Course Code	**:GP 104**
Course Title	**:Mathematics II**
Credits	**: 3**
Prerequisites	**:NONE**
Core/ Elective	**:CORE**

Aims : To encourage students to develop a working knowledge of the central ideas of linear algebra: vector spaces, linear transformations, orthogonality, eigenvalues, eigenvectors and canonical forms and the applications of these ideas in science and engineering

Learning Outcomes : On successful completion of the course, the students should be able to;

- Apply the knowledge of matrices, Gaussian reduction and determinants to solve systems of linear equations.
- Use the properties of vector spaces and to generalize the concepts of Euclidean geometry to arbitrary vector spaces.
- Identify linear transformations, represent them in terms of matrices, and interpret their geometric aspects.
- Calculate and identify the geometric aspects of eigenvalues and eigenvectors.
- Use eigenvalue properties of real symmetric matrices and apply them in quadraticforms and other applications.

No	Topic	Time Allocation/ hours			
		L	T	P	A
1	**Matrix Algebra:** Operations; Elementary matrices; Inverse; Partitioned matrices	2			1
2	**Determinants:** Introduction and properties	2			1
3	**Vector spaces:** Definition; Subspaces; Linear independence and spanning; Basis; Change of basis; Normed spaces; Inner product spaces; Gram-Schmidt orthonormalization	8			6

4	**Linear Transformations:** Introduction; Matrix representation; Operations of LT; Change of Basis	4			2
5	**System of linear equations:** Gauss and Jordan elimination; LU factorization; Least square approximations; Ill-conditioned and over-determined systems	5			2
6	**Characteristic value problem:** Computing eigenvalues and eigenvectors; Eigen-basis; Diagonalization; Matrix exponentials; Real Symmetric matrices / definiteness	8			3
7	**Real Symmetric matrices** :Properties, definiteness, quadratic forms, applications	7			3
	Total	36			18

Note: L – Lectures, T – Tutorials, P – Practicals, A - Assignments

References:

- Advanced Engineering Mathematics - E. Kreyszig
- Linear Algebra and its Applications- David C. Lay
- Elementary Linear Algebra and its Applications-James W. Daniel
- Matrices for Scientists and Engineers - W.W. Bell

Assessment	Percentage Mark
In-course Tutorials/Quizzes Mid Semester Examination	 20 30
End-Semester	50