

**SHREE MANIBHAI VIRANI & SMT. NAVALBEN VIRANI SCIENCE COLLEGE
(AUTONOMOUS)**

Department of Mathematics

For the students admitted from A.Y. 2021-22 & onwards		
Offering Department: Mathematics	Offered to: B.Sc. Chemistry	
Semester – III		
Course Code	Course Title	Course Credit and Hours
	Basic Mathematics	3 Credits - 3 hrs/wk

Course Description:

This course focuses on some fundamental concepts of Geometry. This course introduces students to Differentiation, its solution by using rule. This course introduces students to basic concept of limit and continuity. This course Topics discussed include displaying and describing data, mean, median , mode , Standard deviation , statistical inference with applications in the real world.

Course Purpose:

This course aims to provide basic understanding of Geometry, Elementary functions. This is designed in such a way that students will able to understand the basic understanding of Differentiation. Students will be able to defined relationship between polar, cylindrical and spherical co-ordinates. This course is necessary to understand and learn basic and some advanced topics. Students will be able to analyze statistical data using measures of central tendency, dispersion and location. Students will be able to understand basic theoretical and applied principles of statistics. Students will be able to communicate key statistical concepts to non-statisticians.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	CO Statement	Blooms taxonomy Level (K₁ to K₆)
CO ₁	Understand geometrical concepts including Line, Circle, Area and Volume.	K ₅
CO ₂	Identify and interpret the relationship among co-ordinate systems including Polar, Spherical & Cylindrical Co-ordinates.	K ₂ , K ₄
CO ₃	Analyze the functional relationship among variables including Trigonometric functions, Exponential function, Logarithmic function, and Complex variable.	K ₄

CO ₄	Understand and utilize the fundamental concepts of calculus including limits and continuity and differentiation.	K_5
CO ₅	Calculate mean, median, mode, variance and standard deviation of given data.	K_4, K_3

Course Contents	Hours
Unit-I: Basic geometry	10
<ul style="list-style-type: none"> • Line • Circle • Area • Volume 	
Unit-II: Polar, spherical & cylindrical co-ordinates	10
<ul style="list-style-type: none"> • Co-ordinate. • Polar Co-ordinates in R^2. • Distance between two points in polar Co-ordinates. • Polar equations of a straight line. • Polar equations of circle. • Relation between Cartesian and Polar coordinates. • Relation between Cartesian and Spherical coordinates. • Relation between Cartesian and Cylindrical coordinates. 	
Unit- III: Elementary functions	9
<ul style="list-style-type: none"> • Trigonometric functions • Inverse trigonometric functions • Trigonometric relations • The exponential function • The logarithmic function • Complex variable & Complex conjugate 	
Unit- IV Differentiation	9
<ul style="list-style-type: none"> • Basic concepts of limits and continuity. • The process of differentiation • Differentiation from first principles • Differentiation by rule 	
Unit- V: Measures of central tendency:	10
<ul style="list-style-type: none"> • Mean 	

<ul style="list-style-type: none"> • Median • Mode • Range, Standard deviation, Variance 	
---	--

Pedagogic Tools:

- Chalk and board
- Power point presentation
- Seminars

Text Books:

- Prof. H. K. Dass, Applied Mathematics, CBS Publishers & Distributors, New Delhi.
- Robert R. Stoll, Set Theory and Logic, Eurasia Publishing House Pvt. Ltd.

Reference Books:

- Erich Steiner, The Chemistry Maths Book, OXFORD University Press, Second Edition.
- R. R. Singh, Mukul Bhatt, Numerical and Statistical methods, McGraw Hill Education (India) Private Limited, New Delhi.

Suggested reading / E-resources:

- <https://archive.nptel.ac.in/courses/111/104/111104120/>
- <https://math.hawaii.edu/~wongkl/Lecture%20Notes%20on%20Differentiation%20MATH161.pdf>
- <https://www.selfstudys.com/books/jee-maths/english/notes/3-differentiation/1-differentiation-theory/82886>
- https://www.austincc.edu/pintutor/pin_mh/_source/Handouts/Geometry_Formulas/Geometry_Formulas_2D_3D_Perimeter_Area_Volume.pdf

Suggested MOOCs:

- <https://www.coursera.org/learn/stanford-statistics>
- <https://www.coursera.org/learn/differentiation-calculus>
- <https://www.coursera.org/learn/vector-calculus-engineers>

Methods of Assessment & Tools:

Components of CIA: 30 marks (Example as below)

Sr. No.	Component	Content	Duration (if any)	Marks	Sub Total
A	Test 1	1 st 2 units	1 $\frac{1}{2}$ hours	5 (Set for 30)	20
	Test 2	All 5 units	3 hours	15 (Set for 70)	
B	Assignment			04	10
C	Class activity			06	
Grand Total					30
Assignment	<ul style="list-style-type: none">• Problem formulation and its analysis.• Notes written by the learner on the different topics in the syllabus.				
Class activity	<ul style="list-style-type: none">• Surprise Quiz• Quiz• Seminar• Situation based question etc.				

Note: Any other assessment tools or methods can be adopted as per requirement of the course.

**SHREE MANIBHAI VIRANI & SMT. NAVALBEN VIRANI SCIENCE COLLEGE
(AUTONOMOUS)**

Department of Mathematics

For the students admitted from A.Y. 2021-22 & onwards		
Offering Department: Mathematics	Offered to: B.Sc. Chemistry	
Semester – III		
Course Code	Course Title	Course Credit and Hours
	Practical on Basic Mathematics	1 Credit -3 hrs/wk

Course Description:

This course focuses on some fundamental concepts of Mathematics. This course introduces students to Application Differentiation, its solution by using rule. This course introduces students to basic concept of limit and continuity. This course Topics discussed include displaying and describing data, mean, median , mode , Standard deviation , statistical inference with applications in the real world.

Course Purpose:

This course aims to provide basic understanding of Geometry, Elementary functions. This is designed in such a way that students will able to understand the basic understanding of differentiation. Students will be able to defined relationship between polar, cylindrical and spherical co-ordinates. This course is necessary to understand and learn basic and some advanced topics. Students will be able to analyze statistical data using measures of central tendency, dispersion and location. Students will be able to understand basic theoretical and applied principles of statistics. Students will be able to communicate key statistical concepts to non-statisticians.

Course Outcomes: Upon completion of this course, the learner will be able to

CO No.	CO Statement	Blooms taxonomy Level (K ₁ to K ₆)
CO ₁	Understand geometrical concepts including Line, Circle, Area and Volume.	K ₅
CO ₂	Identify and interpret the relationship among co-ordinate systems including Polar, Spherical & Cylindrical Co-ordinates.	K ₂ , K ₄
CO ₃	Analyze the functional relationship among variables including Trigonometric functions, Exponential function, Logarithmic function, and Complex variable.	K ₄
CO ₄	Understand and utilize the fundamental concepts of calculus including limits and continuity and differentiation.	K ₅
CO ₅	Calculate mean, median, mode, variance and standard deviation of given data.	K ₄ , K ₃

List of Practical

1	Plotting the graphs of Lines and other problems related to lines.
2	Problems based on coordinate system.
3	Problems based on Area & Volume.
4	Plotting the Graphs of Elementary functions including conics.

5	Problems based on Limit & Continuity.
6	Problems based on Differentiation.
7	Problems based on Mean.
8	Problem based on Median.
9	Problem based on Mode.
10	Problems based on Variance and standard deviation.

Pedagogic Tools:
<ul style="list-style-type: none"> • Chalk and board • Power point presentation • Seminars
Text Books:
<ul style="list-style-type: none"> • Prof. H. K. Dass, Applied Mathematics, CBS Publishers & Distributors, New Delhi. • Robert R. Stoll, Set Theory and Logic, Eurasia Publishing House Pvt. Ltd.
Reference Books:
<ul style="list-style-type: none"> • Erich Steiner, The Chemistry Maths Book, OXFORD University Press, Second Edition. • R. R. Singh, Mukul Bhatt, Numerical and Statistical methods, McGraw Hill Education (India) Private Limited, New Delhi.

Suggested reading / E-resources:

- <https://archive.nptel.ac.in/courses/111/104/111104120/>
- <https://math.hawaii.edu/~wongkl/Lecture%20Notes%20on%20Differentiation%20MATH161.pdf>
- <https://www.selfstudys.com/books/jee-maths/english/notes/3-differentiation/1-differentiation-theory/82886>
- https://www.austincc.edu/pintutor/pin_mh/_source/Handouts/Geometry_Formulas/Geometry_Formulas_2D_3D_Perimeter_Area_Volume.pdf

Suggested MOOCs:

- <https://www.coursera.org/learn/stanford-statistics>
- <https://www.coursera.org/learn/differentiation-calculus>
- <https://www.coursera.org/learn/vector-calculus-engineers>

Methods of Assessment & Tools:

Components of CIA: 30 marks (Example as below)

Sr. No.	Component	Content	Duration (if any)	Marks	Sub Total
A	Test 1	50% units	-	15 (Set of 30)	15
B	Record Book			5	5
Grand Total					20
Assignment	<ul style="list-style-type: none">• Problem formulation and its analysis.• Notes written by the learner on the different topics in the syllabus.				
Class activity	<ul style="list-style-type: none">• Surprise Quiz• Quiz• Seminar• Situation based question etc.				

Note: Any other assessment tools or methods can be adopted as per requirement of the course.