

VAC 1: VEDIC MATHEMATICS - I

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Vedic Mathematics - I	02	1	0	1	12 TH Pass	NIL

Learning Objectives

The Learning Objectives of the course are:

- Foster love for maths and remove its fear through Vedic Mathematics
- Enhance computation skills in students through Vedic Mathematics
- Develop logical and analytical thinking
- Promote joyful learning of mathematics
- Discuss the rich heritage of mathematical temper of Ancient India

Learning outcomes

The Learning Outcomes of the course are

- Overcome the fear of maths
- Improved critical thinking
- Familiarity with the mathematical underpinnings and techniques
- Ability to do basic maths faster and with ease.
- Appreciate the Mathematical advancements of Ancient India.

SYLLABUS OF VEDIC MATHEMATICS - I

UNIT – I Vedic Maths- High Speed Addition and Subtraction Sessions/Lectures (5 Weeks)

- Vedic Maths: History of Vedic Maths and its Features
- Vedic Maths formulae: Sutras and Upsutras
- Addition in Vedic Maths: Without carrying, Dot Method

- Subtraction in Vedic Maths: Nikhilam Navatashcaramam Dashatah (All from 9 last from 10)
- Fraction –Addition and Subtraction

UNIT – II Vedic Maths- Miracle Multiplication and Excellent Division (4 Weeks)

- Multiplication in Vedic Maths: Base Method (any two numbers upto three digits)
- Multiplication by Urdhva Tiryak Sutra
- Miracle multiplication: Any three-digit number by series of 1's and 9's
- Division by Urdhva Tiryak Sutra (Vinculum method)

UNIT – III Vedic Maths-Lightening Squares and Rapid Cubes (3 Weeks)

- Squares of any two-digit numbers: Base method
- Square of numbers ending in 5: Ekadhikena Purvena Sutra
- Easy square roots: Dwandwa Yoga (duplex) Sutra
- Square root of 2: Baudhayana Shulbasutra
- Cubing: Yavadunam Sutra

UNIT – IV Vedic Maths-Enlighten Algebra and Geometry (3 Weeks)

- Factoring Quadratic equation: Anurupyena, Adyamadyenantyamanty Sutra
- Concept of Baudhayana (Pythagoras) Theorem
- Circling a square: Baudhayana Shulbasutra
- Concept of pi: Baudhayana Shulbasutra
- Concept angle (θ) 0o, 30o, 45o, 60o and 90o: Baudhayana number

Practical component : (If any) (15 Weeks)

The students are expected to demonstrate the application of Vedic Maths: Sutra and Upsutra

- Conduct workshops under the supervision of the course teacher to spread awareness on the utility of Vedic Mathematics.
- Students are required to visit nearby retail shops/local vendors to purchase stationery/vegetables/bread and butter and use tricks of Vedic maths of addition and subtraction to calculate the amount to pay and receive the difference.
- Students may share their experience with the class teacher in the form of audio-video presentations of 15 minutes.
- If required, students can share their experiences in the form of a Project Report.
- Any other Practical/Practice as decided from time to time

Essential Readings

- The Essential of Vedic Mathematics, Rajesh Kumar Thakur, Rupa Publications, New Delhi 2019.
- Vedic Mathematics Made Easy, Dahaval Bathia, Jaico Publishing, New Delhi 2011
- Vedic Mathematics: Sixteen Simple Mathematical formulae from the Vedas, Jagadguru Swami Sri Bharati Krishna Trithaji, Motilal Banarasidas, New Delhi 2015.
- Learn Vedic Speed Mathematics Systematically, Chaitnaya A. Patil 2018.

Suggested Readings

- A Modern Introduction to Ancient Indian Mathematics, T S Bhanumurthy, Wiley Eastern Limited, New Delhi.
- Enjoy Vedic Mathematics, S M Chauthaiwale, R Kollaru, The Art of Living, Bangalore.
- Magical World of Mathematics, VG Unkalkar, Vandana publishers, Bangalore.

Examination scheme and mode: Subject to directions from the Examination Branch/University of Delhi from time to time

UNIVERSITY OF DELHI

CNC-II/093/1(23)/2022-23/

Dated: 21.03.2023

NOTIFICATION

Sub: Amendment to Ordinance V

Following addition be made to Appendix-II-A to the Ordinance V (2-A) of the Ordinances of the University;

Add the following:

**Value Addition Course (VACs)
Under UGCF-2022 listed under Appendix-II -A to the Ordinance V (2-A) of the Ordinances of the University
(With effect from academic year 2022-23)**

The following two courses are being added under the Pool of Value Addition Courses, which are in progression of the courses (i) Vedic Mathematics-I and (ii) National Cadet Corps-I respectively :

1. Vedic Mathematics-II
2. National Cadet Corps-II

VAC : Vedic Mathematics - II

Course Title and Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Prerequisite of the Course
		Lecture	Tutorial	Practical/Practise		
Vedic Mathematics- II	02	1	0	1	Pass in Class 12 th	VAC-Vedic Mathematics -I

Course Objectives:

- Foster the love for mathematics by creating a positive attitude through Vedic and Ancient Indian Mathematics
- Help students appreciate ancient Indian Mathematics and its contribution to the world.
- Enhance computational proficiency by involving procedures in Linear and Matrix Algebra

- Improve geometrical thinking by understanding the basic tenets of geometry such as construction of line segments, angles, triangles and circles as used in Ancient India
- Develop conceptual knowledge of mathematical concepts
- Appreciate the need of conceptual knowledge over procedural processes

Learning Outcomes:

After completion of the course, students shall be able to

- think critically
- Find mathematical solution of algebraic expressions
- Solve system of linear equations and matrices faster and with ease.
- Appreciate the Mathematical advancements of Ancient India.

Syllabus of Vedic Mathematics - II

	Sessions/Lectures
Unit I: Contribution of Indian Mathematicians	
<ul style="list-style-type: none"> ● Varahmihir ● Brahmagupta ● Srinivasa Ramanujan ● Neelkanth Somayya ● Bharti Krishna Tirtha 	3
Unit II: Easy Solution of linear equations	
<ul style="list-style-type: none"> ● Introduction of simple equation ● Solutions of simple equations ● Solutions of linear equations in two variables ● Practical application of linear equations in two variables 	4
Unit III: High Speed Matrix Algebra	
<ul style="list-style-type: none"> ● Introduction and history of Matrices and Determinants ● Matrices and Determinants of third order ● Inverse of Matrices 	4
Unit IV: Vedic Geometry	
<ul style="list-style-type: none"> ● Different forms of straight lines ● The Triangle ● The Cyclic Quadrilateral, Squares, and the Circle ● Geometrical constructions (such as <i>Altars</i>) ● Transformation of simple shapes ● <i>Kalpa Sutras-Srautha Sutras</i> and <i>Sulbha Sutras</i> 	4

Note: Some of the theoretical concepts would be dealt with during practice hours.

Practical/ Practice Component

(15 sessions of 2 hours each= 30 hours)

The students are expected to demonstrate the application of Vedic Maths through various *Sutras*

- Conduct workshops under the supervision of the course teacher to spread awareness on the utility of Vedic Mathematics.
- Students may share their experience with the class teacher in the form of audio-video presentations of 15 minutes.
- If required, students can share their experiences in the form of a Project Report.
- Any other Practical/Practice as decided from time to time

Essential Readings

- Vedic Mathematics, Swami Bharati Krishna Trithaji, *Motilal Banarsidas, New Delhi.*
- The Essential of Vedic Mathematics, Rajesh Kumar Thakur, *Rupa Publications, New Delhi*
- Vedic Mathematics For All Ages, Vandana Singhal, *Motilal Banarsidas Publishers.*
- Elements of Vedic Mathematics, Udayan S. Patankar, Sunil M. Patankar, TTU Press.
- Vedic Mathematics: The Problem Solver, Ronak Bajaj, *Black Rose Publications.*
- Vedic Geometry Course, S. K. Kapoor, *Lotus Press*
- Gardner, Robert and J.F. Staal. *Altar of Fire.* Documentary. The Film Study Center at Harvard University, 1976

Suggested Readings

- A Modern Introduction to Ancient Indian Mathematics, T S Bhanumurthy, *Wiley Eastern Limited, New Delhi*
- Magical World of Mathematics, VG Unkalkar, *Vandana publishers, Bangalore*
- Vedic Mathematics - Modern Research Methods, Tiwari P., *Campus Books International*
- Learning Vedic Mathematics, S. K. Kapoor, *Lotus Press Publications*
- Vedic Mathematics Made Easy, DahavalBathia, *Jaico Publishing, New Delhi*
- Vedic Mathematics New Horizons Advance Lessons, S. K. Kapoor, *Lotus Press*

Examination scheme and mode: Subject to directions from the Examination Branch/University of Delhi from time to time.

Vedic Mathematics - III

Course Title and Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Prerequisite of the Course
		Lecture	Tutorial	Practical/ Practice		
Vedic Mathematics- III	02	1	0	1	Pass in Class 12th	Vedic Mathematics-II

Course Objectives:

- Foster the love for mathematics by creating a positive attitude through Vedic and Ancient Indian Mathematics
- Help students appreciate ancient Indian Mathematics and its contribution to the world.
- Enhance conceptual as well as computational proficiency in trigonometric ratios and complex numbers
- Understand the conceptual ideas of coordinate geometry as developed and used in Ancient and medieval India
- Discuss the rich heritage of mathematical temperament of Ancient India

Learning Outcomes:

- Improved critical as well as logical thinking
- Familiarity with the mathematical procedures of geometry
- Ability to perform calculations in trigonometric ratios with ease.
- Appreciate the Mathematical advancements of Ancient India.

Syllabus of Vedic Mathematics - III

Unit I: Contribution of Indian Mathematicians -Trigonometry	Sessions/Lectures
<ul style="list-style-type: none"> • Baudhayana • Apastamba • Aryabhata I, II • Bhaskara I, II • Lilavati 	3
Unit II: Trigonometric Ratios	
<ul style="list-style-type: none"> • Introduction of Trigonometric ratios • Trigonometric Identities • BN of Complementary angles • BN of sum and difference ($\alpha \pm \beta$) of an angle 	4
Unit III: Real-life Applications of Trigonometry	

<ul style="list-style-type: none"> ● Application Trigonometry-Height and Distance ● Inverse Trigonometric Function 	3
Unit IV: Vedic Geometry	
<ul style="list-style-type: none"> ● Angle between two lines ● Perpendicular distance from point to line ● Baudhayan Geometry ● <i>Jyothishya Shastram</i>-Introduction of Astronomy, Astrology & Time Computation ● <i>Shilpa Shastram</i>- Introduction of temple architecture and constructions 	5

Note: Some of the theoretical concepts would be dealt with during practice hours.

Practical/ Practice Component

(15 sessions of 2 hours each= 30 hours)

The students are expected to demonstrate the application of Vedic Maths: *Sutra* and *Upsutra*

- Conduct workshops under the supervision of the course teacher to spread awareness on the utility of Vedic Mathematics.
- Students may share their experience with the class teacher in the form of audio-video presentations of 15 minutes.
- If required, students can share their experiences in the form of a Project Report.
- Any other Practical/Practice as decided from time to time

Essential Readings

- Vedic Mathematics, Swami Bharati Krishna Trithaji, *Motilal Banarsidas, New Delhi.*
- The Power of Vedic Mathematics with Trigonometry, *Atul Gupta, Jaico Publishing house.*
- Vedic Mathematics For All Ages, Vandana Singhal, *Motilal Banarsidas Publishers.*
- Studies in Indian Mathematics and Astronomy, Aditya Kolachana, K. Mahesh, K. Ramasubramanian, *Springer, Singapore*
- Elements of Vedic Mathematics, Udayan S. Patankar, Sunil M. Patankar, TTU Press.
- Vedic Mathematics: The Problem Solver, Ronak Bajaj, *Black Rose Publications.*
- Vedic Geometry Course, S. K. Kapoor, *Lotus Press*
- Gardner, Robert and J.F. Staal. *Altar of Fire*. Documentary. The Film Study Center at Harvard University, 1976

Suggested Readings

- A Modern Introduction to Ancient Indian Mathematics, T S Bhanumurthy, *Wiley Eastern Limited, New Delhi*
- Essential of Vedic Mathematics, Rajesh Kumar Thakur, *Rupa Publications, New Delhi*
- Vedic Mathematics - Modern Research Methods, Tiwari P., *Campus Books International*
- A Treatise on Astronomy By Bhaskaracharya, *Cosmo Publication.*
- Astronomical Applications of Vedic Mathematics, K. R. Williams, *Motilal Banarsidass Publishers, Delhi.*

Assessment Method

Subject to directions from the Examination Branch/University of Delhi from time to time

Value Addition Course

Vedic Mathematics - IV

Course Title and Code	Credits	Credit Distribution of the Course			Eligibility Criteria	Prerequisite of the Course
		Lecture	Tutorial	Practical/ Practice		
Vedic Mathematics- IV	02	1	0	1	Pass in Class 12th	Vedic Mathematics-III

Course Objectives:

- Foster the love for mathematics by creating a positive attitude through Vedic and Ancient Indian Mathematics
- Enhance conceptual as well as reduce its fear through Vedic Mathematics
- Understand application of triangular array of numbers with *Meru Prastar*
- To become computational proficiency in differential and integral calculus
- Appreciate the rigour in mathematics conceptual understanding that existing in ancient India

Learning Outcomes:

- Improved critical as well as logical thinking
- Familiarity with the mathematical procedures of Pingala's *Meru Prastar*
- Ability to perform differentiation and integration of expressions faster with ease.
- Appreciate the Mathematical advancements of Ancient India.

Syllabus of *Vedic Mathematics - IV*

Unit I: Contribution of Indian Mathematicians	Sessions/Lectures
<ul style="list-style-type: none"> • Pingala • Mahavira • Narayan Pandit • Jyesthadeva • Parmeshvaran • Madhavan 	3
Unit II: Wonder World of Indian Mathematics-<i>Meru Prastar</i>	
<ul style="list-style-type: none"> • Pingal's binary number system, • Different types of <i>Meru Prastar</i> (including Pascal triangle) • Applications of <i>Meru Prastar</i> 	4
Unit III: Lightning Complex numbers	

<ul style="list-style-type: none"> • Introduction of Complex number • Baudhayan form of Complex • Addition & Subtraction of Complex Number • Multiplication of Complex numbers 	4
Unit IV: Enlighten Calculus	
<ul style="list-style-type: none"> • Introduction to differentiation • Application of derivatives • Introduction to Integration • Application of Integration 	4

Note: Some of the theoretical concepts would be dealt with during practice hours.

Practical/ Practice Component (15 sessions of 2 hours each= 30 hours)

The students are expected to demonstrate the application of Vedic Maths: *Sutra* and *Upsutra*

- Conduct workshops under the supervision of the course teacher to spread awareness on the utility of Vedic Mathematics.
- Students may share their experience with the class teacher in the form of audio-video presentations of 15 minutes.
- If required, students can share their experiences in the form of a Project Report.
- Any other Practical/Practice as decided from time to time

Essential Readings

- Vedic Mathematics, Swami Bharati Krishna Trithaji, *Motilal Banarsidas, New Delhi.*
- The Power of Vedic Mathematics with Trigonometry, *Atul Gupta, Jaico Publishing house.*
- Studies in Indian Mathematics and Astronomy, Aditya Kolachana, K. Mahesh, K. Ramasubramanian, *Springer, Singapore*
- Elements of Vedic Mathematics, Udayan S. Patankar, Sunil M. Patankar, TTU Press.
- Vedic Mathematics For All Ages, Vandana Singhal, *Motilal Banarsidas Publishers.*
- Vedic Geometry Course, S. K. Kapoor, *Lotus Press*

Suggested Readings

- A Modern Introduction to Ancient Indian Mathematics, T S Bhanumurthy, *Wiley Eastern Limited, New Delhi*
- Essential of Vedic Mathematics, Rajesh Kumar Thakur, *Rupa Publications, New Delhi*
- Learning Vedic Mathematics, S. K. Kapoor, *Lotus Press Publications*
- Vedic Mathematics Made Easy, Dahaval Bathia, *Jaico Publishing, New Delhi*

Assessment Method

Subject to directions from the Examination Branch/University of Delhi from time to time
