Shyam Lal College, University of Delhi
Tentative Teaching Plan

Academic Year: 2024-25
Teacher Name: Dr. Saubhagyalaxmi Singh
Course Name: B.Sc.(Hons)
Paper Name: Probability and Statistics
Semester: Semester I (August 29, 2024 to December 24, 2024)
UPC:

Week	Topic to be covered	Activity	Remarks (References/ Resources
Week 1 - 2	Descriptive statistics: Populations, Samples, Stem-and-leaf displays, Dotplots, Histograms, Qualitative data, Measures of location, Measures of variability, Boxplots.	Discussion and illustration	[1] Chapter 1.
Week 3-4	Sample spaces and events, Probability axioms and properties, Conditional probability, Bayes' theorem and independent events.	Discussion and illustration	[1] Chapter 2.
Week 5-6	Discrete random variables and probability distributions, Expected values; Probability distributions with their mean and variance: Binomial, geometric, hypergeometric, negative binomial, Poisson, and Poisson distribution as a limit.	Discussion and illustration	[1] Chapter 3.
Weeks 7-8	Continuous random variables, Probability density functions, Uniform distribution, Cumulative distribution functions and expected values.	Discussion and illustration	[1] Chapter 4 (Sections 4.1 and 4.2).
Weeks 9-10	Normal and standard normal distributions with their percentiles, Approximating the binomial distribution; Exponential distribution, Lognormal	Discussion and illustration	[1] Chapter 4 [Sections 4.3, 4.4 (up to Example 4.22 page 172), and 4.5

	distribution.		(Definition page 179 to Example 4.27)].
Week 11-12	Sampling distribution and standard error of the sample mean, Central Limit Theorem and applications	Discussion and illustration	. [1] Chapter 5 (Section 5.4).
Week 13 - 15:	Scatterplot of bivariate data, Regression line using principle of least squares (statement with normal equations), Predicted values and the residuals, Error sum of squares, Coefficient of determination, The sample correlation coefficient and properties.	Discussion and illustration	[1] Chapter 12 [Sections 12.1 (up to Example 12.2), 12.2, and 12.5 (up to page number 529)].

References:

1. Devore, Jay L. (2016). Probability and Statistics for Engineering and the Sciences (9th ed.). Cengage Learning India Private Limited. Delhi. Indian Reprint 2020.

Suggestive Readings

• Mood, A. M., Graybill, F. A., & Boes, D. C. (1974). Introduction to the Theory of Statistics (3rd ed.). Tata McGraw-Hill Pub. Co. Ltd. Reprinted 2017.

Practical component –

Software labs using Microsoft Excel or any other spreadsheet.

1. Presentation and analysis of data (univariate and bivariate) by frequency tables, descriptive statistics, stem-and-leaf plots, dotplots, histograms, boxplots, comparative boxplots, and probability plots ([1] Section 4.6).

2. Fitting of binomial, Poisson and normal distributions.

3. Illustrating the Central Limit Theorem through Excel.

4. Fitting of regression line using the principle of least squares.

5. Computation of sample correlation coefficient.

Assessment Activity Schedule:

The assessment will be conducted during the course, preferably after completion of each unit. Week 1 – 4, Week 5 – 9 and Week 10 – 15 contain three units of the syllabus. Besides tests/assignments, students are encouraged to give

blackboard presentation or power point presentation on the topic of their choices covering the content of the syllabi and applications of the theory.

Name of the Teacher: Dr. Saubhagyalaxmi Singh
Designation: Assistant Professor in Mathematics

Shyam Lal College, University of Delhi
Tentative Teaching Plan

Academic Year: 2024-25
Teacher Name: Dr. Saubhagyalaxmi Singh
Course Name: SEC
Paper Name: Statistics with 'R'
Semester: Semester I (August 29, 2024 to December 24, 2024)
UPC:

Unit 1: Data Extraction and Spread Sheet Exploration (3 Weeks)

Extraction of economics and financial data from Prowessiq, RBI, IMF, World bank or an equivalent financial/economic database. The students should be able to save and export the data to 'R-environment' for further analysis.

Unit 2: Basics of R-language (7 Weeks)

Overview of the R language: Installing R and R Studio : Using R studio, Scripts, Text editors for R, Graphical User Interfaces (GUIs) for R, Creating and storing R workspaces, installing packages and libraries, Mathematical operations. Data Types in R – Numeric, Integer, Character, Logical, Complex and missing data. Data Structures in R

- Vectors – Creation, Arithmetic operations of Vectors, Vector Sub setting, Sorting and Sequencing functions.
- Matrix and Arrays – Creation, Arithmetic Operations of matrix, Sub setting, Use of Drop Function.

Factors – Converting a vector into factor, assigning levels and labels, ordered Factor.

- List – Creating a list, accessing elements from a list, adding a new element and eliminating an existing element form the list, converting list to vectors.
- Data Frames – Creation of Data Frame, adding new columns, rows and removing columns, accessing column using the $ sign, importing a data set (important file formats such as csv, txt and spreadsheet), aggregate function and subsetting of data frames, tapply function, manipulation using dply r package (select, filter, arrange, mutate and group by function, pipe operator).

Programming Fundamentals: Logical operators, conditional statements (if, else, else if statements in R), While loops, For loops, repeat loops.

Creating functions in R.

Reading data in R (file formats such as csv, txt, and xlsx), Writing data to external files (fileformats such as csv, txt, and xlsx), writing a table to a file, print function.

Unit 3: Basic Statistics and Regression (5 Weeks)

Summarizing and exploring data: Descriptive statistics (mean, median, mode, variance, skewness, five-point summary), dealing with missing data in R, Data cleaning (dplyr package, tidyr package and pipe operator), Exploratory Data Analysis; data visualization using inbuilt functions and ggplot2 package (pie chart, bar chart, line chart, histogram, box plot, scatter plot,Normal QQ plot).

Regression analysis using R: Regression vs Correlation, Simple and multiple regression, Ordinary least square, Assumptions of classical normal linear regression model (CNLRM), corrplot package, car package, lmtest package, scatter plot (using plot function and ggplot2 package) to understand the relationship between variables, lm, abline, predict, resid function, interpreting 'summary table' of the regression model, normality of residuals (qqnorm and qqPlot functions), multicollinearity (correlation matrix, corrplot and vif function), autocorrelation (acf plot and Durbin Watson test),heteroscedasticity (graphically, bptest, ncvTest), impact on estimates and inferences in case of violations of assumptions of CNLRM, methods to take care of violations.

Time series data, components of a time series data, additive and multiplicative time series model,ts function, diff function, plot of a time series data, time series data with linear trend; regression analysis using 'lm' function, stationarity in time series (concept only).

Essential/recommended readings

- Gardener, M. (2018), Beginning R: The Statistical Programming Language, Wiley & Sons.
- Sekhar, S.R.M., et al. (2017), Programming with R, Cengage Learning India.
- Wickham, H., et al. (2017), R for Data Science: Import, Tidy, Transform, Visualize, and Model Data, O'Reilly'.
- Field, A., Miles, J and Field (2012), Z. Discovering Statistics using R (Indian Reprint 2022), SAGE
- Simple R - Using R for Introductory Statistics: John Verzani.
- The R Guide.
- Analysis of Epidemiological Data Using R and Epicalc: Virasakdi Chongsuvivatwong.
- Statistics Using R with Biological Examples: Kim Seefeld and Ernst Linder.
- An Introduction to R: Software for Statistical Modeling & Computing: Petra Kuhnert and Bill Venables.

- Gujarati, D.N. et al (2018), Basic Econometrics, McGraw Hill India, 5th Ed.
- CRAN website: https://cran.r-project.org/
- https://prowessiq.cmie.com, • https://data.worldbank.org/indicator,
- https://rstudio.com/products/rstudio/download/(Rstudio)
- http://r-statistics.co

Examination scheme and mode:

Total Marks: 100

Internal Assessment: 25 marks

Practical Exam (Internal): 25 marks

End Semester University Exam: 50 marks

The Internal Assessment for the course may include Class participation, Assignments, Class tests, Projects, Field Work, Presentations, amongst others as decided by the faculty.

Name of the Teacher: Dr. Saubhagyalaxmi Singh
Designation: Assistant Professor in Mathematics

Shyam Lal College, University of Delhi
Tentative Teaching Plan

Academic Year: 2024-25
Teacher Name: Dr. Saubhagyalaxmi Singh
Course Name: B.Sc. (Prog.)
Paper Name: Topics in Calculus
Semester: Semester I (August 29, 2024 to December 24, 2024)
UPC:

Week	Topic to be covered	Activity	Remarks (References/ Resources
Week 1 - 2	Limit of a function, ε- δ − definition of a limit, Infinite limits, Continuity and types of discontinuities	Discussion and illustration	[1] Chapter 2.
Week 3-4	Differentiability of a function, Successive differentiation: Calculation of the nth derivatives, Leibnitz theorem.	Discussion and illustration	[1] Chapter 3 (Sections 3.1, and 3.2), and Chapter 5.
Week 5	Partial differentiation, Euler's theorem on homogeneous functions.	Discussion and illustration	[1] Chapter 12 [Section 12.2 (12.21 without proof, exclude 12.22 and 12.23), and Section 12.3].
Weeks 6- 7	Rolle's theorem, Mean value theorems and applications to monotonic functions and inequalities.	Discussion and illustration	[1] Chapter 7 (Sections 7.4 to 7.6)
Weeks 8 - 9	Taylor's theorem with Lagrange's and Cauchy's form of remainders, Definition and examples of convergent sequences and series, Taylor's series, Maclaurin's series expansion of $e^x, sinx, cosx, \log(1+x)\ (1+x)^m$.	Discussion and illustration	[1] Chapter 6 (Brief introduction of convergence from the Sections 6.1 and 6.2). [1] Chapter 7 (Sections 7.7, and 7.8).
Week 10	Indeterminate forms.	Discussion and illustration	[1] Chapter 16.
Week 11	Asymptotes (parallel to axes and oblique).	Discussion and illustration	[1] Chapter 9 (Sections 9.1 to 9.4).
Week 12-13	Concavity and inflexion points, Singular points (cusp, node and	Discussion and illustration	[1] Chapter 10 (Section 10.7). [1]

	conjugate), Tangents at the origin and nature of singular points, Curve tracing (cartesian and polar equations).		Chapter 11. Use only statement for nature of double points in the Section 11.4.
Week 14-15	Reduction formulae for $\int \sin^n x\,dx, \int \cos^n x\,dx, \text{and} \int \sin^m x \cos^n x\,dx$ and their applications.	Discussion and illustration	[2] Chapter 4 (Sections 4.1, 4.11, 4.12, and 4.13).

References:

1. Prasad, Gorakh (2016). Differential Calculus (19th ed.). Pothishala Pvt. Ltd. Allahabad.

2. Prasad, Gorakh (2015). Integral Calculus. Pothishala Pvt. Ltd. Allahabad.

Suggestive Readings

• Apostol, T. M. (2007). Calculus: One-Variable Calculus with An Introduction to Linear Algebra (2nd ed.). Vol. 1. Wiley India Pvt. Ltd.

• Ross, Kenneth. A. (2013). Elementary Analysis: The Theory of Calculus (2nd ed.). Undergraduate Texts in Mathematics, Springer. Indian reprint.

Assessment Activity Schedule:

The assessment will be conducted during the course, preferably after completion of each unit. Besides tests/assignments, students are encouraged to give blackboard presentation or power point presentation on the topic of their choices covering the content of the syllabi and applications of the theory.

Name of the Teacher: Dr. Saubhagyalaxmi Singh
Designation: Assistant Professor in Mathematics

Shyam Lal College, University of Delhi
Tentative Teaching Plan

Academic Year: 2024-25
Teacher Name: Dr. Saubhagyalaxmi Singh
Course Name: VAC
Paper Name: VEDIC MATHEMATICS - I
Semester: Semester I (August 29, 2024 to December 24, 2024)

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 l's and 9's
- Division by Urdhva Tiryak Sutra (Vinculum method)

UNIT- Ill 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 (8) 0o, 300, 450, 600 and 900: 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 audiovideo 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.

The Internal Assessment for the course may include Class participation, Assignments, Class tests, Projects, Field Work, Presentations, amongst others as decided by the faculty.

Name of the Teacher: Dr. Saubhagyalaxmi Singh
Designation: Assistant Professor in Mathematics

Shyam Lal College, University of Delhi
Model Course Handout/Lesson Plan

Course Name: B.Sc. (Physical Science) with Computer Science						
Semester	**Course Code**	**Course Title**	**Lecture**	**Tutorial**	**Practical**	**Credit**
5th		Elements of Real Analysis	3	1	0	4
Teacher	**Dr. Seema Guglani**					
Session	2023-24					

Course Objectives: The primary objective of this course is to:

- The real line with algebraic, order and completeness properties.
- Convergence and divergence of sequences and series of real numbers with applications.

Course Learning Outcomes: This course will enable the students to:

- Understand the basic properties of the set of real numbers, including completeness and Archimedean with some consequences.
- Recognize bounded, convergent, monotonic and Cauchy sequences
- Learn to apply various tests such as limit comparison, ratio, root, and alternating series tests for convergence and absolute convergence of infinite series of real numbers.

Week	Topic to be covered	Pedagogical Approaches	References
Weeks 1 and 2	Field and order properties of $\mathbb{R}$, basic properties and inequalities of the absolute value of a real number.	Technology based learning	Chapter 1 (Sections 1.1, and 1.2).
Weeks 3 and 4	Bounded above and bounded below sets, Suprema and infima, The completeness axiom and the Archimedean property of $\mathbb{R}$.	Technology based learning	Chapter 1 (Section 1.6 [1.6.1 to 1.6.14, Theorems 1.6.2 and 1.6.10 without proofs]). Chapter 1 (Section 1.5 [1.5.1, 1.5.2, and 1.5.9]).
Weeks 5 and 6	Convergence of a real sequence, Algebra of limits.	Technology based learning	Chapter 2 (Section 2.1). Chapter 2 (Section 2.2

			[2.2.1 to 2.2.14, Theorems 2.2.8, 2.2.12, and 2.2.13 (d to f) without proofs])
Week 7	The squeeze principle and applications.	Group Learning and Teaching	Chapter 2 (Section 2.3 [2.3.1 to 2.3.14, Theorems 2.3.6, 2.3.10, and 2.3.14 without proofs])
Weeks 8 and 9	Monotone sequences, Monotone convergence theorem and applications.	Group Learning and Teaching	Chapter 2 (Section 2.5 [2.5.1 to 2.5.10, Theorems 2.5.5 and 2.5.7 without proofs)
Week 10	Cauchy sequences, Cauchy criterion for convergence and applications.	Group Learning and Teaching	Chapter 2 (Section 2.7 [2.7.1 to 2.7.6, Theorem 2.7.4 without proof])
Week 11	Convergence and divergence of infinite series of real numbers, Necessary condition for convergence, Cauchy criterion for convergence of series	Technology based learning	Chapter 2 (Section 8.1).
Weeks 12 to 14	Tests for convergence of positive term series, Applications of the integral test, Comparison tests, D'Alembert's ratio test, Cauchy's *n*th root test, Raabe's test.	Group Learning and Teaching	Chapter 2 (Section 8.2 [8.2.1 to 8.2.12, 8.2.14, 8.2.15, 8.2.17, 8.2.21, and 8.2.22, with all theorems without proofs]).
Week 15	Alternating series, Leibniz alternating series test, Absolute and conditional convergence	Group Learning and Teaching	Chapter 2 (Section 8.3 [8.3.1 to 8.3.10, Theorems 8.3.2, and 8.3.4 without proofs]).

Evaluation Scheme:

No.	Component		Duration	Marks
1	Internal Assessment	Tests		30
		Attendance		
		Assignments		

2	Continuous Assessment	Quiz with MCQ		40
		Case Study		
		Projects		
		Assignments		
		Attendance		
		Seminar Presentations		
3	End Semester Examination		3 hrs.	90

Essential Reading

1. Denlinger, Charles G. (2011). Elements of Real Analysis. Jones & Bartlett India Pvt. Ltd. Student Edition. Reprinted 2015.

Suggestive Readings

• Bartle, Robert G., & Sherbert, Donald R. (2011). Introduction to Real Analysis (4thed.). John Wiley & Sons. Wiley India Edition 2015.
• Bilodeau, Gerald G., Thie, Paul R., & Keough, G. E. (2010). An Introduction to Analysis (2nd ed.). Jones & Bartlett India Pvt. Ltd. Student Edition. Reprinted 2015.

Shyam Lal College, University of Delhi
Model Course Handout/Lesson Plan

Course Name: B.Sc. (H) Mathematics						
Semester	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
3rd	2352012302	Riemann Integration	3	1	0	4
Teacher	Dr. Seema Guglani					
Session	2023-24					

Course Objectives: The primary objective of this course is to:

- Understand the integration of bounded functions on a closed and bounded interval and its extension to the cases where either the interval of integration is infinite, or the integrand has infinite limits at a finite number of points on the interval of integration.
- Learn some of the properties of Riemann integrable functions, its generalization and the applications of the fundamental theorems of integration.
- Get an exposure to the utility of integration for practical purposes.

Course Learning Outcomes: This course will enable the students to:

- Learn about some of the classes and properties of Riemann integrable functions, and the applications of the Riemann sums to the volume and surface of a solid of revolution.
- Get insight of integration by substitution and integration by parts.
- Know about convergence of improper integrals including, beta and gamma functions.

Week	**Topic to be covered**	**Pedagogical Approaches**	**References**
Weeks 1 and 2	Definition of upper and lower Darboux sums, Darboux integral, Inequalities for upper and lower Darboux sums.	Technology based learning	[1]: Chapter 6 (Sections 32.1 to 32.4).
Weeks 3 and 5	Necessary and sufficient conditions for the Darboux integrability; Riemann's definition of integrability by Riemann sum and the equivalence of Riemann's and Darboux's definitions of integrability.	Group Learning and Teaching	[1]: Chapter 6 (Sections 32.5 to 32.10).
Week 6	Definition and examples of the Riemann-Stieltjes integral	Group Learning and Teaching	[1]: Chapter 6 (Sections 35.1, and 35.2).

Weeks 7 and 9	Riemann integrability of monotone functions and continuous functions, Properties of Riemann integrable functions.	Group Learning and Teaching	[1]: Chapter 6 (Sections 33.1, and 33.6).
Week 10	Definitions of piecewise continuous and piecewise monotone functions and their Riemann integrability; Intermediate value theorem for integrals	Technology based learning	[1]: Chapter 6 (Sections 33.7 to 33.9, and Exercise 33.14).
Week 11	Fundamental Theorems of Calculus (I and II).	Technology based learning	[1]: Chapter 6 (Sections 34.1 to 34.3).
Weeks 12 and 13	Methods of integration: integration by substitution and integration by parts; Volume by slicing and cylindrical shells, Length of a curve in the plane and the area of surfaces of revolution.	Technology based learning	[2]: Chapter 4 (Section 4.9), Chapter 7 (Section 7.2), and Chapter 5 (Sections 5.2 to 5.5)
Weeks 14 and 15	Improper integrals of Type-I, Type-II and mixed type, Convergence of improper integrals, The beta and gamma functions and their properties.	Group Learning and Teaching	[3]: Chapter 7 (Section 7.8). [4]: Chapter 9 [Sections 9.5 (up to examples 9.47, page 395), and 9.6 (pages 405 to 408).

Evaluation Scheme:

No.	Component		Duration	Marks
1	Internal Assessment	Tests		30
		Attendance		
		Assignments		
2	Continuous Assessment	Quiz with MCQ		40
		Case Study		
		Projects		
		Assignments		

		Attendance		
		Seminar Presentations		
3	End Semester Examination		3 hrs.	90

Essential Readings

1. Ross, Kenneth A. (2013). Elementary Analysis: The Theory of Calculus (2nd ed.). Undergraduate Texts in Mathematics, Springer.
2. Anton, Howard, Bivens Irl and Davis Stephens (2012). Calculus (10th ed.). John Wiley & Sons, Inc.
3. Denlinger, Charles G. (2011). Elements of Real Analysis, Jones & Bartlett India Pvt. Ltd.
4. Ghorpade, Sudhir R. and Limaye, B. V. (2006). A Course in Calculus and Real Analysis. Undergraduate Texts in Mathematics, Springer (SIE). Indian Reprint.

Shyam Lal College, University of Delhi
Model Course Handout/Lesson Plan

Course Name: B.Sc. (H) Mathematics						
Semester	**Course Code**	**Course Title**	**Lecture**	**Tutorial**	**Practical**	**Credit**
3rd	6967006001	Vedic Mathematics-2	1	0	1	2
Teacher	**Dr. Seema Guglani**					
Session	2023-24					

Course Objectives: The primary objective of this course is to:

- Introduce the contributions of key mathematicians like Varahamihira, Brahmagupta, and Ramanujan.
- Teach practical Vedic techniques for solving equations, HCF, LCM, and linear equations.
- Explore the concepts and applications of matrices, determinants, and their historical significance.

Course Learning Outcomes: This course will enable the students to:

- Appreciate the mathematical contributions of ancient Indian mathematicians.
- Apply Vedic techniques to solve mathematical problems efficiently.
- Understand and work with matrices, determinants, and their inverses.
- Construct and analyse geometric shapes using Vedic methods.
- Utilize technology in mathematical problem-solving and presentations.

Week	Topic to be covered	Pedagogical Approaches
Weeks 1 to 3	• Varahamihira • Brahmagupta • Srinivasa Ramanujan • Neelkanth Somayya • Bharti Krishna Tirtha	Group Learning and Teaching
Weeks 4 to 7	• HCF and LCM • Introduction of simple equation • Solutions of simple equations • Solutions of linear equations in two variables • Practical application of linear equations in two variables	Technology based learning
Weeks 8 to 11	• Introduction and history of	Technology based learning

	Matrices and Determinants ● Matrices and Determinants of third order ● Inverse of Matrices	
Week 12 to 15	● Different forms of straight lines ● The Triangle ● The Cyclic Quadrilateral, Squares, and the Circle ● Geometrical constructions & Transformation of shapes ● Kalpa Sutras -Srautha Sutras and Sulbha Sutras	Group Learning and Teaching

Evaluation Scheme:

No.	Component		Duration	Marks
1	Internal Assessment	Tests		10
		Attendance		
		Assignments		
2	Continuous Assessment	Quiz with MCQ		40
		Case Study		
		Projects		
		Assignments		
		Attendance		
		Seminar Presentations		
3	End Semester Examination		1 hr	30

Essential Reading

- Thakur, Rajesh Kumar (2019). Advanced Vedic Mathematics. Rupa Publications India Pvt Ltd.
- Tiratha, B.K. (1965). Vedic Mathematics, Motilal Banarasi Dass, New Delhi.