

Lecture Plan		
Name of the college: Government College of Arts, Science and Commerce, Sanquelim- Goa		
Name of Faculty: Ankita M. Vernekar	Subject: Chemistry	
Paper code: CHC-241	Program: S Y BSc	Division: A
Academic year: 2026 - 2027	Semester: III	Total Lectures: 15
Course Objectives: To equip students with fundamental mathematical, statistical, and computational skills required for the analysis, interpretation, and presentation of chemical data, and to develop proficiency in using software tools for scientific problem-solving in chemistry.		
Expected Course Outcome:		
1. Explain and apply logarithmic, exponential, and trigonometric functions in solving chemical and scientific problems. 2. Construct and interpret various graphs, including linear equations, curve sketches, and time-displacement graphs, for scientific data analysis. 3. Apply differentiation, partial differentiation, maxima-minima concepts, integration, and basic statistical methods (mean, median, and standard deviation) to solve quantitative problems in chemistry. 4. Utilize software tools such as MS Excel and Chemdraw for chemical data management, data analysis, graphical representation, and drawing chemical structures.		
Student Learning Outcome:		
1. Explain and apply logarithmic, exponential, and trigonometric functions in solving chemical and scientific problems. 2. Construct and interpret various graphs, including linear equations, curve sketches, and time-displacement graphs, for scientific data analysis. 3. Apply differentiation, partial differentiation, maxima-minima concepts, integration, and basic statistical methods (mean, median, and standard deviation) to solve quantitative problems in chemistry. 4. Utilize software tools such as MS Excel and Chemdraw for chemical data management, data analysis, graphical representation, and drawing chemical structures.		

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	19/06/2026	27/06/2026	1	Introduction to various functions: Logarithmic functions	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
July	29/06/2026	04/07/2026	1	exponential functions	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
July	06/07/2026	11/07/2026	1	trigonometric functions.	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
July	13/07/2026	18/07/2026	1	Curve sketching	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
July	20/07/2026	25/07/2026	1	Time displacement graph	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
July/ August	27/07/2026	01/08/2026	1	graphs of linear equations	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
August	03/08/2026	08/08/2026	1	graphs of linear equations	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition.

							2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
August	10/08/2026	15/08/2026	1	Differentiations	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
August	17/08/2026	22/08/2026	1	partial differentiations	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
August	24/08/2026	29/08/2026	1	Maxima and Minima,	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
September	31/09/2026	05/09/2026	1	Integrations	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
September	07/09/2026	12/09/2026	1	Methods of statistical data analysis: Mean, Median	Solve numericals	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
September	14/09/2026	19/09/2026	CHATURTHI BREAK				
September	21/09/2026	26/09/2026	1	Methods of statistical data analysis: Std. Deviation			
September/ October	28/09/2026	03/10/2026	1	Introduction to computer software's - MS Excel, Chemdraw and their use in chemical data management,	Sketch graphs	Smart board	1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition.

				data analysis, graphing and in sketching chemical structures			
October	05/10/2026	10/10/2026	1	Chemdraw and their use in chemical data management, data analysis, graphing and in sketching chemical structures	Sketch structures	Smart board	2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.
October	12/10/2026	17/10/2026	1	REVISION			1)Puri, Sharma and Pathania, Principles of Physical Chemistry, Vishal Publishing Company, 2018, New Delhi, 1st edition. 2)E. Joseph Billo, Excel for Scientists and Engineers: Numerical methods, Wiley-Interscience, 2007, New Jersey, USA, 1st edition.

Practical Plan		
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Name of the college: Government college of Arts Science and commerce Sanquelim Goa.		
Name of Faculty: Ms. Ankita M. Vernekar	Subject: Chemistry	
Paper code: CHC-241	Program: S.Y.B.Sc	Division: A
Academic year: 2026- 2027	Semester:III	Total Practicals/Labs: 15 (60 hours)
Credits: 2		
Course Objectives:- To equip students with fundamental mathematical, statistical, and computational skills required for the analysis, interpretation, and presentation of chemical data, and to develop proficiency in using software tools for scientific problem-solving in chemistry.		
Expected Course Outcome: 1) Explain and apply logarithmic, exponential, and trigonometric functions in solving chemical and scientific problems. 2) Construct and interpret various graphs, including linear equations, curve sketches, and time-displacement graphs, for scientific data analysis. 3) Apply differentiation, partial differentiation, maxima-minima concepts, integration, and basic statistical methods (mean, median, and standard deviation) to solve quantitative problems in chemistry. 4) Utilize software tools such as MS Excel and Chemdraw for chemical data management, data analysis, graphical representation, and drawing chemical structures.		
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Month	Practicals/Labs Scheduled Date	No. of Practical's/Labs planned	List of Experiments	Reference books
June	19/06/2026-27/06/2026		To solve and plot the integrated rate law equations for a. Zeroth order b. First order c. Second order	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
June/July	29/06/2026-04/07/2026	4	To solve and plot the integrated rate law equations for a. Zeroth order b. First order c. Second order	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
July	06/07/2026-11/07/2026	4	To plot a function and its derivative using Henderson-Hasselbalch equation.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
July	13/07/2026-18/07/2026	4	To find the critical points in a function using Henderson Hasselbalch equation and characterize them using a. Graphical method b. Derivative method	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
July	20/07/2026-25/07/2026	4	To find the critical points in a radial distribution function for 2s orbital and characterize them using a. Graphical method b. Derivative method	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
July/August	27/07/2026-01/08/2026	4	Plotting atomic orbitals and finding how shapes of orbitals emerge.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
August	03/08/2026-08/08/2026	4	Obtain Mean, Median, Standard deviation from the given data.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.

August	10/08/2026-15/08/2026	4	Numerical problems in logarithmic functions.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
August	17/08/2026-22/08/2026	4	Demonstration of MS excel for calculations and graphical representations for above experiments 1-6.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
August	24/08/2026-29/08/2026	4	Demonstration of MS excel for calculations and graphical representations for above experiments 1-6.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
September	31/08/2026-05/09/2026	4	Demonstration of use of Chemdraw/Chems sketch for drawing chemical structures.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
September	07/09/2026-12/09/2026	4	Demonstration of use of Chemdraw/Chems sketch for drawing chemical structures.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
September	14/09/2026-19/09/2026	GANESH CHATURTHI HOLIDAY		
September	21/09/2026-26/09/2026	4	Graphical representation on Cartesian and spherical polar coordinate.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
September/October	28/09/2026-03/10/2026	4	Problem solving on differentiation, partial differentiation.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.

October	05/10/2026-10/10/2026	4	Problem solving on maxima and minima.	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.
October	12/10/2026-17/10/2026	4	Revision	1. D. A. McQuarrie and J. D. Simon, Physical chemistry a molecular approach, Viva Books Pvt Ltd, 2012, Mumbai 1st edition. 2. R. G. Mortimer, Mathematics for Physical Chemistry, 4th edition, Academic Press, 2013, USA.

Assessment Rubrics

Component	Max Marks
ISA 1	5
ISA 2	5
ISA 3	5
Practical	50
Project	-
Semester End Exam	20