Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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ક્રમાંક :એસ./પરિપત્ર/૧૦૮૦૫/૨૦૨૪
તા.૨૨/૦૫/૨૦૨૪

પ્રતિ,
વડાશ્રી,
ડિપાર્ટમેન્ટ ઓફ ગણિતશાસ્ત્ર,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષય:– Five Years Integrated M.Sc.Mathematics Sem.-1 & 2 ના અભ્યાસક્રમ બાબત.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવનાર Five Years Integrated M.Sc.Mathematics Sem.-1 & 2 Major,Minor,MDC,AEC,SEC અને VAC નો અભ્યાસક્રમ ગણિતશાસ્ત્ર વિષયની અભ્યાસ સમિતિની તા.૧૩/૦૫/૨૦૨૪ ની સભાના ઠરાવ ક્રમાંકઃ ૦૨ અન્વયે મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિદ્યાશાખાવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૦૧/૦૩/૨૦૨૪ ની સભાના ઠરાવ ક્રમાંકઃ૧૦૪ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત ઈ.ચા.માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

કુલસચિવ

પ્રતિ,
૧) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા,
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....જાણ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY
SYLLABUS FOR FIVE YEAR
INTEGRATED M.Sc. MATHEMATICS
With Effect from June2024

Integrated M.Sc. (Mathematics) Sem – I							
Sr. No.	Subject Code and Name of the Course	Teaching Schedule Hrs/week	Exam Schedule				Credit
			Duration	Internal marks	External marks	Total marks	
1	**Major Paper – I** MH-MAJ-101: Fundamentals of Calculus	4	3	30	70	100	4
2	**Major Paper – II** MH-MAJ-102: Functions of Complex Variables	4	3	30	70	100	4
3	**Minor Elective Paper** MH-MIN-101: Mathematical Statistics – I	3 + 2	3	30	70	100	4
4	**Multi-Disciplinary Paper** MH-MDC-101: Fundamentals of Computer	3+2	3	30	70	100	4
5	**Ability Enhancement Course** MH-AEC-101: Communication Skill	2	2	20	30	50	2
6	**Skill Enhancement Course** MH-SEC-101: Vedic Mathematics – I	2	2	20	30	50	2
7	**Value Added Course** MH-VAC-101: Introduction to IKS – 1	2	2	20	30	50	2
TOTAL		**24**	**18**	**180**	**270**	**550**	**22**

chairman
DR. M R. TAILI
D.o.s. Maths
13/05/2024

VEER NARMAD SOUTH GUJARAT UNIVERSITY
SYLLABUS FOR FIVE YEAR
INTEGRATED M.Sc. MATHEMATICS
With Effect from June2024

Integrated M.Sc. (Mathematics) Sem – II							
Sr. No.	**Subject Code and Name of the Course**	**Teaching Schedule Hrs/week**	**Exam Schedule**				**Credit**
			Duration	**Internal marks**	**External marks**	**Total marks**	
1	**Major Paper – I** MH-MAJ-201: Differential Calculus	4	3	30	70	100	4
2	**Major Paper – II** MH-MAJ-202: Integral Calculus	4	3	30	70	100	4
3	**Minor Elective Paper** MH-MIN-201: Mathematical Statistics – II	3 + 2	3	30	70	100	4
4	**Multi-Disciplinary Paper** MH-MDC-201: EXCEL Programming	3+2	3	30	70	100	4
5	**Ability Enhancement Course** MH-AEC-201: Personality Development	2	2	20	30	50	2
6	**Skill Enhancement Course** MH-SEC-201: Vedic Mathematics – II	2	2	20	30	50	2
7	**Value Added Course** MH-VAC-201: Introduction to IKS – 2	2	2	20	30	50	2
TOTAL		**24**	**18**	**180**	**270**	**550**	**22**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: I

Syllabus to be in force from June 2024

Major Paper – I

MH-MAJ-101: Fundamentals of Calculus

Total Hours: 40
Credit: 4

Theory	Practical	Tutorial	Total
4	0	0	4

Unit 1: Limits, Continuity and Differentiability:

- Limits: Investigate the behavior of functions as they approach specific values.
- Continuity: Learn about continuous functions and their properties.
- Differentiability: Study the concept of derivatives and their applications.
- Understand how sequences and series behave as their terms accumulate.
- Explore concepts like convergence, divergence and the behavior of infinite sums.

Unit 2: Mean Value Theorems:

- Mean Value Theorems: Understand the existence of a specific point where the derivative equals the average rate of change.
- Taylor's Theorem: Explore approximations of functions using polynomial expansions.
- Power Series: Dive into infinite series expressed as polynomials.
- Maxima and Minima: Analyze critical points of functions to find local extrema.

Unit 3: Fundamental Theorem of Calculus, Partial Derivatives and Multivariable Calculus:

- Fundamental of integrals.
- Fundamental Theorem of Calculus: Connect derivatives and integrals.

Unit 4: Fundamental Theorem of Calculus, Partial Derivatives and Multivariable Calculus:

- Partial Derivatives: Extend derivatives to functions of multiple variables.
- Gradient and Directional Derivatives: Explore rates of change in different directions.
- Lagrange Multipliers: Optimize functions subject to constraints.

Syllabus is covered from the following reference books:

1. T.M. Apostol: Calculus, Volumes 1, 2, 2nd ed., Wiley, 2007.
2. James Stewart: Calculus, 8th ed., Thomson, 2011.
3. G.B. Thomas and R.L. Finney: Calculus and Analytic Geometry, 12th ed., Pearson, 2015.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: I

Syllabus to be in force from June 2024

Major Paper – II

MH-MAJ-102:Functions of Complex Variables

Total Hours: 40
Credit: 4

Theory	Practical	Tutorial	Total
4	0	0	4

Unit I:De'Moivre's theorem:

- De'Moivre's theorem, It's applications, Trigonometric functions for multiplearguments.

Unit II: Euler's expression:

- Euler's expressions, Evaluation of Indeterminate forms by using Euler'sexpressions, Hyperbolic functions for real arguments and their inverses.

Unit III:Euler's theorem:

- Exponential, Circular and Hyperbolic functions of complex variables and theiridentities, Euler's Theorem, Relations between circular and Hyperbolicfunctions.

Unit IV: Logarithmic functions:

- Logarithm of complex quantities, Separations of Logarithmic, inverse circularand inverse hyperbolic functions in to their real and imaginary parts.

Syllabus is covered from the following reference books:

1. S.L.Loney: Plane trigonometry, Part I and II, McMillan & Co. London, 2016
2. R.S.Verma& K.S. Shukla: Text book of Trigonometry, Pothishala Pvt. Ltd. Allahabad, 1999
3. Narasimhan, R.: Complex Analysis in One Variable, Birkhauser Boston Inc. 2001
4. Greene, R.E. and Krantz, S.G.: Function Theory of One Complex Variable, 2nd ed., AMS 2002.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: I

Syllabus to be in force from June 2024

MinorElective Paper

MH-MIN-101:Mathematical Statistics – I

Total Hours: 40
Credit: 4

Theory	Practical	Tutorial	Total
3	2	0	5

Unit 1: Introduction to Statistics and probability theory:

- Understand the role of statistics in analyzing data and making informed decisions.
- Explore descriptive statistics, which summarize and present data.
- Basic concepts of probability.
- Probability distributions (such as binomial and normal distributions).
- Random variables and their properties.

Unit 2: Statistical Inference:

- Estimation: Point estimation and interval estimation.
- Hypothesis testing: Formulating and testing hypotheses about population parameters.
- Confidence intervals: Estimating the range within which a parameter lies.

Unit 3: Sampling Techniques:

- Simple random sampling.
- Stratified sampling.
- Systematic sampling.
- Cluster sampling.

Unit 4: Descriptive Statistics:

- Measures of central tendency (mean, median, mode).
- Measures of dispersion (range, variance, standard deviation).
- Skewness and kurtosis.

Syllabus is covered from the following reference books:

1. A.M. Goon, M.K. Gupta, B. Das Gupta:Fundamentals of Statistics, (Vol-I) - The World Press (Pvt) Ltd., 2013
2. David Lane:Introduction to Statistics, Open Textbook, 2003
3. S.C. Gupta and V.K. Kapoor: Fundamentals of Applied Statistics, Sultan Chand & Sons, 2014
4. A.M. Goon, M.K. Gupta, B. Das Gupta:An Outline of Statistical Theory (2 Volumes) World press, 2014

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: I

Syllabus to be in force from June 2024

Multi-Disciplinary Paper

MH-MDC-101:Fundamentals of Computer

Total Hours: 40
Credit: 4

Theory	Practical	Tutorial	Total
3	2	0	5

Unit 1: Introduction to Computers:

- Understand the characteristics and capabilities of computer systems.
- Explore computer hardware and software components.
- Differentiate between data and information.
- Learn about various types of computers
- Study the generations of computers.

Unit 2: Computer Peripherals:

- Introduction to input devices.
- Output fundamentals.

Unit 3: Basic Components & Storage:

- Central Processing Unit (CPU):Microprocessor, control unit, ALU, registers, buses.
- Main memory (RAM) for microcomputers.
- Read-Only Memory (ROM)
- Storage devices:Primary and secondary storage, Sequential, direct, and indexed sequential data storage methods, Tape storage devices, hard disks, disk cartridges, optical disks (CD-ROM).

Unit 4: Computer Software & Languages:

- System software vs. application software.
- Types of system software.
- Operating systems (boot loader, diagnostic programs, BIOS, utility programs).
- Microcomputer software and interacting with the system: Overview of computer languages:Generations of computer languages, Types of languages (high-level, assembly, machine), Language processors (assembler, interpreter, compiler, linker, loader)

Syllabus is covered from the following reference books:

1. ReemaThareja: Fundamentals of Computers, Oxford, 2014
2. V.Rajaraman and NeeharikaAdabala: Fundamentals of Computers,6th Edition, PHI,2014
3. Anita Goel:Computer Fundamentals,Pearson Education India, 2010

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: I

Syllabus to be in force from June 2024

Ability Enhancement Course

MH-AEC-101:Communication Skill

Total Hours: 20
Credit: 2

Theory	Practical	Tutorial	Total
2	0	0	2

Unit 1: Basic Language Skills:

- Grammar and Usage: Enhance your ability to fill in blanks, correct errors, choose correct forms, rewrite sentences, and replace sections with single words, opposites, or synonyms.
- Comprehension of Unseen Passages: Understand passages and demonstrate language skills by analyzing words and usage. Also, practice short independent composition based on themes from the passage.
- Phonology and Stress Marking: Train in sounds and correct pronunciation.

Unit 2: Social and Official Correspondence:

- Learn about different parts of official correspondence, including inquiries, complaints, job application letters, letters to the editor, and social appeals.
- Understand the "Seven Cs of Communication."

Syllabus is covered from the following reference books:

1. Dale Carnegie: How to Win Friends and Influence People, Simon & Schuster, 1998
2. Patrick King: How to Listen with Intention, Pkcs Media, Inc. 2020
3. Joseph Grenny, Kerry Patterson, Ron McMillan, Al Switzler, and Emily Gregory: Crucial Conversations, McGraw Hill, 2021
4. Carmine Gallo: Five Stars: The Communication Secrets to Get from Good to Great, Pan, 2019

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: I

Syllabus to be in force from June 2024

Skill Enhancement Course

MH-SEC-101:Vedic Mathematics – I

Total Hours: 20
Credit: 2

Theory	Practical	Tutorial	Total
2	0	0	2

Unit 1: Introduction to Vedic Mathematics:

- Understand the history and features of Vedic Mathematics.
- Explore the Vedic Maths formulae, including Sutras and Upsutras.

Unit 2: High-Speed Addition and Subtraction:

- Learn techniques for addition without carrying, including the Dot Method.
- Explore subtraction using the NikhilamNavatashcaramamDashatah method (All from 9, last from 10).
- Practice fraction addition and subtraction.

Syllabus is covered from the following reference books:

1. Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaj: Vedic Mathematics, Motilal Banarsidass Publishers, 1999
2. Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaja: Vedic Mathematics: Sixteen Simple Mathematical Formulae from The Vedas, Motilal Banarsidass Publishers, 2015
3. Kaushal Patel: Vedic Mathematics for all, Notion press,2023

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: I

Syllabus to be in force from June 2024

Value Added Course

MH-VAC-101:Introduction to IKS – 1

Total Hours: 20
Credit: 2

Theory	Practical	Tutorial	Total
2	0	0	2

Unit 1: An overview of Indian Knowledge System (IKS):

- Importance of Ancient Knowledge
- Definition of IKS
- Classification framework of IKS
- Unique aspects of IKS.

The vedic corpus: Vedas and Vedangas

- Distinctive features of vedic life.

Indian philosophical systems:

- Different schools of philosophy.

Wisdom through the ages:

- Puranas – Ithihasas - Nitishastras - Subhasitas.

Unit 2: Linguistics:

- Components of a language
- Paṇini's work on Sanskrit grammar
- Phonetics in Sanskrit and the role of Sanskrit in natural language processing.

The knowledge triangle:

- Prameya, Pramaṇa, Saṃsaya
- Framework for establishing valid knowledge
- Potential fallacies in the reasoning process.

Syllabus is covered from the following reference books:

1. A. K. Bag: History of Technology in India, Vol. I, Indian National Science Academy, New Delhi, 1997.
2. D.N. Bose, S.N. Sen and B. V. Subbarayappa: A Concise History of Science in India, Indian National Science Academy, New Delhi, 2009.
3. B. Datta and A. N. Singh: History of Hindu Mathematics: Parts I and II, Asia Publishing House, Bombay, 1962.
4. M. Hiriyanna: Outlines of Indian Philosophy, MotilalBanarsidass, New Delhi, 1994.
5. B. Mahadevan, VinayakRajat Bhat and R.N. NagendraPavana: Introduction to Indian Knowledge System: Concepts and Applications, PHI Learning Private Limited, New Delhi, 2022.
6. S. N. Sen and K. S. Shukla: History of Astronomy in India, Indian National Science Academy, 2nd edition, New Delhi, 2000.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: II

Syllabus to be in force from June 2024

Major Paper – I

MH-MAJ-201:Differential Calculus

Total Hours: 40
Credit: 4

Theory	Practical	Tutorial	Total
4	0	0	4

Unit 1: Derivatives:

- Learn about the derivative as the rate of change of a function.
- Differentiate functions using rules like the power rule, product rule, quotient rule, and chain rule.
- Applications of derivatives, including finding tangent lines, velocity, acceleration, and optimization problems.

Unit 2: Implicit Differentiation and Higher Order Derivatives:

- Apply implicit differentiation to find derivatives of implicitly defined functions.
- Solve related rates problems involving changing quantities
- Explore second and higher-order derivatives.
- Understand concavity, inflection points, and the second derivative test.

Unit 3: Curve Sketching:

- Analyze functions to sketch their graphs.
- Identify critical points, local maxima and minima.

Unit 4: Optimization and Applications:

- Solve optimization problems using derivatives.
- Explore topics like exponential growth and decay,
- Newton's law of cooling, and business applications.

Syllabus is covered from the following reference books:

1. James Stewart:Calculus, Cengage Learning, Inc, 2015
2. Hamza E. Alsamraee:Advanced Calculus Explored with Applications in Physics, Chemistry, and Beyond.Curious Math Publications, 2019
3. Dan Hamilton: Calculus I: Differentiation and Integration, Hamilton Education Guide, 2002

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: II

Syllabus to be in force from June 2024

Major Paper – II

MH-MAJ-202: Integral Calculus

Total Hours: 40
Credit: 4

Theory	Practical	Tutorial	Total
4	0	0	4

Unit 1: Riemann Integrals:

- Substitution Rule: Apply substitution to simplify integrals.
- Integration by Parts: Use integration by parts to evaluate certain integrals.
- Partial Fractions: Decompose rational functions into simpler fractions.
- Understand the concept of integration as a limit of Riemann sums.
- Explore properties of Riemann integrable functions.
- Learn techniques for evaluating definite integrals.

Unit 2: Improper Integrals:

- Investigate integrals over unbounded intervals or with infinite limits.
- Study convergence and divergence of improper integrals.

Unit 3: Applications of Integrals:

- Area Under Curves: Compute areas bounded by curves.
- Volume of Solids: Use integration to find volumes of solids of revolution.
- Arc Length and Surface Area: Explore arc length and surface area of curves and surfaces.
- Applications to Physics and Engineering: Understand how integrals model physical quantities.

Unit 4: Multiple Integrals:

- Explore double integrals and triple integrals.
- Understand change of order of integration.
- Compute volume integrals and surface integrals

Syllabus is covered from the following reference books:

1. James Stewart: Calculus, Cengage Learning, Inc, 2015
2. Hamza E. Alsamraee: Advanced Calculus Explored with Applications in Physics, Chemistry, and Beyond. Curious Math Publications, 2019
3. Dan Hamilton: Calculus I: Differentiation and Integration, Hamilton Education Guide, 2002

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: II

Syllabus to be in force from June 2024

Minor Elective Paper

MH-MIN-201:Mathematical Statistics – II

Total Hours: 40
Credit: 4

Theory	Practical	Tutorial	Total
3	2	0	5

Unit 1: Introduction to Curve Fitting and Regression:

- Understanding the need for curve fitting and regression analysis.
- Differentiating between interpolation and curve fitting.
- Exploring linear and nonlinear relationships.

Unit 2: Least Squares and polynomial Regression:

- Simple linear regression: Fitting a straight line to data points.
- Multiple linear regression: Modeling relationships with multiple independent variables.
- Coefficients, residuals, and goodness of fit.
- Fitting polynomial curves (quadratic, cubic, etc.) to data.
- Orthogonal polynomials and their properties.

Unit 3: Correlation Analysis:

- Pearson correlation coefficient: Measuring linear association between variables.
- Scatter plots and correlation matrices.
- Interpretation of correlation values.

Unit 4: Nonlinear Regression:

- Fitting nonlinear models using least squares.
- Exponential, logarithmic, and power functions.

Syllabus is covered from the following reference books:

1. A.M. Goon, M.K. Gupta, B. Das Gupta: Fundamentals of Statistics, (Vol-I) - The World Press (Pvt) Ltd., 2013
2. David Lane: Introduction to Statistics, Open Textbook, 2003
3. S.C. Gupta and V.K. Kapoor: Fundamentals of Applied Statistics, Sultan Chand &Sons, 2014
4. A.M. Goon, M.K. Gupta, B. Das Gupta:An Outline of Statistical Theory (2 Volumes) World press, 2014

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: II

Syllabus to be in force from June 2024

Multi-Disciplinary Paper

MH-MDC-201:EXCEL Programming

Total Hours: 40
Credit: 4

Theory	Practical	Tutorial	Total
3	2	0	5

Unit 1: Introduction to Excel Customization and Automation:

- Overview of Excel's capabilities beyond basic spreadsheet functions.
- Introduction to VBA (Visual Basic for Applications) and macros.

Unit 2: Excel VBA Basics, Objects and Properties:

- Understanding the VBA environment within Excel.
- Writing and running simple VBA macros.
- Recording and editing macros.
- Understanding Excel's object model (workbooks, worksheets, cells, ranges, etc.).
- Manipulating properties and methods of objects using VBA.

Unit 3: Control Structures and Loops:

- Using conditional statements (If-Then-Else) in VBA.
- Implementing loops (For, While, Do-While) for repetitive tasks.

Unit 4: User Forms and Custom Dialog Boxes:

- Creating custom user forms for data input.
- Linking user forms to VBA code.

Syllabus is covered from the following reference books:

1. Greg Harvey: Excel All-in-one for Dummies, For Dummies, 2018
2. Mike Girvin and Bill Jelen: Slaying Excel Dragons, Holy Macro! Books, 2011
3. Henry E. Mejia: Excel Charts and Graphs Ninja, Dokumen, 2020

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: II

Syllabus to be in force from June 2024

Ability Enhancement Course

MH-AEC-201:Personality Development

Total Hours: 20
Credit: 2

Theory	Practical	Tutorial	Total
2	0	0	2

Unit 1: Introduction to Personality Development:

- The concept of personality.
- Dimensions of personality theories (such as Freud and Erikson).
- Significance of personality development.
- Understanding success: What it means and the hurdles in achieving it.
- Overcoming obstacles and factors responsible for success.
- Understanding failure: Causes and coping strategies.
- SWOT analysis (Strengths, Weaknesses, Opportunities, Threats).
- Attitude: Concept, significance, and factors affecting it.
- Developing a positive attitude.
- Motivation: Internal and external motives, self-motivation.

Unit 2: Other Aspects of Personality Development:

- Body language.
- Problem-solving.
- Conflict and stress management.
- Decision-making skills.
- Leadership qualities.
- Teamwork.
- Time management.
- Work ethics.
- Good manners and etiquette.

Syllabus is covered from the following reference books:

1. Mitra: Personality Development and Soft Skills.O.U.P. (India),2023
2. Kumar Sanjay and Pushplata:Communication Skills.Oxford, 2011
3. S.K Mandal:Effective Communication and Public Speaking, Jaico Publishing House, 2006

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: II

Syllabus to be in force from June 2024

Skill Enhancement Course

MH-SEC-201:Vedic Mathematics – II

Total Hours: 20
Credit: 2

Theory	Practical	Tutorial	Total
2	0	0	2

Unit 1: Miracle Multiplication and Excellent Division:

- Multiply using the base method for any two numbers up to three digits.
- Discover miracle multiplication using a series of 1s and 9s.
- Divide using the UrdhvaTiryak Sutra (Vinculum method).

Unit 2: Square, cube, square root, cube roots, system of equations:

- Square
- Square root
- Cube
- Cube root
- Solving system of equations

Syllabus is covered from the following reference books:

1. Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaj: Vedic Mathematics, Motilal Banarsidass Publishers, 1999
2. Jagadguru Swami Sri Bharati Krishna Tirthaji Maharaja: Vedic Mathematics: Sixteen Simple Mathematical Formulae from The Vedas, Motilal Banarsidass Publishers, 2015
3. Kaushal Patel: Vedic Mathematics for all, Notion press,2023

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Integrated M.Sc. (Mathematics) Semester: II

Syllabus to be in force from June 2024

Value Added Course

MH-VAC-201:Introduction to IKS – 2

Total Hours: 20
Credit: 2

Theory	Practical	Tutorial	Total
2	0	0	2

Unit 1: Salient features of the Indian numeral system:

- Importance of decimal representation
- The discovery of zero and its importance
- Unique approaches to represent numbers.
- Unique aspects of Indian mathematics
- Great mathematicians and their significant contributions in the area of arithmetic, algebra, geometry, trigonometry, combinatorial problems in Chandaḥ-sastra of Pingala, binary mathematics and Magic squares in India.
- Highlights of Indian Astronomy
- Historical development of astronomy in India
- The Celestial Coordinate System
- Astronomical terminologies
- Equinotical points, precession of eqinoxes, movable and fixed zodiac
- Elements of the Indian Calendar - Panchanga.

Unit 2: Indian science and technology heritage:

- Metals and metalworking
- Mining and ore extraction
- Extraction of iron from Biotite by indigenous techniques
- Manufacture of steel
- Lost wax casting of idols and artefacts
- Tools employed for extraction of metallic components.
- Physical structures in India
- Irrigation and water management
- Dyes and painting technology
- Surgical Techniques
- Shipbuilding
- Sixty-four art forms (64 Kalas)
- Status of indigenous science and technology.

Syllabus is covered from the following reference books:

1. A. K. Bag: History of Technology in India, Vol. I, Indian National Science Academy, New Delhi, 1997.
2. D.N. Bose, S.N. Sen and B. V. Subbarayappa: A Concise History of Science in India, Indian National Science Academy, New Delhi, 2009.
3. B. Datta and A. N. Singh: History of Hindu Mathematics: Parts I and II, Asia Publishing House, Bombay, 1962.
4. M. Hiriyanna: Outlines of Indian Philosophy, MotilalBanarsidass, New Delhi, 1994.
5. B. Mahadevan, VinayakRajat Bhat and R.N. NagendraPavana: Introduction to Indian Knowledge System: Concepts and Applications, PHI Learning Private Limited, New Delhi, 2022.