Appendix-76
Resolution No. 27 {27-1 (27-1-13)}

INDEX
VALUE ADDITION COURSE

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*

	Sessions/Lectures
Unit I: Contribution of Indian Mathematicians -**Trigonometry**	
• Baudhayana • Apastamba • Aryabhata I, II • Bhaskara I, II • Lilavati	3
Unit II: **Trigonometric Ratios**	
• 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**	

● Application Trigonometry-Height and Distance ● Inverse Trigonometric Function	3
Unit IV: Vedic **Geometry**	
● Angle between two lines ● Perpendicular distance from point to line ● Baudhayan Geometry ● *Jyothishya Shastram*-Introduction of Astronomy, Astrology & Time Computation ● *Shilpa Shastram*- 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., *Cumpus 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

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Value Addition Course
<u>Vedic Mathematics - IV</u>

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
- Pingala - Mahavira - Narayan Pandit - Jyesthadeva - Parmeshvaran - Madhavan	3
Unit II: **Wonder World of Indian Mathematics-*Meru Prastar***	
- Pingal's binary number system, - Different types of *Meru Prastar* (including Pascal triangle) - Applications of *Meru Prastar*	4
Unit III: **Lightening Complex numbers**	

● Introduction of Complex number ● Baudhayan form of Complex ● Addition & Subtraction of Complex Number ● Multiplication of Complex numbers	4
Unit IV: **Enlighten Calculus**	
● 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

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VAC : NATIONAL CADET CORPS – III

Credit distribution, eligibility criteria and pre-requisites of the course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/Practice		
National Cadet Corps -III	2	1	0	1	Pass in Class 12th	Enrolled as NCC Cadet and in semester three.

Learning Objectives:

The course aims to:
- Provide understanding about the life history and leadership qualities of great leaders, sportsperson & entrepreneurs.
- Provide understanding of the various aspects of types of mindset.
- Provide understanding of the methods and qualities of public speaking.
- Provide knowledge about the organization related to disaster management and their functioning.
- Provide understanding about the various types of adventure activities.

Learning Outcomes:

After completing this course, the cadets will be able to:-
- Admire and get inspired from the accomplishments of leaders from various walks of life.
- Develop public speaking skills.
- Understand the importance of positive mindset and optimistic attitude in life.
- Appreciate the need & requirements for disaster management and their role in disaster management activities.

SYLLABUS OF NATIONAL CADET CORPS-II

Unit I: Personality Development   (5 Weeks)

- Group Discussion- Change your Mindset
- Public Speaking

Unit II: Leadership   (4 Weeks)

- Case Studies- APJ Abdul Kalam, Deepa Malik, Maharana Pratap, N.R. Narayana Murthy

Unit III: Disaster Management   (4 Weeks)

- Organisation of NDMA
- Types of Disasters
- Essential Services
- Types of Assistance

Unit IV: Adventure Activities-   (2Weeks)

- Parasailing
- Slithering
- Rock Climbing
- Cycling and Trekking

Practical Component: **(15 Weeks)**

- Drill
- Map Reading/Principles of Flight & Airmanship/Naval Communication, Navigation & Seamanship
- Weapon Training
- Field Craft & Battle Craft
- Social Service & Community Development
- Obstacle Training

Suggested Readings:

- DGNCC Cadet's Hand Book - Common Subjects -All Wings (in English)
- DGNCC Cadet's Hand Book - Common Subjects -All Wings(in Hindi)
- DGNCC Cadet's Hand Book — Specialised Subjects —Army, Navy and Air Wing

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