**Course-13 Title: Mathematics-II**

**Course Code: MAT 121 Credit: 3.00 Contact Hour: 3 per week Total marks: 100**

**11.1 Rationale:** To be a computer Engineer one needs to have Knowledge about Matrix, Coordinate Geometry and Vector Analysis.

* 1. **Objectives:**

1. To achieve knowledge about matrix and application of Matrix.
2. To know and apply the Coordinate Geometry
3. To gain knowledge about Vector Analysis.

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| **11.3**  **Learning Outcomes** | **11.4**  **Course Content** | **11.5**  **Teaching / Learning Strategy** | **11.6 Assessment Strategy** |
| 1. Describe different kind of Matrix | | Matrix:  Definition of Matrix, equality of two matrices. Addition, Subtraction and Multiplication of Matrices. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |
| 1. Define Inverse matrix and rank of Matrix 2. Compute the inverse of matrix and Rank of matrix | | Transpose of matrices, Inverse of matrix and Rank of matrices. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |
| 1. Deduce transformation of co-ordinates | | Co-ordinate Geometry :  Change of axes, transformation of co-ordinates and simplification of equations of curves. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |
| 1. Find the angles between the pair of straight lines 2. Deduce the equation of bisectors between the pair of straight lines | | Pair of straight lines, conditions under which general equations of the second degree may represent a pair of straight lines. Homogeneous equations of second degree. Angle between the pair of lines. Pair of lines joining the origin to the point of intersection of two curves. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |
| Explain direction cosines and direction ratios  Determine the projection of lines | | Distance and Division formulae. Direction cosines and direction ratios of a line. Angle between two lines. Projection of a segment. Projection of the joint of two points on a line. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |
| Describe about circle, parabola, ellipse and hyperbola | | Standard equations of circle, parabola, ellipse and hyperbola with explanations.  Conic together with its Cartesian and po1ar equations. Discussions of the general equation of second degree in x and y for for representing a conic. Representation of a point in a space. Rectangular Cartesian co-ordinates. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |
| Define plane  Find the angle between the planes | | The equation of a plane, its normal form and intercept form. Angle between two planes. The equation of a line in symmetrical form. Equations of sphere, paraboloid and ellipsoid. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |
| 1. Define vectors. 2. Compare Linear dependence and independence of vectors. 3. Define line, surface and volume integrals. | | Vector Analysis:  Definition of vectors. Equality of vectors. Addition and multiplication of vectors. Linear dependence and independence of vectors. Differentiation and integration of vectors together with elementary applications. Definitions of line, surface and volume integrals. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |
| 1. Explain Gradient of a scalar function, Divergence and curl of a vector function. 2. State and prove Divergence theorem, Stoke’s theorem, Green’s theorem and Gauss’s theorem | | Gradient of a scalar function. Divergence and curl of a vector function. Physical significance of gradient, divergence and curl. Various formulae. Integral forms of gradient, divergence and curl. Divergence theorem. Stoke’s theorem, Green’s theorem and Gauss’s theorem. | Lecture  Exercise | Assignment  Essay  Exercise  Short answer | |

**RECOMMENDED BOOKS AND PERIODICALS**

**References:**

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| 1. | S.L. Loney | : Analytical Co-ordinate Geometry. |
| 2. | M. L. Khanna | : Theory of Matrices |
| 3. | P. N. Chatterjee | : Theory of Matrice |
| 4. | M. R. Spiegel | : Vector Analysis |
| 5. | S. A. Sattar | : Vector Analysis |
| 6. | M. L. Khanna | : Vector Analysis |