ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : B.Sc. (Hons) Ist year Theory						
Semester	**Course Code**	**Course Title**	**Lecture (L)**	**Tutorial (T)**	**Practical (P)**	**Credit (C)**
I		Algebra	5	1	0	6
Teacher/Instructor(s)		Rajpal Rajbhar				
Session		2021-2022				

Course Objective: : The primary objective of this course is to introduce the basic tools of theory of equations, complex numbers, number theory and matrices to understand their connection with the real-world problems. Perform matrix algebra with applications to computer graphics.

Course Learning Outcomes: This course will enable the students to employ De Moivre's theorem in a number of applications to solve numerical problems. Learn about equivalent classes and cardinality of a set. Use modular arithmetic and basic properties of congruences. Recognize consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix. Find eigen-values and corresponding eigenvectors for a square matrix.

List of Experiments:

Details of the Lab Course		
Session	**Name of Experiment**	**Contact Hours**
1	Polynomials, The remainder and factor theorem, Synthetic division, Factored form of a polynomial.	4Hrs
2	Fundamental theorem of algebra	2Hrs
3	Relations between the roots and the coefficients of polynomial equations	2Hrs
4	Theorems on imaginary, integral and rational roots	2Hrs
5	Polar representation of complex numbers.	3Hrs
6	De Moivre's theorem for integer and rational indices and their applications.	4Hrs
7	The nth roots of unity.	3Hrs
8	Equivalence relations	2Hrs
9	Functions, Composition of functions, Invertibility and inverse of functions	4Hrs
10	One-to-one correspondence and the cardinality of a set	4Hrs
11	Well ordering principle	2Hrs
12	The division algorithm in , Divisibility and the Euclidean algorithm, Modular arithmetic and basic properties of congruences	4Hrs
13	Statements of the fundamental theorem of arithmetic and principle of mathematical induction	4Hrs
14	Systems of linear equations, ,	3Hrs

15	Row reduction and echelon forms, Vector equations	4Hrs
16	The matrix equation Ax = b, Solution sets of linear systems, The inverse of a matrix.	3Hrs
17	Subspaces, ,	2Hrs
18	Linear independence, Basis and dimension	4Hrs
19	The rank of a matrix and applications.	4Hrs
20	Introduction to linear transformations	1Hrs
21	Matrix of a linear transformation	2Hrs
22	Applications to computer graphics.	2Hrs
23	Eigenvalues and eigenvectors	3Hrs
24	The characteristic equation and Cayley−Hamilton theorem	2Hrs
	Total	**70 hours**

Suggested Books:

Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1.	Andreescu, Titu & Andrica Dorin. (2014). Complex umbers from A to...Z. (2nd ed.). Birkhäuser	2014
2.	Dickson, Leonard Eugene (2009). First Course in the Theory of Equations.TheProjectGutenbergEBook(http://www.gutenberg.org/ebooks/29785)	2009
3.	Goodaire, Edgar G., & Parmenter, Michael M. (2005). Discrete Mathematics with Graph Theory (3rd ed.). Pearson Education Pvt. Ltd. Indian Reprint 2015.	2005
4.	Kolman, Bernard, & Hill, David R. (2001). Introductory Linear Algebra with Applications (7th ed.). Pearson Education, Delhi. First Indian Reprint 2003.	2001
5.	Lay, David C., Lay, Steven R., & McDonald, Judi J. (2016). Linear Algebra and its Applications (5th ed.). Pearson Education	2016

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		25
	• Quiz/Viva		
	• Observation & Record		
	• Attendance		
	• Model Exam		
2.	End Semester Examination	3 hr	75

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