener & members of CBOS-

 Dr. S. Das
 Dr. Omkar
 Dr. Madhu Shrivastava
 Dr. P. K. Sahu
 Dr. S. Khan
 Dr. Aradhana Sharm

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 Studies
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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)

गणित

FOURTH YEAR UNDER GRADUATE PROGRAM(NEP-2020)

Program: Bachelor of Science (2024-28)

DISCIPLINE- MATHEMATICS

Session-2024- 25

DSC -01 to08		DSE-01to12		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	MASE-03	Numerical Methods		
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		
MASC-08	Advanced Abstract Algebra	MASE-08	Discrete Mathematics	VAC	
		MASE-09	Measure Theory	MAVAC-01	Basic Mathematics and Logic
		MASE-10	General and Algebraic Topology		
		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.

[Signature]
Dr. S. Dashpreet

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Dr. S. Khan

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Dr. P. K. Sahu

Officer-in-Charge (Academic)
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

[Signature]
Dr. R. S. Sahu

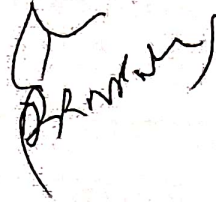
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Dr. A. K. Sahu

[Signature]
Dr. Aradhana

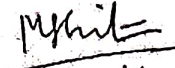
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Dr. Madhu Shrivastava

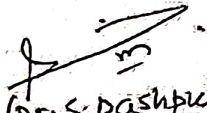
PO5. This program will also enable the learners to join teaching profession in schools and this will help the students to enhance their employability for government jobs, jobs in banking insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.


Dr. Omkeshwar Shrivastava






Dr. Madhu Shinde


(Dr. S. Dashputre)


(Dr. P. K. Sahu)


Dr. C. S. Patil


Dr. S. Khan




Dr. Ashwini Sharm

Chairman
of Studies
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

Under-in-Charge (Lecture)
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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

Part A: Introduction			
Program: Bachelor in Science (Diploma/Degree/Honors)		Semester - III	Session:2024-2025
1	Course Code	MASC-03	
2	Course Title	Differential Equations	
3	Course Type	Discipline Specific Course (DSC)	
4	Pre-requisite(if any)	Knowledge of basic Differential and Integral calculus and differential equation.	
5	Course Learning Outcome (CLO)	This Course will enable the students to: ➤ Learn various techniques of getting exact solutions of certain solvable first order differential equations and linear differential equations of second order. ➤ Understand the genesis of ordinary as well as partial differential equations. ➤ 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.	
6	Credit Value	4 C	1Credit = 15 hours- Learning and Observation
7	Total Marks	Maximum Marks : 100	Minimum Passing Marks:40

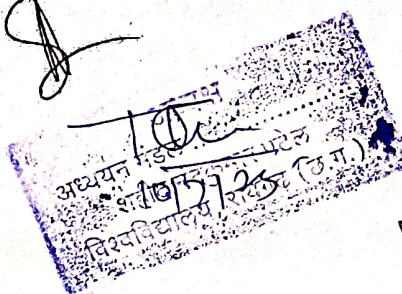
Part B: Content of the Course		
Total no of teaching – learning period =60 Periods (60 Hours)		
UNIT	Topics	No of Periods
I	Contributions and Biography of Indian Mathematicians: Aryabhatta, Varahmihir, Bhaskar-I, Shreedharacharya, Shreepati and Parmeshwar. First Order and higher degree Differential Equations : Differential equations of first order and first degree, Equations in which variables are separable, Homogeneous equations, Linear differential equations and equations reducible to linear form, Exact differential equations, Integrating factor, First order higher degree equations solvable for x, y and p, Clairaut's form and singular solutions, orthogonal trajectories.	15
II	Linear and Ordinary simultaneous differential equations: 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 simultaneous differential equations.	15
III	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

(Dr. S. Dashputra)
(Dr. P. K. Sahu)

Dr. S. Dashputra
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Dr. S. Dashputra
Dr. P. K. Sahu



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Dr. P. K. Sahu

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

Part A: Introduction		
Program: Bachelor in Science (Diploma/Degree/Honors)	Semester - IV	Session:2024-2025
1	Course Code	MASC-04
2	Course Title	Abstract Algebra
3	Course Type	Discipline Specific Course (DSC)
4	Pre-requisite(if any)	Knowledge of algebra, vector space and inner product space.
5	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 transformations.
6	Credit Value	4 C
7	Total Marks	Maximum Marks : 100
		1 Credit = 15 hours- Learning and Observation
		Minimum 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	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 subgroup of cyclic groups, Permutation group and properties, Even and odd permutations, Cayley's theorem.	15
II	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, Polynomials over the Rational Field. The Eisenstein Criterion, Polynomial Rings over Commutative Rings, Unique factorization domain. R unique factorization domain implies so is $R[x_1, x_2, \dots, x_n]$.	15
III	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 subspace of a finite dimensional vector space. Dimension of sums of subspaces. Quotient space and its dimension.	15

(Dr. S. Dash)

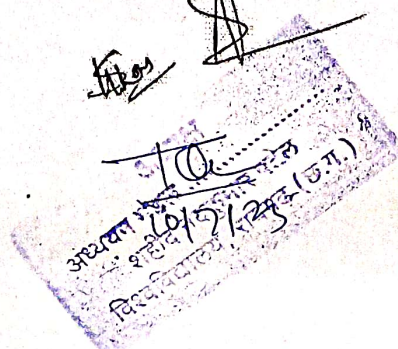
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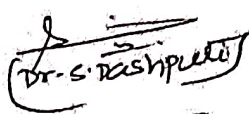
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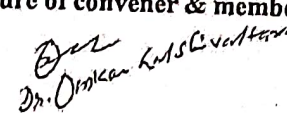


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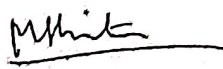
IV	Linear Transformation: Linear transformations and their representation as matrices. The Algebra of linear transformations. The rank nullity theorem. Change of basis. Dual space. Bi-dual space and natural isomorphism. Adjoint of a linear transformation.	15
Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Text Books Recommended- 1. Nathan Jacobson (2009). <i>Basic Algebra I</i> (2 nd edition). Dover Publications. 2. Nathan Jacobson (2009). <i>Basic Algebra II</i> (2 nd edition). Dover Publications.		
Reference Books Recommended- 3. I. M. Gel'fand (1989). <i>Lectures on Linear Algebra</i> . Dover Publications. 4. Kenneth Hoffman & Ray Kunze (2015). <i>Linear Algebra</i> (2 nd edition). Prentice-Hall. 5. Serge Lang (2005). <i>Introduction to Linear Algebra</i> (2 nd edition). Springer India. 6. Gilbert Strang (2014). <i>Linear Algebra and its Applications</i> (2 nd edition). Elsevier		
E-resources: https://onlinecourses.nptel.ac.in https://epqp.inflibnet.ac.in https://swayam.gov.in https://www.mooc.org		
Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		
Continuous Internal Assessment (CIA):		100 Marks
End Semester Examination (ESE):		30 Marks
		70 Marks
Continuous Internal Assessment (CIA) (Conducted by course teacher)	Test /Quiz – 20+20 Marks Assignment/Seminar- 10 Marks	Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks
End Semester Examination (ESE)	Two Section-A&B 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	

Name and signature of convener & members of CBOS-


 Dr. S. Kashyap

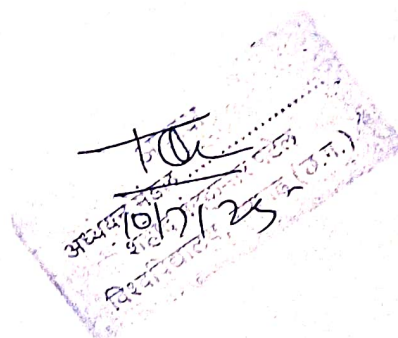
 (Dr. P. K. Sahu)

 Dr. Omkar Kulkarni

 Dr. Anand

 Dr. Anand

 Dr. Anand

 Dr. Anand

 Dr. Anand





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

Part A: Introduction			
Program: Bachelor in Science (Diploma/Degree/Honors)		Semester - III	Session:2024-2025
1	Course Code	MASE-01	
2	Course Title	Advanced Calculus	
3	Course Type	Discipline Specific Elective (DSE)	
4	Pre-requisite (if any)	Basic idea of elementary differential and integral calculus	
5	Course Learning Outcome (CLO)	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 three variables with their uses and techniques ➤ Understand conceptual variations while advancing from one variable to several variables in calculus. ➤ Understand the concept of integration of functions of two and three variables and their evaluation technique with emphasis on beta and gamma functions .	
6	Credit Value	4 C	1Credit = 15 hours- Learning and observation
7	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	Topics	No of Periods
I	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
II	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
III	Jacobians , Maxima, Minima and saddle points of function of two variables. Lagrange's multipliers method. Envelopes, Evolutes	15
IV	Beta and Gamma function. Double and triple integrals .Dirichelet's integrals. Change of order of integration.	15

(Dr. Dashputra)

Dr. Omkar Lal S. Bhatnagar

M. H. White

(Dr. P. K. Sahu)

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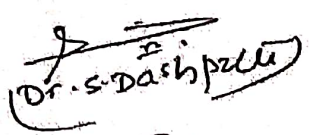
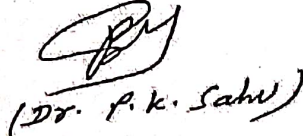
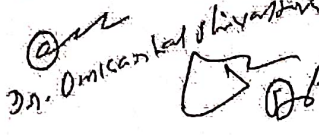
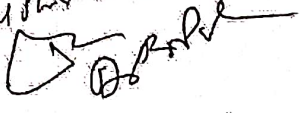
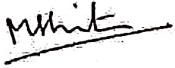
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 श. वि. विद्यापीठ
 विद्यार्थी विकास

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://epqp.inflibnet.ac.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 Assessment (CIA) (Conducted by course teacher)	Test /Quiz – 20+20 Marks Assignment/Seminar- 10 Marks	Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks
End Semester Examination (ESE)	Two Section-A&B 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	

Name and signature of convener & members of CBOS-

 (Dr. S. Dash)
 (Dr. P. K. Sahu)
 Dr. Amit Kumar
 Dr. Anil Kumar
 Dr. Rakesh
 Dr. Dhanu
 Dr. Mrit
 Dr. An

30/04/2023
 2023-2024
 Farahat, Noida (U.P.)



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

Part A: Introduction		
Program: Bachelor in Science (Diploma/Degree/Honors)		Semester - IV
		Session: 2024-2025
1	Course Code	MASE-02
2	Course Title	MECHANICS
3	Course Type	Discipline Specific Elective (DSE)
4	Pre-requisite(if any)	Basic idea of Statics and Dynamics
5	Course Learning Outcome (CLO)	This Course will enable the students to: ➤ The object of the paper is to give students knowledge of basic mechanics such as simple harmonic motion, motion under other laws and forces. ➤ Learn about a nul point, a nul line, and a nul plane with respect to a system of forces acting on a rigid body together with the idea of central axis. ➤ Understand necessary conditions for the equilibrium of particles acted upon by various forces and learn the principle of virtual work for a system of coplanar forces acting on a rigid body. Determine the centre of gravity of some materialistic systems and discuss the equilibrium of a uniform cable hanging freely under its own weight. ➤ Deal with the kinematics and kinetics of the rectilinear and planar motions of a particle including the constrained oscillatory motions of particles. Learn that a particle moving under a central force describes a plane curve and know the Kepler's laws of the planetary motions, which were deduced by him long before the mathematical theory given by Newton. ➤ Understand the reduction of force system in three dimensions to a resultant force acting at a base point and a resultant couple, which is independent of the choice of base of reduction.
6	Credit Value	4 C
7	Total Marks	Maximum Marks : 100
		1 Credit = 15 hours-Learning and Observation
		Minimum 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, Poinot's central axis, Wrenches, Null lines and planes.	15
II	Virtual work, Stable and Unstable equilibrium, Catenary.	15
III	Velocities and accelerations along and transverse directions, and along tangential and normal directions, Simple harmonic motion, Motion under other law of forces. Elastic strings.	15

(Dr. S. Dasgupta)

(Dr. P. K. Sahu)



IV	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.	15
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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 Pvt. Ltd.
2. 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:

<https://onlinecourses.nptel.ac.in>
<https://epgp.inflibnet.ac.in>
<https://swayam.gov.in>
<https://www.mooc.org>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

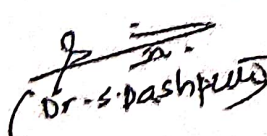
Maximum Marks: 100 Marks

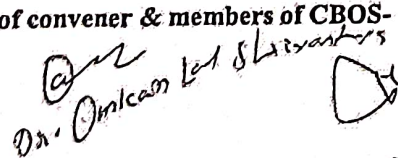
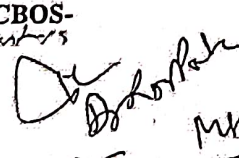
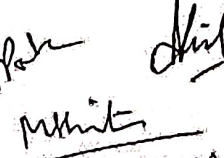
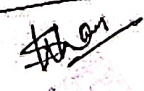
Continuous Internal Assessment (CIA): 30 Marks

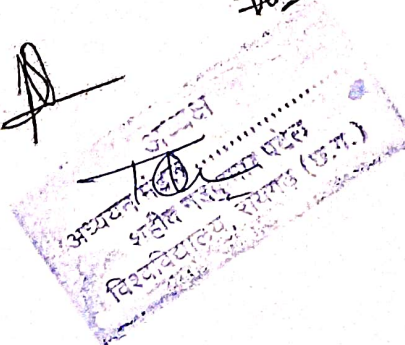
End Semester Examination (ESE): 70 Marks

Continuous Internal Assessment (CIA) (Conducted by course teacher)	Test /Quiz – 20+20 Marks Assignment/Seminar- 10 Marks	Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks
End Semester Examination (ESE)	Two Section-A&B 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	

Name and signature of convener & members of CBOS-


 (Dr. S. Dashputra)

 (Dr. P. K. Sahu)

 Dr. Omkar Lal Shrivastava

 Dr. D. K. Sahu

 Dr. M. K. Sahu

 Dr. J. K. Sahu





FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)

DEPARTMENT OF MATHEMATICS

COURSE CURRICULUM -2024-25

Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		SEMESTER-III/IV/V/VI	Session: 2024-2025
1	Course Code	MABEC-1	
2	Course Title	Introduction to L ^A T _E X	
3	Course Type	Skill Enhancement Course (SEC)	
4	Pre-requisite (if any)	Basic understanding of document editing, familiarity with markup languages, and willingness to learn L ^A T _E X syntax and formatting conventions.	
5	Course Learning Outcome (CLO)	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 L ^A T _E X. ✓ Prepare Articles and Inserting Pictures. ✓ Prepare Question paper and PowerPoint presentation in L ^A T _E X format.	
6	Credit Value	2 Credits (1C + 1C)	Credit = 15 Hours = Theoretical learning and = 30 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: Theory – 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 L ^A T _E X, 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 BIB _T E _X , Presentation material.	15
II	Practicals Based on- 1.Introduction to TeX and L ^A T _E X- Creating and typesetting a simple L ^A T _E X document, 2.Adding basic information to documents- Environments, Footnotes, Sectioning, Displayed material. 3.Accents and symbols- Mathematical typesetting (elementary and advanced): Subscript/ Superscript, Fractions, Roots, Ellipses,	30

(Dr. P. K. Sahu)

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

Chairman
of Studies
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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. Banner, Frames-Setting up banner document, Enhancing banner presentation 8. Bibliographic data bases and BIBTeX-Create and manage bibliographic references using BIBTeX	
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Part C - Learning Resource

Text Books, Reference Books, Other Resources

Text Books Recommended-

1. Murugan Swaminathan, Latex For Beginners, Publisher: Notion Press

Reference Books Recommended

2. Dilip Datta, Latex in 24 Hours A Practical Guide for Scientific Writing, Springer

E-resources:

Free Online LaTeX Editor- <https://www.overleaf.com/>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks

Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Coordinator)	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
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment 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	Managed by Coordinator as per skilling

Name and signature of convener & members of CBOS-

Dr. S. Dashpreet

10/6/2024
Dr. Omkar W. Shivankar

Dr. R. N. K.

Dr. A. K.

Dr. P. K. Sahu

Dr. S. K.

Dr. M. K.

Dr. A. K.

Dr. M. K.

Dr. A. K.

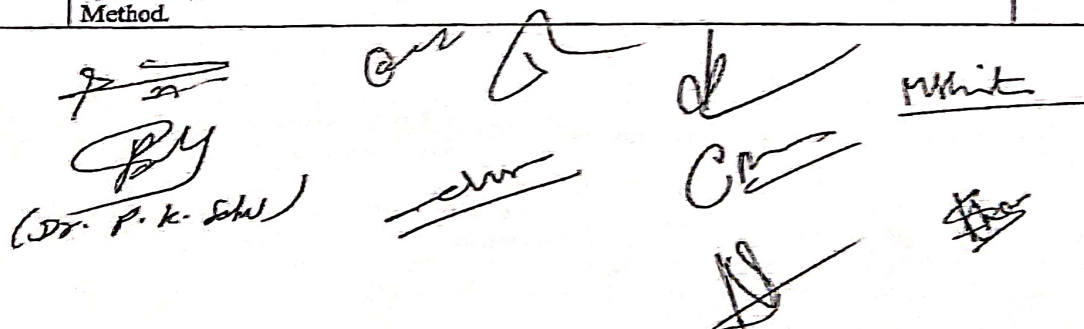
Officer-In-Charge (Academic)
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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

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

Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Class: B.Sc. II/IV/V/VI Semester	Session: 2024-2025
1	Course Code	MASEC-2	
2	Course Title	Python	
3	Course Type	Skill Enhancement Course (SEC)	
4	Pre-requisite (if, any)	Basic understanding of programming concepts, familiarity with syntax.	
5	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 (1C ÷ 1C)	Credit = 15 Hours – Theoretical learning and = 30 Hours Laboratory or Field learning/Training
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

Part B: Content of the Course		
UNIT	Topics	No. of Hours
I	(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



Officer-In-Charge (Academic) 51
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 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- Write a program that takes two numbers and prints the sum of these numbers. ▪ Practical 4 - Write a program to check whether the input number is even or odd. ▪ Practical 5- Write a program to compare three numbers and print the largest one. ▪ Practical 6- Write a program to print factors of a given number. ▪ Practical 7- Write a program to print table using while Loop. ▪ Practical 8 - Write a program to create the 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].	30
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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-Peter Halvorsen.
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:

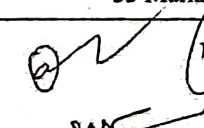
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<https://swayam.gov.in>
<https://www.mooc.org>

PART -D: Assessment and Evaluation

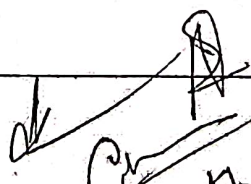
Suggested Continuous Evaluation Methods:

Maximum Marks: 50 Marks
 Continuous Internal Assessment (CIA): 15 Marks
 End Semester Exam (ESE): 35 Marks


 Dr. P. K. Sharma


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Officer-in-Charge (Academic)
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 Vishwavidyalaya, Raigarh (C.G.)


 Chairman

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

Continuous Internal Assessment (CIA); (By Course Coordinator)	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
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment 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	Managed by Coordinator as per skilling

Name and signature of convener & members of CBOS-

[Signature]
Dr. S. Dashputra

[Signature]
Dr. O. K. Kishorewar

[Signature]
M. White

[Signature]
(Dr. P. K. Sahu)

[Signature]
C. V.

[Signature]
C. V.

[Signature]
D. S.

[Signature]
K.

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

[Signature]
Chairman
Shaheed Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)

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

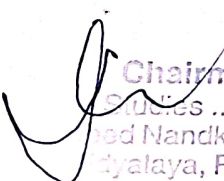
Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Class: B.Sc. I/III/V Sem	Session:2024-2025
1	Course Code		
2	Course Title	MAVAC-1	
3	Course Type	Basic Mathematics and Logic	
4	Course Learning Outcome (CLO)	Value Addition Course	
		This Course will enable the students- ➤ 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 -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
II	Problem based on Numbers, Decimal Fractions, Average, Simple Interest , Percentage ,Clocks	8
III	Problems on Profit & Loss , Discount, Ages, Speed, Time & Distance, Train , Ratio & Proportion, Mixture	8


 (Dr. P. K. Sahu)


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

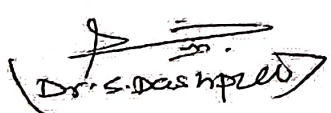
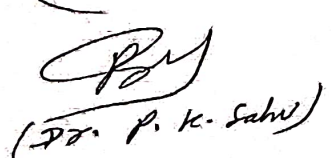
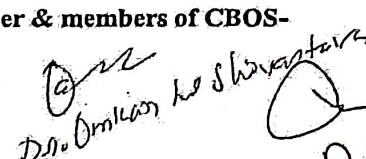

Chairman
 Shaheed Nandkumar Patel
 Vishwavidyalaya, Raigarh (C.G.)

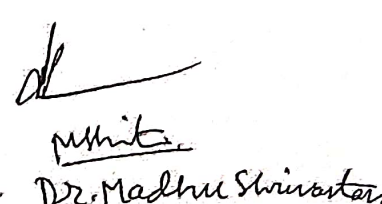
10/7/25
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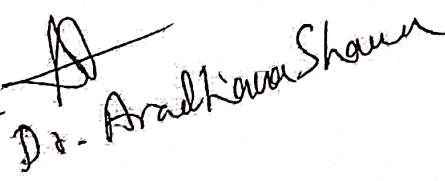
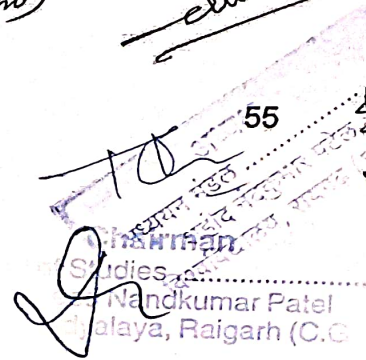
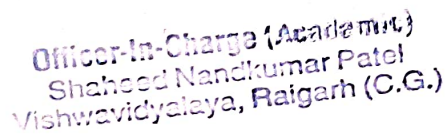
IV	Logical Ability: Problems on Series Completion , Coding- Decoding , Inserting the Missing Character , Problems on Mirror Image & Water Image Problems on Blood relations , Direction Sense Tests , Cubes & Dice , Logical Deductions based on Universal, Particular, Affermative & Negative Premises.	6
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Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Text Books Recommended-		
1. Dr. R.S. Aggarwal, Quantitative Aptitude, S. Chand and Company Ltd., New Delhi. 2. Abhijit Guha, Quantitative Aptitude, Tata McGraw Hill Publishing Company Limited., New Delhi. 3. Dr. R.S. Aggarwal , Verbal & Non –Verbal Reasoning , S. Chand and Company Ltd., New Delhi		
Reference Books Recommended-		
4. Rajesh Kumar Singh , Tricky Mathematics , Success Mantra Publications , Patna 5. Govind Prasad Singh & Rakesh Kumar , Text Book of Quickest Mathematics (For all Competitive Examinations) 6. Vedic Mathematics Made Easy Published by Dhaval Bhatia		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50 Marks		
Continuous Internal Assessment (CIA): 15 Marks		
End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): (By Course Teacher)	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
End Semester Exam (ESE):	Two section – A & B Section A: Q1. Objective – 05 x 1 = 05 Mark; Q2. Short answer type- 5x2 =10 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit- 4x05 =20 Marks	

Name and signature of convener & members of CBOS-



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

(छत्तीसगढ़ विश्वविद्यालय अधिनियम 1973 द्वारा स्थापित राजकीय विश्वविद्यालय)



राष्ट्रीय शिक्षा नीति – 2020
के तहत V एवं VI सेमेस्टर
नवीन पाठ्यक्रम
(सत्र 2026–27)

..... गणित

FOURTH YEAR UNDER GRADUATE PROGRAM(NEP-2020)

Program: Bachelor of Science (2024-28)

DISCIPLINE- MATHEMATICS

Session-2024- 25

DSC -01 to08		DSE-01to12		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	MASE-03	Numerical Methods		
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 Space	MASE-06	Topology	MASEC-02	Python
MASC-07	Advanced Real Analysis	MASE-07	Complex Analysis - I		
MASC-08	Advanced Abstract Algebra	MASE-08	Discrete Mathematics	VAC	
		MASE-09	Measure Theory	MAVAC-01	Basic Mathematics and Logic
		MASE-10	General and Algebraic Topology		
		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.

Dr. S. Dashputra
Dr. S. Khan
Dr. P. K. Sahu
Dr. A. K. Singh
Dr. Aradhana
Dr. Madhu Shrivastava
Shahood Nandkumar Patel
Vishwavidyalaya, Raigarh (C.G.)
22/6/26
10/7/25

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.

Dr. Omkar Chivastav
Dr. Omkar Chivastav

Dr. Omkar Chivastav

Dr. Omkar Chivastav

Dr. Madhu Shrivastava

Dr. S. Khan

Dr. S. Dashprabhu

Dr. P. K. Sahu

Dr. C. S. Patil

Dr. Pradip Kumar Shrivastava

Chairman
 Dr. Nandkumar Patel
 Vishwavidyalaya, Raigarh (C.G.)

23/10/26
 अध्ययन मंडल
 शहीद नंदकुमार पटेल
 विश्वविद्यालय (रायगढ़)

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

FOUR YEAR UNDERGRADUATE PROGRAM(2024-28)
DEPARTMENT OF MATHEMATICS
COURSE CURRICULUM

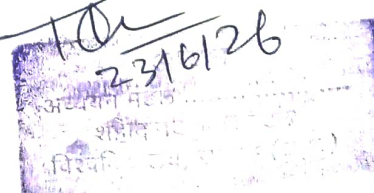
Part A: Introduction		
Program: Bachelor in Science (Degree/Honors)		Semester - V
		Session:2024-2025
1	Course Code	MASE-03
2	Course Title	Numerical Methods
3	Course Type	Discipline Specific Elective (DSE)
4	Pre-requisite (if any)	Basic idea of Numerical solutions, Differential equation and theory of equation.
5	Course Learning Outcome (CLO)	This Course will enable the students to: ➤ The aim of this course is to teach the student the application of various numerical techniques for variety of problems occurring in the daily life. ➤ The main outcome will be that student will be able to handle problems and finding approximated solution. ➤ Obtain numerical solutions of algebraic and transcendental equations. ➤ Find numerical solutions of system of linear equations and to check the accuracy of the solutions. ➤ Learn about various interpolating and extrapolating methods to find numerical solutions.
6	Credit Value	4 C
7	Total Marks	Maximum Marks : 100
		1Credit=15 hours-Learning and Observation
		Minimum Passing Marks:40

Part B: Content of the Course

Total no of teaching – learning period =60 Periods (60 Hours)

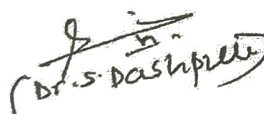
UNIT	Topics	No of Periods
I	Numerical Methods for Solving Algebraic and Transcendental Equations Round-off error and computer arithmetic, Local and global truncation errors, Algorithms and convergence; Bisection method, false position method, fixed point iteration method, Newton's method and secant method for solving equations.	15
II	Lagrange and Newton interpolations, Piecewise linear interpolation, Cubic spline interpolation, Finite difference operators, Gregory Newton forward and backward difference interpolations.	15
III	First order and higher order approximation for first derivative, Approximation for second derivative; Numerical integration: Trapezoidal rule, Simpson's rule and its error analysis, BulirschStoer extrapolation methods, Richardson extrapolation.	15
IV	Euler's method, RungeKutta methods, Higher order one step method, Multi-step methods; Finite difference method, Shooting method, Real life examples: Google search engine, 1D and 2D simulations, Weather forecasting.	15

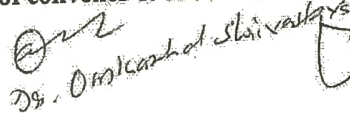
(Dr. P. K. Sahu)

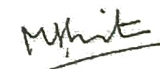


Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Text Books Recommended- 1. M.K. Jain, S. R. K. Iyengar & R. K. Jain (2012). Numerical Methods for Scientific and Engineering Computation (6th edition). New Age International Publishers. 2. C. F. Gerald & P. O. Wheatley (2008). Applied Numerical Analysis (7th edition), Pearson Education, India.		
Reference Books Recommended- 3. Brian Bradie (2006), A Friendly Introduction to Numerical Analysis. Pearson. 4. Robert J. Schilling & Sandra L. Harris (1999). Applied Numerical Methods for Engineers Using MATLAB and C. Thomson-Brooks/Cole.		
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: 100 Marks Continuous Internal Assessment (CIA): 30 Marks End Semester Examination (ESE): 70 Marks		
Continuous Internal Assessment (CIA) (Conducted by course teacher)	Test /Quiz – 20+20 Marks Assignment/Seminar- 10 Marks	Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks
End Semester Examination (ESE)	Two Section-A&B 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	

Name and signature of convener & members of CBOS-


 (Dr. S. Dasgupta)

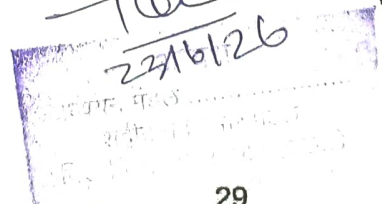
 (Dr. P. K. Sahu)

 Dr. Omprakash Shrivastava

 Dr. Anil Kumar

 Dr. Mihir

 Dr. Anurag

 Dr. Chandra

 Dr. Anshu

 Dr. Anshu

 22/6/26

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

Part A: Introduction			
Program: Bachelor in Science (Degree/Honors)		Semester - VI	Session: 2024-2025
1	Course Code	MASE-04	
2	Course Title	Number Theory	
3	Course Type	Discipline Specific Elective (DSE)	
4	Pre-requisite (if any)	Basic idea of theory of equation and congruence relations	
5	Course Learning Outcome (CLO)	This Course will enable the students to: ➤ Know about distribution of prime and congruence. ➤ Solve Number theoretic functions ➤ Learn primitive, Quadratic Reciprocity Law and Public Key Encryption	
6	Credit Value	4C	1Credit = 15 hours- Learning and observation
7	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	Topics	No of Periods
I	Distribution of Primes and Theory of Congruences Linear Diophantine equation, Prime Counting function, Prime number theorem, Goldbach conjecture, Fermat and Mersenne primes, Congruence relation and it's properties, Linear congruence and Chinese remainder theorem, Fermats' little theorem, Wilson's theorem.	15
II	Number Theoretic Functions Number theoretic functions for sum and number of divisors, Multiplicative function, The Mobius inversion formula, The greatest integer function. Euler's phi-function and properties, Euler's theorem.	15
III	Primitive The order of an integer modulo n, Primitive roots for primes, Composite numbers having primitive roots; Definition of quadratic residue of an odd prime, and Euler's criterion.	15
IV	Quadratic Reciprocity Law and Public Key Encryption The Legendre symbol and it's properties, Quadratic reciprocity, Quadratic congruences with composite moduli; Public key encryption, RSA encryption and decryption.	15

Dr. S. Dasgupta Dr. P. K. Sahu 30 T.O. 23/6/26

 The stamp is from Shaheed Nandkumar Patel, with the date 23/6/26.

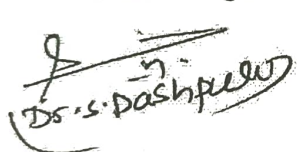
Part C - Learning Resource

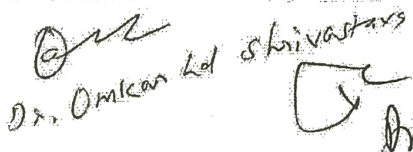
Text Books, Reference Books, Other Resources	
Text Books Recommended-	
1. Burton, David M. (2012) : Elementary Number Theory(7th ed.) Mc-Graw Hill Education Pvt. Ltd. Indian Reprint.	
Reference Books Recommended-	
2. Jones, G. A., & Jones, J. Mary. (2005) : Elementary Number Theory. Undergraduate Mathematics Series(SUMS). First Indian Print.	
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

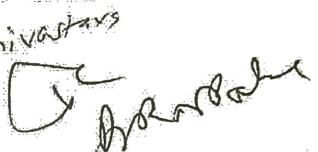
Suggested Continuous Evaluation Methods:		
Maximum Marks:		100 Marks
Continuous Internal Assessment (CIA):		30 Marks
End Semester Examination (ESE):		70 Marks
Continuous Internal Assessment (CIA) (Conducted by course teacher)	Test /Quiz – 20+20 Marks Assignment/Seminar- 10 Marks	Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks
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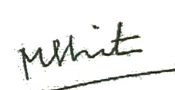
Name and signature of convener & members of CBOS-


Dr. S. Dashpreet


Dr. Omkar Lal Shrivastava

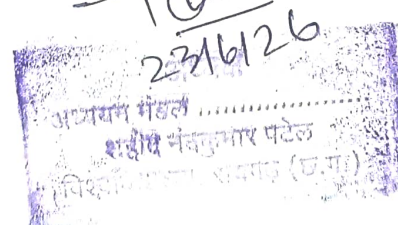

Dr. P. K. Sahu


Dr. Anurag


Dr. Nitish


Dr. A


Dr. J


23/6/26
अध्यक्ष मंडल
श्री श्री मंडल मंडल
विश्वविद्यालय, रायपुर (छ.ग.)

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

Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		SEMESTER-II/IV/V/VI	Session: 2024-2025
1	Course Code	MASEC-1	
2	Course Title	Introduction to LATEX	
3	Course Type	Skill Enhancement 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)	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 (1C + 1C)	Credit = 15 Hours – Theoretical learning and = 30 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: Theory – 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
II	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/ Superscript, Fractions, Roots, Ellipsis,	30

(Dr. P. K. Sahu)

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

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

4. Mathematical symbols- Arrays, Delimiters, Multiline formulas, mode.	
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 - Learning Resource

Text Books, Reference Books, Other Resources

Text Books Recommended-

1. Murugan Swaminathan, Latex For Beginners, Publisher: Notion Press

Reference Books Recommended

2. Dillip Datta, Latex in 24 Hours A Practical Guide for Scientific Writing, Springer

E-resources:

Free Online LaTeX Editor- <https://www.overleaf.com/>

PART -D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

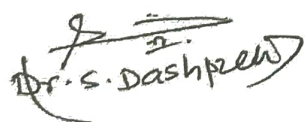
Maximum Marks: 50 Marks

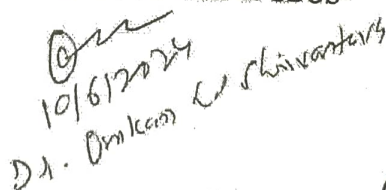
Continuous Internal Assessment (CIA): 15 Marks

End Semester Exam (ESE): 35 Marks

Continuous Internal Assessment (CIA): (By Course Coordinator)	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
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment 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	Managed by Coordinator as per skilling

Name and signature of convener & members of CBOS-


Dr. S. Dashpreet


Dr. Anil Kumar


Dr. Anil Kumar


Dr. Anil Kumar


Dr. P. K. Sahu

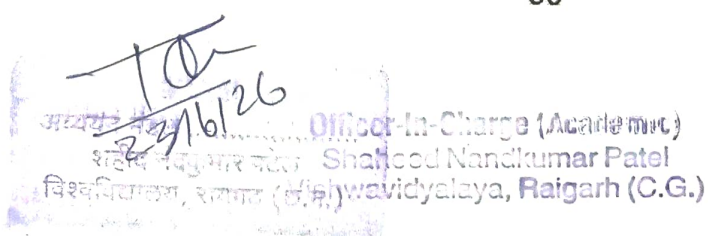

Dr. Anil Kumar

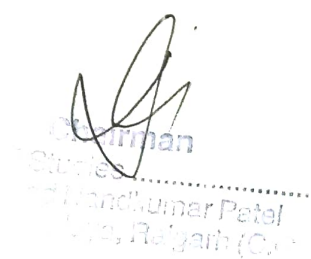

Dr. Anil Kumar


Dr. Anil Kumar


Dr. Anil Kumar


Dr. Anil Kumar


Shalok Nandikumar Patel
Director-In-Charge (Academic)
Vishwavidyalaya, Raigarh (C.G.)

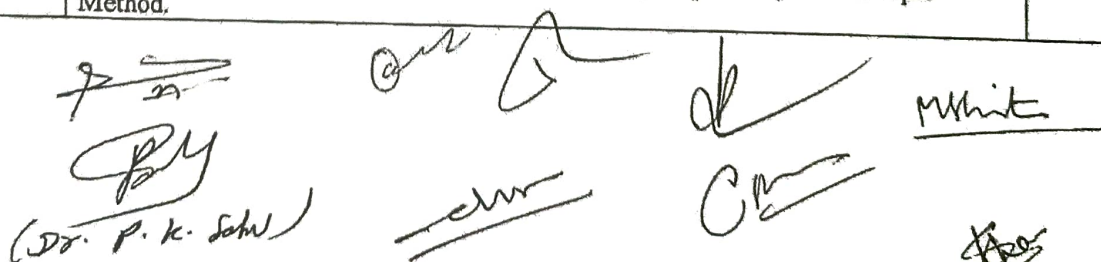

Shalok Nandikumar Patel
Director-In-Charge (Academic)
Vishwavidyalaya, Raigarh (C.G.)

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

Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Class: B.Sc. II/IV/V/VI Semester	Session: 2024-2025
1	Course Code		
2	Course Title	MASEC-2	
3	Course Type	Python	
4	Pre-requisite (if, any)	Skill Enhancement Course (SEC)	
5	Course Learning Outcome (CLO)	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 (1C + 1C)	<i>Credit = 15 Hours – Theoretical learning and = 30 Hours Laboratory or Field learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20

Part B: Content of the Course

UNIT	Topics	No. of Hours
I	(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



 (Dr. P. K. Sahu)

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22/6/26
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II

List of practicals based on Python :-

30

- 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- Write a program that takes two numbers and prints the sum of these numbers.
- Practical 4 - Write a program to check whether the input number is even or odd.
- Practical 5- Write a program to compare three numbers and print the largest one.
- Practical 6- Write a program to print factors of a given number.
- Practical 7- Write a program to print table using while Loop.
- Practical 8 - Write a program to create the 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-Peter Halvorsen.
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://epgp.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
 End Semester Exam (ESE): 35 Marks

(Dr. P. K. Sahu)

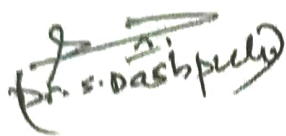
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Officer-in-Charge (Academic)
 Shashidhar Nandkumar Patel
 Vishwavidyalaya, Raigarh (C.G.)

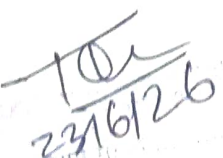
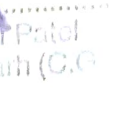
22/6/20
 Officer-in-Charge (Academic)
 Shashidhar Nandkumar Patel
 Vishwavidyalaya, Raigarh

Continuous Internal Assessment (CIA): (By Course Coordinator)	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
End Semester Exam (ESE):	Laboratory / Field Skill Performance: On spot Assessment 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	Managed by Coordinator as per skilling

Name and signature of convener & members of CBOS-

 Dr. S. Dashputra
 Dr. D. Orskan
 Dr. Orskan
 Dr. Orskan
 Dr. P. K. Sahu
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Officer in Charge (Academic)
 Shahced Nandhumar Patel
 Vishwavidyalaya, Raigarh (C.G.)

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

Part A: Introduction			
Program: Bachelor in Science (Certificate/Diploma/Degree/Honors)		Class: B.Sc. I/III/V Sem	Session: 2024-2025
1	Course Code	MAVAC-1	
2	Course Title	Basic Mathematics and Logic	
3	Course Type	Value Addition Course	
4	Course Learning Outcome (CLO)	This Course will enable the students- ➤ 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 -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
II	Problem based on Numbers, Decimal Fractions, Average, Simple Interest , Percentage ,Clocks	8
III	Problems on Profit & Loss , Discount, Ages, Speed, Time & Distance, Train , Ratio & Proportion, Mixture	8

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

23/11/24

Signature

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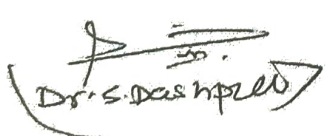
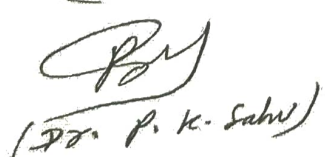
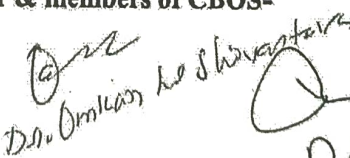
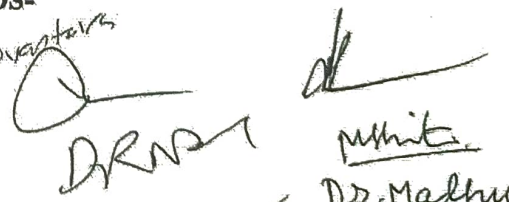
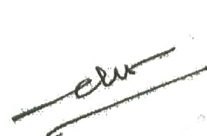
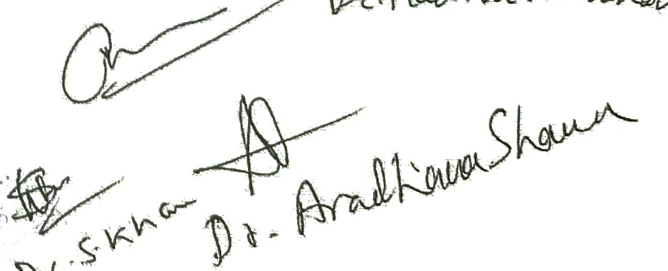
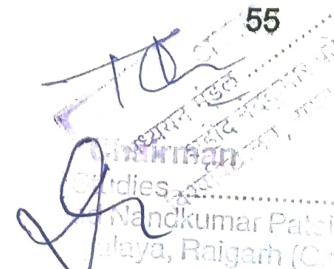
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IV	Logical Ability: Problems on Series Completion , Coding- Decoding , Inserting the Missing Character , Problems on Mirror Image & Water Image Problems on Blood relations , Direction Sense Tests , Cubes & Dice , Logical Deductions based on Universal, Particular, Affermative & Negative Premises.	6
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Part C - Learning Resource		
Text Books, Reference Books, Other Resources		
Text Books Recommended-		
1. Dr. R.S. Aggarwal, Quantitative Aptitude, S. Chand and Company Ltd., New Delhi. 2. Abhijit Guha, Quantitative Aptitude, Tata McGraw Hill Publishing Company Limited., New Delhi. 3. Dr. R.S. Aggarwal , Verbal & Non -Verbal Reasoning , S. Chand and Company Ltd., New Delhi		
Reference Books Recommended-		
4. Rajesh Kumar Singh , Tricky Mathematics , Success Mantra Publications , Patna 5. Govind Prasad Singh & Rakesh Kumar , Text Book of Quickest Mathematics (For all Competitive Examinations) 6. Vedic Mathematics Made Easy Published by Dhaval Bhatia		
PART -D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks: 50 Marks		
Continuous Internal Assessment (CIA): 15 Marks		
End Semester Exam (ESE): 35 Marks		
Continuous Internal Assessment (CIA): (By Course Teacher)	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
End Semester Exam (ESE):	Two section - A & B Section A: Q1. Objective - 05 x 1 = 05 Mark; Q2. Short answer type- 5x2 = 10 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit- 4x05 = 20 Marks	

Name and signature of convener & members of CBOS-


 Dr. S. Dashpreet

 Dr. P. K. Sahu

 Dr. Omkar K. Shrivastava

 Dr. Madhu Shrivastava

 Dr. S. K. Sharma

 Dr. Anand Kumar Sharma

 Shashid Nandkumar Patel
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