



ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc. (Maths Hons) Lab						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
Ist	BMATH101	Calculus			4	2
Teacher/Instructor(s)		Shilpi Jain/Amit Mittal				
Session		2021-2022				

Course Description: This course includes hand on sessions in computer lab to have a deep conceptual understanding of calculus and matrices by using software “Maxima”.

List of Experiments:

Details of the Lab Course		
Session	Name of Experiment	Contact Hours
1	Plotting the graphs of the following functions: ax , $[x]$ (greatest integer function), $\sqrt{ax + b}$, $ ax + b $, $c \pm ax + b $, $x^{\pm n}$, $x^{1/n}$ ($n \in \mathbb{Z}$), $ x /x$, $\sin(1/x)$, $x \sin(1/x)$, and $e^{\pm 1/x}$ for $x \neq 0$, e^{ax+b} , $\log(ax + b)$, $1/(ax + b)$, $\sin(ax + b)$, $\cos(ax + b)$, $ \sin(ax + b) $, $ \cos(ax + b) $. Observe and discuss the effect of changes in the real constants a, b and c on the graphs.	10
2	Plotting the graphs of polynomial of degree 4 and 5, and their first and second derivatives, and analysis of these graphs in context of the concepts covered in Unit 1.	6
3	Sketching parametric curves, e.g., trochoid, cycloid, epicycloid and hypocycloid	4
4	Tracing of conics in Cartesian coordinates	4
5	Obtaining surface of revolution of curves	4
6	Graph of hyperbolic functions	4
7	Computation of limit, Differentiation, Integration and sketching of vector-valued functions.	4
8	Complex numbers and their representations, Operations like addition, multiplication, division, modulus. Graphical representation of polar form.	4
9	Find numbers between two real numbers and plotting of finite and infinite subset of \mathbb{R}	4
10	Matrix operations: addition, multiplication, inverse, transpose; Determinant, Rank, Eigenvectors, Eigenvalues, Characteristic equation and verification of the Cayley–Hamilton theorem, Solving the systems of linear equations.	8

11	Revision and test	4
Total		56

Suggested Books:

Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1.	Anton, Howard, Bivens, Irl, & Davis, Stephen (2013). Calculus (10th ed.). John Wiley & Sons Singapore Pte. Ltd. Indian Reprint (2016) by Wiley India Pvt. Ltd. Delhi.	2013
2.	Prasad, Gorakh (2016). Differential Calculus (19th ed.). Pothishala Pvt. Ltd. Allahabad.	2016
3.	Strauss, Monty J., Bradley, Gerald L., & Smith, Karl J. (2007). Calculus (3rd ed.). Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). Delhi. Indian Reprint 2011.	2011
4	Practical Mathematics (Using Maxima Software) by Dr. Gurpreet Singh Tuteja, Book Age Publications	2012

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		25
	• Quiz/Viva		
	• Observation & Record		
	• Attendance		
	• Model Exam		
2.	End Semester Examination	3 hr	25