SEC-2

Session: 2023-24			
Part A - Introduction			
Subject	Mathematics		
Semester	II		
Name of the Course	Calculation Skills with Vedic Mathematics-I		
Course Code	B23-SEC-203		
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	SEC		
Level of the course	100-199		
Pre-requisite for the course (if any)	NA		
Course Learning Outcomes (CLOs): CLO 5 is related to the practical components of the course.	**After completing this course, the learner will be able to:** 1. Gain the knowledge of *Sutras* and *Upsutras* from Vedic Mathematics. Perform simple arithmetic calculations with speed and accuracy. 2. Have the procedural knowledge of multiplication of complicated numbers quickly with the aid of Vedic *sutras* and generate tables of any number. 3. Make use of Vedic *sutras* to quickly divide, and find LCM and HCF of many digit numbers. 4. Acquire the cognitive skills to calculate square and cube roots of numbers speedily with accuracy. 5. Attain skills to perform calculations in competitive examinations with speed and accuracy.		
	Theory	Practical	Total
Credits	2	1	3
Contact Hours	2	2	4

Internal Assessment Marks	15	5	20
End Term Examination Marks	35	20	55
Examination Time	3Hrs	3Hrs	
Max. Marks:75			

Part B-Contents of the Course

Instructions for Paper- Setter

Note: The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will contain 7 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unitand the compulsory question.

Unit	Topics	Contact Hours
I	History of Vedic Mathematics and introduction to its *Sutras* and *Upsutras*. Addition in Vedic Mathematics: Without Carrying, Dot Meth method subtraction in Vedic Mathematics: *Nikhilam Navatashcaramam Dashatah* (All from 9 last 10). Fraction: Addition and Subtraction.	8
II	Multiplication of two numbers of two digits (*Ekadhikena Purvena* method), Multiplication of two numbers of three digits, (*Ekanyunena Purvena* method, *Urdhva Tiryagbhyam* method, *Nikhilam Navatashcaramam Dashatah* method), Combined Operations, Generating Tables (*Nikhilam*).	**8**
III	Division: *Nikhilam Navatashcaramam Dashatah* (two digits divisor), *ParavartyaYojyet* Method (three digits divisor). Divisibility: *Ekadhikena Purvena* Method (two digits divisor), *Eknunen Purvena* Method (two digits divisor) LCM, HCF.	8
IV	Squares of any two digits numbers: Base method, Squares of numbers ending in 5: *Ekadhikena Purvena* Method.	8

	Square Roots: *Dwandwa Yoga* (Duplex) Method, Square root (four digit number). Cubing: *Yavadunam* Method, Cube root (six digit numbers)	
Practical		
	The examiner will set 4 questions at the time of practical examination by taking course learning outcomes (CLOs) into consideration. The examinee will be required to solve 2 questions. The evaluation will be done on the basis of practical record, viva-voce and written examination. **Problem Solving**-Questions related to the following problems will be solved and record of those will be maintained in the Practical Note Book: 1. Addition of two 5-digit numbers by without carrying and dot method. 2. Subtraction of 5-digit numbers by base method. 3. Multiplication of 2-digit numbers by base method. 4. Multiplication of 3-digit numbers by numbers consisting of all 9s. 5. Multiplication of 3-digit numbers by numbers consisting of all 1s. 6. Multiplication of 3-digit numbers by Vinculum method. 7. Division of 2-digit and 3-digit numbers. 8. Generating table of any number. 9. Square of any 2-digit number by base method. 10. Square of any number ending with 5. 11. Square root of 4-digit numbers. 12. Cube root of 6-digit numbers. 13. LCM and HCF of numbers. 14. Answer checking by digit-sum method.	30
Suggested Evaluation Methods		

InternalAssessment:	End Term Examination:
➢ **Theory 15** • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.: 4 • Mid-Term Exam: 7 ➢ **Practicum 5** • Class Participation: • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam:	➢ **Theory** 35 Written Examination ➢ **Practicum** 20 Lab record, viva-voce, written examination.

Part C-Learning Resources

Recommended Books:

1. U. S. Patankar and S. M. Patankar (2018). *Elements of Vedic Mathematics.* TTU Press.
2. V.Singhal (2014).*Vedic Mathematics for all ages.* Motilal Banarsidas Publishers.
3. R.K.Thakur (2013).*The Essentials of Vedic Mathematics.* Rupa Publications. New Delhi.
4. P. Tiwari and V.K. Pandey (2012). *Vedic Mathematics - Modern Research Methods.* Campus Books International.
5. S. K. Kapoor (2006).*Vedic Geometry Course.* Lotus Press.
6. A. Gupta (2004). *Power of Vedic Mathematics with Trigonometry.* Jaico Publishing House.
7. S.B.K. Krishna Trithaji(1990). *Vedic Mathematics.* Motilal Banarsidas, New Delhi.

SEC-2

Session: 2023-24	
Part A - Introduction	
Subject	Mathematics
Semester	II
Name of the Course	Numerical Ability Enhancement Skills
Course Code	B23-SEC-225
Course Type: (CC/MCC/MDC/CC-M/DSEC/VOC/DSE/PC/AEC/VAC)	SEC
Level of the course	100-199
Pre-requisite for the course (if any)	NA
Course Learning Outcomes(CLOs):	**After completing this course, the learner will be able to:** 1. Understand real number system, fundamental arithmetical operations, use of BODMAS rule and solve typical expressions accurately and fast. 2. Acquire skill to identify types of given sequences/series and apply suitable method to find a particular term, sum of specific number of terms and practice this learning in real life mathematical problems. 3. To formulate equations for specific mathematical problem and making use of mathematical skills to solve that. 4. Have a deeper and comprehensive understanding of the basic concepts of Percentage, Profit & Loss, Alligation or mixture, Averages and acquire skill to use this knowledge in real life problems
CLO 5 is related to the practical component.	5. Attain cognitive and analytical skills to identify, analyze and generate solutions to realistic problems by exploring procedural knowledge associated with the problems. Have analytical skills to compare and recognize various geometrical figures available in

	surroundings with mathematical figures and determine areas and volumes of the same.		
Credits	Theory	Practical	Total
	2	1	3
Contact Hours	2	2	4
Internal Assessment Marks	15	5	20
End Term Examination Marks	35	20	55
Examination Time	3 Hours	3 Hours	
Max. Marks: 75			

Part B- Contents of the Course

Instructions for Paper- Setter

The examiner will set 9 questions asking two questions from each unit and one compulsory question by taking course learning outcomes (CLOs) into consideration. The compulsory question (Question No. 1) will contain 7 parts covering entire syllabus. The examinee will be required to attempt 5 questions, selecting one question from each unit and the compulsory question.

Unit	Topics	Contact Hours
I	Real number system, Operations on numbers, Tests for divisibility of natural numbers, Decimals, Fractions, Square roots, Cube roots, Surds and indices, Use of BODMAS.	8
II	HCF, LCM of integers, Ratio and Proportion, Progressions: Arithmetic Progression, Geometric Progression, Harmonic Progression with their simple and basic practical applications, Number series completion.	8
III	Percentage, Profit & Loss, Alligation or mixture, Average, Average speed problems, Calendar.	8
IV	Logarithms, Area of Quadrilaterals (Parallelogram, Square, Rectangle, Rhombus, Trapezium), Volume and surface area of Cube, Cuboid, Cylinder, Cone, Sphere and Hemisphere.	8

Practical	
The examiner will set 4 questions at the time of practical examination by taking course learning outcomes (CLOs) into consideration. The examinee will be required to solve 2 questions. The evaluation will be done on the basis of practical record, viva-voce, written examination.	30
Problem Solving- Questions related to the following problems will be solved and their record will be maintained in the Practical Notebook: 1. To solve problems related to the simplification of expression involving fractions having use of BODMAS. 2. Practical problems of salary increment, population increase etc. & apply formula for n^{th} term and sum of n terms based on A.P. and G.P. 3. Working out average speed during a trip from a destination to another destination assuming non uniform speed taking at least three variation in magnitude of speed. 4. Practical problems related to ratio and proportion. 5. Practical problems related to two digit numbers and reversal of digits at unit and ten's places. 6. Draw a chart for quadrilateral (Parallelogram, Square, Rectangle, Rhombus, Trapezium) mentioning their properties, surface area and perimeter. 7. Draw 3-D figures Cuboid, Cube, Cylinder, Cone, Sphere and Hemisphere and problems solving for the surface area and volume of these figures. 8. Derive a formula to determine average speed of a person	

	travelling from a destination 'A' to another destination 'B' with a speed of x km/h and returning back with a speed of y km/h . 9. 'M' offers a discount of 25% on a book to 'A' and for the same book, he offers 'B' a discount of 10% and again an additional discount of 15%. Analyze, which has to pay more for the same book. 10. Problem of determining single discount in percent equivalent to successive discount of x %, y% and z %. 11. Problem of determining loss percent when a person sells two similar items, one at a gain of x % and the other at a loss of x %. 12. To solve problem related to the value of an item after 'n' years if it depreciates at the rate of 'r %' per annum , when its present value 'P' is given. 13. Problem of determining the value of an item 'n' years ago if its depreciation rate 'r %' per annum and present value 'P' is given. 14. Problem of percentage reduction in consumption of a commodity if its price increases 'r %' so as not to increase the expenditure. 15. Problem to find the ratio in which two or more ingredients at the given price must be mixed to produce a mixture of a desired price.	
Suggested Evaluation Methods		
Internal Assessment: ➢ **Theory 15** • Class Participation: 4 • Seminar/presentation/assignment/quiz/class test etc.: 4 • Mid-Term Exam: 7 ➢ **Practicum 5** • Class Participation: • Seminar/Demonstration/Viva-voce/Lab records etc.: 5 • Mid-Term Exam:		**End Term Examination:** ➢ **Theory** **35** Written Examination ➢ **Practicum** **20** Lab record, viva-voce, write up.
Part C-Learning Resources		

Recommended Books:

1. R. S. Aggarwal (2022). *Quantitative Aptitude.* S Chand & Company Limited, New Delhi.
2. A. Guha (2020). *Quantitative Aptitude* (7th Edition). Mc Graw Hill Publications.
3. V. Dyke, J. Rogers and H. Adams (2011). *Fundamentals of Mathematics,* Cengage Learning.
4. A.S. Tussy, R. D. Gustafson and D. Koenig (2010). *Basic Mathematics for College Students.* Brooks Cole.
5. C. C. Pinter (2014). *A Book of Set Theory.* Dover Publications.
6. G. Klambauer (1986). *Aspects of calculus.* Springer-Verlag.