# 20SH1204 - ENGINEERING MATHEMATICS - II

(Common to all Branches)

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| **Course Category:** | Basic Science | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3-1-0 |
| **Prerequisite:** | Intermediate Mathematics | **Sessional Evaluation:**  **Univ. Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Objectives** | To make the student learn about   * The concepts of Double integrals, Areas and Volumes. * The basic concepts of Triple integrals and its volume, Beta and Gamma functions. * The Gradient, Divergence and Curl operators, Solenoidal and Irrotational vectors. * The basic concepts of Vector Integration. * The determination of Fourier coefficients, Fourier series, Even and Odd Functions and Change of intervals. * The concepts of Fourier Transforms. | | |

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| **Course Outcomes** | Upon successful completion of this course students will be able to: | |
| CO1 | Attains skills in analysing the Double integrals also its Areas and Volumes. |
| CO2 | Understand effectively in analyzing the Triple integrals, Beta and Gamma functions. |
| CO3 | Acquire knowledge in analyzing the Curl, Divergence and Gradient operators, Solenoidal and Irrotational vectors with their applications. |
| CO4 | Attains skills in analysing the applications of Green’s, Stoke’s and Gauss-divergence theorems. |
| CO5 | Develop analytical skills in solving the problems involving Fourier Series. |
| CO6 | Understand effectively Fourier Sine and Cosine integral, Fourier Transforms, Fourier Sine and Cosine transforms. |
| **Course Content** | UNIT - I  **Double integrals:** Double integrals - Change of order of integration - Change to polar coordinates - Area and Volumes by double integration.  UNIT - II  **Triple integrals and Special functions:** Evaluation of triple integrals, Volume by triple integral. Beta and Gamma functions and their properties, Relation between Beta and Gamma functions.  UNIT - III  **Vector Differentiation:** Scalar and vector point function, Vector operator Del, Del applied to scalar point function, Gradient, Divergence, Curl, Solenoidal and Irrotational vectors.  UNIT - IV  **Vector Integration:** Line integral-circulation-workdone, Surface integrals – flux, Green’s theorem in the plain (Without proof), Stoke’s theorem (Without proof), Volume integral, Gauss-divergence theorem (without proof).  UNIT - V  **Fourier Series:** Determination of Fourier coefficients - Fourier series - Even and Odd functions - Change of intervals (0,2l).  UNIT - VI  **Fourier Transforms:** Fourier Integral Theorem (Without proof)-Fourier Sine and Cosine integral - Fourier integral in complex form - Fourier Transforms - Fourier Sine and Cosine transforms. | |
| **Text Books and References** | Text Books:   1. Higher Engineering Mathematics - B. S. Grewal, Khanna Publishers, New Delhi. 2. Engineering Mathematics - B.V. Ramana, Tata McGraw-Hill Education Pvt. Ltd, New Delhi. | |
| Reference Books:   1. Higher Engineering Mathematics - H.K. Dass, Er. Rajnish Verma, S. Chand Publication, New Delhi. 2. Advanced Engineering Mathematics - N.P. Bali & M. Goyal, Lakshmi Publishers, New Delhi. 3. Advanced Engineering Mathematics - Erwin Kreyszig, Wiley, India | |