NATIONAL EDUCATION POLICY-2020

Skill Enhancement Course

in

Vedic Mathematics



Sridev Suman Uttarakhand University Badshahi Thaul (Tehri Garhwal) Uttarakhand -249199

(State University of Uttarakhand)

2023



Curriculum Design Committee

S. No.	Name & Designation	
1.	Prof. N.K. Joshi	
	Vice-Chancellor, Sridev Suman Uttarakhand University,	Chairman
	Badshahi Thaul, Tehri Garhwal, Uttarakhand	
2.	Prof. Manmohan Singh Chauhan	Member
	Vice-Chancellor, Kumaon University, Nainital,	
	Uttarakhand	
3.	Prof. O.P.S. Negi	Member
	Vice-Chancellor, Uttarakhand Open University	
4.	Prof. Jagat Singh Bisht,	Member
	Vice-Chancellor, Soban Singh Jeena University, Almora	
5.	Prof Surekha Dangwal	Member
	Vice-Chancellor, Doon University, Dehradun	
6.	Prof. M.S.M. Rawat	Member
	Advisor, Rashtriya Uchchatar Shiksha Abhiyan, Uttarakhand	
7.	Prof. K.D. Purohit Advisor	Member
	Rashtriya Uchchatar Shiksha Abhiyan, Uttarakhand	

Sridev Suman Uttarakhand University Badshahi Thaul, Tehri Garhwal (Uttarakhand)

Department of Mathematics

Members of Board of Studies

i.	Name	Designation	Department	Board of Studies	Signature
1.	Prof. G. K. Dhingra	Dean Faculty of Science Pt. L.M.S. Campus Sridev Suman Uttarakhand University Rishikesh	Faculty of Science	Chairman	6-0ha
2.	Director	Uttarakhand Science Education and Research Council	USERC	Member	11.07.
3.	Prof. K.S. Rawat	Professor and Head Department of Mathematics H.N.B. Garhwal Central University S.R.T. Campus, Tehri Garhwal, Uttarakhand	Mathematics	Member (External Expert)	11.07.
4.	Prof. Pushpa Negi	Principal Govt. P.G.College New Tehri	Higher Education	Member	0
5.	. Prof. Pankaj Pant	Principal, Govt. P.G.College Nagnath Pokhari	Higher Education	Member	K
4.	Prof. Kuldeep Singh Negi	Principal, Govt. P.G. College, Khanpur(Haridwar)	Higher Education	Member	J
5.	. Prof. Anita Tomar	Professor & Head, Department of Mathematics Pt. L.M.S. Campus, Sridev Suman Uttarakhand University Rishikesh	Mathematics	Member	Ju
6.	Prof. Dipa Sharma	Professor Department of Mathematics Pt. L.M.S. Campus, Sridev Suman Uttarakhand University Rishikesh	Mathematics	Member	Ber
7.	Dr. Gaurav Varshney	Associate Professor, Department of Mathematics Pt. L.M.S. Campus, Sridev Suman Uttarakhand University Rishikesh	Mathematics	Member	eans 11.7.23
8	Dr. Dhirendra Singh	Assistant Professor, Department of Mathematics Pt. L.M.S. Campus, Sridev Suman Uttarakhand University Rishikesh	Mathematics	Member	A Jun 11.7-28

Syllabus Preparation Committee

S.No.	Name	Designation	Affiliation
1.	Prof. Anita Tomar	Professor	Department of Mathematics
		and Head	Pt. L. M. S. Campus, Sridev Suman
			Uttarakhand University Campus, Rishikesh
2.	Dr. Gaurav Varshney	Associate	Department of Mathematics
		Professor	Pt. L. M. S. Campus, Sridev Suman
			Uttarakhand University Campus, Rishikesh
3.	Dr. Deepak Singh	Assistant	Department of Mathematics
		Professor	B.L.J. Govt. (P.G.) College Purola, Uttarkashi

Course Description

S.No.	Course Code	Course	Semester	Credit
1.	VM01	Vedic Arithmetic-I	First	3
2.	VM02	Vedic Arithmetic-II	Second	3
3.	VM03	Vedic Algebra-I	Third	3
4.	VM04	Vedic Algebra-II	Fourth	3

Vedic Mathematics is a super-fast way of calculation. There are just 16 Sutras or Word Formulae which solve allknown mathematical problems in the branches of Arithmetic, Algebra, Geometry, and Calculus. They are easy to understand, easy to apply, and easy to remember.

Objectives:

- To enable the learners to explore the power of Vedic Mathematics.
- To make learners strong in Numerical Mathematics.
- To enable learners to recognize and understand simple techniques of Arithmetic Calculations.
- To train learners to use the ideas of Vedic Mathematics in daily calculations and make those calculations with accuracy and speed.

Course Outcomes: By completing this course, the learner will be able to:

- generate tables of any number.
- perform difficult calculations speedily.
- Learn about Matrices and Determinants, Algebraic equations, partial fractions, data visualization
- Applications of Vedic arithmetic and Vedic algebra.

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Syllabus

	VM01	
Course Title: Vedic Arithmetic-ICredits: 1		
Cours	 se Outcome: Upon completion of the course, students will be able to: perform simple arithmetic calculations with speed and accuracy. to perform products of large numbers quickly develop confidence in calculating square roots and cube roots of integers. 	
Unit	Contents	No. of Lectures
1	 Multiplication Introduction and history of Arithmetic and Number Contribution of Indian Mathematicians (Aryabhatta, Brahmagupta, Mahaviracharya, Bharati Krishna Tirtha) in the context of Arithmetic. Ekadhiken Purven Method (Multiplication of Two binary and, Three Digits Numbers) Eknunen Purven Method (Multiplication of Two Three Digits Numbers) Urdhvtiaryagbhyam Method (Multiplication of Two Three Digits Numbers) Mixed Operation) 15
2	 Introduction of Division and Divisibility Division Nikhilam Navtashcharam Method (Division of Two digits Number) Paravartya Yojyet Method (Division of Three digits Number) Divisibility Ekadhiken Purven Method (Division of Two digits Number) Eknunen Purven Method (Division of Two digits Number) Applications of Division and Divisibility 	10
3	 LCM & HCF: Introduction of LCM & HCF Method to find LCM & HCF Application of LCM & HCF 	10
4	 POWER AND ROOTS: Introduction of simple equation Formation of simple equation Solutions of simple equations Solutions of linear equations in two variables Practical application of linear equations in two variables 	10
5	 Project Work: It is mandatory for the students to undertake a project assigned by the consolid Some Suggested Project Works are: Applying Vedic Mathematics Techniques to Financial Calculations Comparing Vedic Mathematics with other Alternative Methods Investigating Vedic Mathematics Techniques for Arithmetic Reference Books: Vedic Ganit Nirdeshika Bhag-2, Vidya Bharti Akhil Bhartiya Shiksha Sansthan Kurushetr Vedic Ganit, Motilal Banarsidas, New Delhi Vedic Ganit Vihangam Drishti 1, Shiksha Sanskriti Uthhan Nyas Delhi Lilayati of Bhaskracarya: A Treatise of Mathematics of Vedic Tradition 	<i>irse instructor</i> . a

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VM02				
Cour	Course Title: Vedic Arithmetic-IICredits: 3			
Cours	 Course Outcome: Upon completion of the course, students will be able to: Perform Addition, Subtraction and multiplication of large numbers quickly Develop confidence in calculating square roots and cube roots of integers. 			
Unit	Contents	No. of Lectures		
1	 Unit 1: Contribution of Indian Mathematicians (Sridharacharya, Brahmagupta, Mahaviracharya, Srinivas Ramanujan) Vinakulum number, Introduction, Conversion and Application) Vertically and Crosswise Method - Multiplication of three two- digits numbers Deviation Method - Multiplication of three or four numbers Mixed Operations - Addition, Subtraction, Multiplication and Square 	15		
2	 Unit 2: Arithmetic application of binomial by Meru-Prastra Cube and Higher Powers Square roots & cube roots by division method 	10		
3	 Unit 3: Introduction & history of decimal system Recurring decimals Number Systems Conversion of bases Encryption 	10		
4.	 Unit 4: Test of Divisibility Auxiliary Fraction Divisibility and Simple Osculators 	10		
 Froject work: It is mandatory for the students to undertake a project assigned by the course instructor. Some Suggested Project Works are: Investigating Vedic Mathematics Techniques for Geometry Exploring Vedic Mathematics Techniques for Trigonometry Analyzing the Efficiency of Vedic Mathematics Techniques Reference Books: 				
	 Vedic Ganit Nirdeshika Bhag-2, Vidya Bharti Akhil Bhartiya Shiksha Sanstha Vedic Ganit, Motilal Banarsidas, New Delhi Vedic Ganit Vihangam Drishti 1, Shiksha Sanskriti Uthhan Nyas Delhi Lilavati of Bhaskracarya: A Treatise of Mathematics of Vedic Tradition 	an Kurushetra		

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Course Title: Vedic Algebra-I Credits: 3 Course Outcome: Upon completion of the course, students will be able to: perform algebraic calculations with speed and accuracy. will be able to factorize linear expression. to perform division of linear expression. solve simple equations. able to visualize data. Unit Contents No. of Lectures Unit I: Multiplication (Quadratic expression of one variable) Introduction and History of Algebra Contribution of Indian Mathematicians (Varahamihira, Bhaskaracharya, Nilakantha Somayaji, Bharati Krishna Tirtha) in the context of Arithmetic Addition & subtraction of algebraic expression Vertically & crosswise method Mixed Operation Deviation method Unit 2: Division and Factorization Division (Linear Expression in One Variable) Factorization ((Linear Expression in One Variable) Unit 3: Solution of simple equations Formation of simple equations Solutions of simple equation Solutions of linear equations in two variables Linear equations in two variables Unit 4: Applications of Data Visualization Visualization of financial data Ota visualization of financial data Topieet Work: It is mandatory for the students to undertake a project assigned by the course instructor. Some Suggested Project Works are: Soleuping a Curriculum for Teaching vedic Mathematics Analyzing the Efficiency of Vedic Mathematics Analyzing the Efficiency of Vedic Mathematics Vedic Ganit Windenshida Bhag-2,	VM03			
Course Outcome: Upon completion of the course, students will be able to: perform algebraic calculations with speed and accuracy. will be able to factorize linear expression. to perform division of linear expression. solve simple equations. able to visualize data. Unit Contents No. of Lectures Unit 1: Multiplication (Quadratic expression of one variable) Introduction and History of Algebra Contribution of Indian Mathematicians (Varahamihira, Bhaskaracharya, Nilakantha Somayaji, Bharati Krishna Tirtha) in the context of Arithmetic Addition & subtraction of algebraic expression Vertically & crosswise method Mixed Operation Deviation method Unit 2: Division and Factorization Division (Linear Expression in One Variable) Division (Linear Expression in One Variable) Introduction of simple equation Formation of simple equation Solutions of linear equations in two variables Unit 4: Applications of Data Visualization Visualization of romachine clearning and artificial intelligence Case studies in data visualization Visualization for machine learning and artificial intelligence Case studies in data visualization Project Work: It is mandatory for the students to undertake a project assigned by the course instructor. Some Suggested Project Works are: Exploring the History and Philosophy of Vedie Mathematics Analyzing the Efficiency of Vedic Mathematics Analyzing the Efficiency of Vedic Mathematics Analyzing the Efficiency of Vedic Mathematics Vedic Ganit Wichapagm Drishti I, Shiksha Sanskriti Uthhan Nyas Delhi <	Course Title: Vedic Algebra-ICredits: 3			
Course Outcome: Upon completion of the course, students will be able to: • perform algebraic calculations with speed and accuracy. • will be able to factorize linear expression. • to perform division of linear expression. • solve simple equations. • able to visualize data. Unit Contents No. of Lectures Unit 1: Multiplication (Quadratic expression of one variable) Icetures • Introduction and History of Algebra Contribution of Indian Mathematicians (Varahamihira, Bhaskaracharya, Nilakantha Somayaji, Bharati Krishna Tirtha) in the context of Arithmetic 15 • Vertically & crosswise method • Mixed Operation 15 • Vertically & crosswise method • Mixed Operation 10 • Privision and Factorization 10 10 • Factorization ((Linear Expression in One Variable) 10 • Factorization ((Linear Expression in One Variable) 10 • Introduction of simple equations 10 • Solutions of simple equations 10 • Solutions of simple equations 10 • Visualization of Simple equations 10 • Visualization of financial data 10 • Solutions of linear equations in two variables 10				
Unit Contents No. of Lectures Unit 1: Multiplication (Quadratic expression of one variable) Introduction and History of Algebra Introduction and History of Algebra 1 • Contribution of Indian Mathematicians (Varahamihira, Bhaskaracharya, Nilakantha Somayaji, Bharati Krishna Tirtha) in the context of Arithmetic 15 • Addition & subtraction of algebraic expression 15 • Vertically & crosswise method 16 • Mixed Operation 10 • Pactorization (Linear Expression in One Variable) 10 • Factorization ((Linear Expression in One Variable) 10 • Factorization ((Linear Expression in One Variable) 10 • Formation of simple equation 10 • Solutions of simple equation 10 • Solutions of linear equations in two variables 10 • Linear equations of two variables 10 • Visualization of machine learning and artificial intelligence 10 • Visualization of machine learning and artificial intelligence 10 • Visualization of financial data 10 <td>Cours</td> <td colspan="3"> Course Outcome: Upon completion of the course, students will be able to: perform algebraic calculations with speed and accuracy. will be able to factorize linear expression. to perform division of linear expression. solve simple equations. </td>	Cours	 Course Outcome: Upon completion of the course, students will be able to: perform algebraic calculations with speed and accuracy. will be able to factorize linear expression. to perform division of linear expression. solve simple equations. 		
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Unit 1: Multiplication (Quadratic expression of one variable) • Introduction and History of Algebra • Contribution of Indian Mathematicians (Varahamihira, Bhaskaracharya, Nilakantha Somayaji, Bharati Krishna Tirtha) in the context of Arithmetic 15 • Addition & subtraction of algebraic expression • Vertically & crosswise method 15 • Vertically & crosswise method • Vertically & crosswise method 10 • Deviation method • Division (Linear Expression in One Variable) 10 • Factorization ((Linear Expression in One Variable) 10 • Factorization (Cilicar Expression in One Variable) 10 • Solution of Simple equation • Introduction of simple equation • Interact equations in two variables • Interact equations in two variables • Linear equations in two variables • Unit 4: Applications of Data Visualization • Visualization of financial data 10 • Data visualization for machine learning and artificial intelligence • Case studies in data visualization • Visualization of Hinder y and Philosophy of Vedic Mathematics 10 • Exploring the History and Philosophy of Vedic Mathematics 10 • Divisualization of machine learning and artificial intelligence • Analyzing the Efficiency of Vedic Mathematics 1. Exploring the History and Ph			Lectures	
Unit 2: Division and Factorization102Division (Linear Expression in One Variable)10• Factorization ((Linear Expression in One Variable)10• Factorization ((Linear Expression in One Variable)103Unit 3: Solution of Equations • Introduction of simple equation • Solutions of simple equations • Solutions of linear equations in two variables • Linear equations in two variables104• Visualization of Data Visualization • Visualization of simale elerning and artificial intelligence • Case studies in data visualization105IExploring the History and Philosophy of Vedic Mathematics 	1	 Unit 1: Multiplication (Quadratic expression of one variable) Introduction and History of Algebra Contribution of Indian Mathematicians (Varahamihira, Bhaskaracharya, Nilakantha Somayaji, Bharati Krishna Tirtha) in the context of Arithmetic Addition & subtraction of algebraic expression Vertically & crosswise method Mixed Operation Deviation method 	15	
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Unit 3: Solution of Equations Introduction of simple equation Formation of simple equation Formation of simple equations Solutions of simple equations Solutions of simple equations Solutions of linear equations in two variables 10 Unit 4: Applications of Data Visualization 10 Visualization of scientific data 10 • Visualization of financial data 10 • Data visualization for machine learning and artificial intelligence 10 • Case studies in data visualization 10 • Project Work: It is mandatory for the students to undertake a project assigned by the course instructor. Some Suggested Project Works are: 10 1 Exploring the History and Philosophy of Vedic Mathematics 2 2. Analyzing the Efficiency of Vedic Mathematics Techniques 3 Developing a Curriculum for Teaching Vedic Mathematics 2. Vedic Ganit Nirdeshika Bhag-2, Vidya Bharti Akhil Bhartiya Shiksha Sansthan Kurushetra 2. Vedic Ganit, Motilal Banarsidas, New Delhi 3. Vedic Ganit Vihangam Drishti 1, Shiksha Sanskriti Uthhan Nyas Delhi 4. Lilavati of Bhaskracarya: A Treatise of Mathematics of Vedic Tradition 10		Factorization ((Linear Expression in One Variable)		
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		 Reference Books: 1. Vedic Ganit Nirdeshika Bhag-2, Vidya Bharti Akhil Bhartiya Shiksha Sansthan 2. Vedic Ganit, Motilal Banarsidas, New Delhi 3. Vedic Ganit Vihangam Drishti 1, Shiksha Sanskriti Uthhan Nyas Delhi 4. Lilavati of Bhaskracarya: A Treatise of Mathematics of Vedic Tradition 	Kurushetra	

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VM04			
Cour	Course Title: Vedic Algebra-IICredits: 3		
Cours	e Outcome: Upon completion of the course, students will be able to:		
	learn about Matrices and Determinants.		
	• learn to find inverse of Matrices.		
	learn about partial fractions		
	learn to find the roots of Quadratic Equation and its applications	I	
Unit	Contents	No. of	
	Unit 1.	Lectures	
	Contribution of Indian Mathematicians (Varahmihir Dattatreva Ramchandra		
	Kaprekar (1905-1986), Nilakantha Somaiya, C.R. Rao (1900))		
1	 Factorization of Cubic and Biguadratic Polynomials 	15	
_	Relation between roots and coefficients		
	Remainder Theorem & application		
	• Algebraic application of binomial by Meru-Prastra		
	Unit 2:		
	 Introduction & history of Matrices and Determinants 		
2	 Types of Matrices and Determinants 	10	
	Matrix and Determinants of Third Order		
	Inverse of Matrix		
	Unit 3:		
2	Introduction of Partial Fraction	10	
3	Iypes of Partial Fraction Dential Exaction	10	
	 Faction Types of Partial Fractions and their Solutions 		
	Unit 4.		
	Ouadratic Equation		
4	Roots of Ouadratic Equation	10	
	• Relation between roots and coefficients of Quadratic Equation and		
	Applications		
	Project Work: It is mandatory for the students to undertake a project assigned by the	e course	
	instructor. Some Suggested Project Works are:		
5	1. Applying Vedic Mathematics Techniques for Solving Algebraic Equations		
	2. Investigating Vedic Mathematics Techniques for Calculus		
	3. Investigating the Applications of Vedic Mathematics in Computer Science		
	Reference Books:	T 7 1	
	1. Vedic Ganit Nirdeshika Bhag-2, Vidya Bharti Akhil Bhartiya Shiksha Sansthan Kurushetra		
	2. Vedic Ganit, Motilal Banarsidas, New Delhi		
	3. Vedic Ganit Vihangam Drishti 1, Shiksha Sanskriti Uthhan Nyas Delhi		
	4. Lilavati of Bhaskracarya: A Treatise of Mathematics of Vedic Tradition		

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