



ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc. (H) Chemistry Lab						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
III	32173901	IT SKILL FOR CHEMIST	2	0	0	2
Teacher/Instructor(s)		Dr Sunita Bansal				
Session		2022-23				

Course Description:

During the session students will have the understanding of

- * basic concepts of mathematics , mathematical functions- algebraic and transcendental, solving the algebraic functions , plotting of functions.
- * units of measurement and their interconversion.
- * error in measurement, types of errors, combining error, propagation of error , reduction in error, statistical methods that are used in reduction of error as numerical curve fitting method, least squares methods.
- * numerical methods – Newton Raphson, binary bisection method, Newton forward and backward difference method, Trapezoidal method and Simpson methods.

Details of the Course		
Session	Topic	Contact Hours
1	Fundamentals of mathematics, mathematical functions –Algebraic and transdental, polynomial expressions, logarithms, the exponential function	2
2	constants and variables, solving the equations – linear, quadratic , cubic and quartic	2
3	plotting graphs straight line, quadratic, exponential, logarithm , trigonometric and so on.	2
4	units of a measurement, interconversion of units	2
5	types of uncertainties, combining uncertainties. Statistical treatment. Mean, standard deviation, relative error. Data reduction and the propagation of errors.	2
6.	Graphical and numerical data reduction. Numerical curve fitting: the method of least squares (regression).	2
7.	Class test -1	2
8.	Algebraic operations on real scalar variables (e.g. manipulation of van der Waals equation in different forms). Roots of quadratic equations analytically and iteratively (e.g. pH of a weak acid). Numerical methods	2

	of finding roots (Newton-Raphson, binary –bisection, e.g. pH of a weak acid not ignoring the ionization of water, volume of a van der Waals gas, equilibrium constant expressions).	
9.	The tangent line and the derivative of a function, numerical differentiation (e.g., change in pressure for small change in volume of a van der Waals gas, potentiometric titrations).	2
10.	Numerical integration (Trapezoidal and Simpson’s rule, e.g. entropy/enthalpy change from heat capacity data).	2
11.	Test -2	2
12.	Revision and discussion	2
13.	Revision and discussion	2
14.	Problem solving	2
15.	Discussion of previous years question papers	2
		30

Suggested Books:

Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1.	McQuarrie, D.A., Mathematics for Physical Chemistry University Science Books.	2008
2.	Steiner, E., The Chemical Maths Book Oxford University Press	2008
3.	Yates, P, Chemical calculations, CRC Press	2007

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Continuous Evaluation		12
	• Test		
	• Assignment		
	• discussion		
	• Presentation		
2.	End Semester Examination	2 hours	38
3	Total		50