



FIRST SEMESTER 2019-20
Course Handout Part-II

01-08-2019

In addition to Part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course Number : BITS F218
Course Title : **General Mathematics III**
Instructor-In charge : Jhuma Sen Gupta

Scope and Objective of the Course: The course is designed for Pharmacy students keeping in mind the importance of Linear Algebra and Linear programming problems and their possible applications in various fields of science and engineering. Linear algebra begins with vectors and matrices – two of the most important practical concepts in mathematics. Linear Algebra is broadly concerned with solving systems of linear equations which in turn depends on working with vectors and matrices. Whereas Linear programming is a method to achieve the best outcome in a mathematical model whose requirements are represented by linear relationships. Linear programming can be applied to various fields of study. It is used in business and economics, but can also be utilized for some engineering problems. Industries that use linear programming models include transportation, energy, telecommunications, and manufacturing.

1. Text Books:

T1: E. Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley, 2010
T2: HA Taha, Operation Research: An Introduction, Pearson Education, 10th Edition, 2011.

2. Reference Books:

R1: S. Andrilli and D. Hecker, Elementary Linear Algebra by, 4th edition, 2012, Elsevier.
R2: SS Rao, Engineering Optimization: Theory and Practice, New Ge International (P) Limited, 3rd Edition, 1996.
R3: BS, Grewal, Higher Engineering Mathematics, 40th Edition, Khanna Publication, 2009.

3. Course Plan for General Mathematics III:

Lect. No.	Learning objectives	Topics to be covered	Chapter in the Text Book
Part I: LINEAR ALGEBRA			
1-3	To learn the rule of addition, multiplication of two matrices and transpose of a matrix.	Matrix addition, multiplication and transpose	T1 (6.1-6.2)

4-5	Study linear system of equations, coefficient and augmented matrix, to understand how to apply elementary row operation to reduce a matrix into Echelon and RREF form.	Solving systems and Row equivalent forms – Matrices, Augmented matrices, Row reduced equivalent forms	T1 (6.3)
6-8	Interpret linear systems as matrix equation. To solve the system of homogeneous and inhomogeneous equations. To understand the meaning of consistent and inconsistent systems, concept of unique solution, infinite solution and no solutions.	Solving Homogenous systems and non-homogenous systems	R1 (2.1 – 2.3)
9-10	To find determinant of a matrix, inverse of a matrix (if it exists) using row transformation, and Adjoint of a matrix and to understand Cramer's rule.	Inverse matrix, Determinant, Adjoint matrix, Cramer's rule	T1 (6.6 – 6.7)
11-14	To understand the meaning of vector space, linear independence/dependence and span, Basis and dimensions.	Linear dependence, Basis and Dimensions	R1 (4.1-4.5)
15-16	Identify the linear transformation, Determine the standard matrix of a linear transformation.	Linear transformation	R1 (5.1-5.2)
Part II: LINEAR PROGRAMMING			
17-19	To understand the meaning of Linear programming, its importance and applications, concept to formulate a linear programming problem, solving LPP involving two decision variables using graphical methods.	Introduction to LP – Formulation to LPP, Graphical solutions	T2 (2.1, 2.2, 2.4)
20-26	To introduce and explain the computational procedure of the simplex method, artificial starting solution (M method and two phase method), Introduce various special cases.	Algebraic solutions - Simplex method, Artificial variable method, Special cases	T2 (3.2 - 3.5)
27-29	The concept of Duality, computational techniques for Dual simplex method and interpretation.	Duality and Dual Simplex Method	T2 (4.1, 4.2, 4.4)
30-32	To analyze the post optimal results subject to the change of objective function coefficient, constraints, addition and subtraction of variable etc.	Introduction to post optimal analysis	T2 (4.5)
33-37	To deal various Transportation and Assignment problems using various computational methods.	Transportation and Assignment problem, Finding BFS, Using North-West Corner Rule, LCM & VAM, Modi's method , Hungarian	T2 (5.1, 5.3, 5.4)



		Method for solving assignment problem	
	Part II: NONLINEAR PROGRAMMING		
38-43	To understand the techniques to solve non-linear programming problems where the objective function is non-linear.	Single variable, Unconditional optimization, Fibonacci search method, Golden Section Search Method, Gradient based method	R2 (5.7) T2 (21.1)

4. Evaluation Scheme:

Sl. No.	Evaluation Component	Duration	Weightage (%)	Date and Time	Nature of Component
1	Mid Semester Test	90 min	30	28/9, 9.00 -- 10.30 AM	Closed
2	Assignment(s)		20	There will be two assignments, one before the mid semester exam and one after the mid semester exam	Open
3	Quizzes		10	There will be three quizzes conducted at tutorial/lecture hours, out of three best two will be taken. Dates will be announced in Class/CMS	Closed
4	Comprehensive Exam	3 hours	40	2/12 FN	Closed

- Announcements:** All the announcements in relation to the above course will be put up on CMS.
- Total Marks: 100**
- Make up policy:** Make up for the mid-semester/comprehensive examination will be given to genuine cases.
- Chamber consultation hours:** To be announced in the class.
- Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor In-Charge
BITS F218

