**N.B.K.R. INSTITUTE OF SCIENCE AND TECHNOLOGY:: VIDYANAGAR**

**(AUTONOMOUS)**

**I.B.TECH. II-SEMESTER**

**(*New regulations with effect from 2019-20)***

**ENGINEERING MATHEMATICS - II**

**(Common to All Branches)**

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| Course Category: | | Basic Sciences | | Credits: | 4 |
| Course Type: | | Theory | | Lecture-Tutorial-Practical: | 3-1-0 |
| Pre – requisite: | | Intermediate Mathematics | | Sessional Evaluation:  External Evaluation:  Total Marks: | 40  60  100 |
| Course  Objectives: | To make the student learn about   1. The concepts of double integrals and its applications. 2. The basic concepts of triple integrals and its applications, Beta and Gamma functions. 3. The gradient, divergence and curl operators, Solenoidal and Irrotational vectors. 4. The basic concepts of vector integration and their applications. 5. To express a function in Fourier series in an interval. 6. The concepts of Fourier transform. | | | | |
| Course Outcomes: | After completing the course the student will be able to | | | | |
| CO1 | | Apply double integration techniques in evaluating areas bounded by region. | | |
| CO2 | | Understand effectively in analyzing the Triple integrals, Beta and Gamma functions | | |
| CO3 | | Interpret the physical meaning of different operators such as Gradient, Divergence and Curl. | | |
| CO4 | | Apply Green’s, Stokes and Divergence theorems in evaluation of double and triple integrals. | | |
| CO5 | | Develop analytical skills in solving the problems involving Fourier Series. | | |
| CO6 | | Understand effectively Fourier Sine and Cosine integral, Fourier Sine and Cosine transforms. | | |
| Course  Content: | UNIT - I  **Double Integrals:** Double integrals – Change of order of integration – Change to polar coordinates – Area by double integration.  UNIT - II  **Tripple 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 functions – Vector differential operator – Gradient, Divergence and Curl – Solenoidal and Irrotational vectors.  UNIT - IV  **Vector Integration:** Line integral-circulation-workdone – Surface integrals -flux – Volume integral – Vector integral theorems - Green’s theorem, Stoke’s theorem and Gauss-divergence theorem (without proof).  UNIT-V  **Fourier Series:** Determination of Fourier coefficients (without proof) – Fourier series – Even and odd functions – Change of intervals.  UNIT-VI  **Fourier Transforms:** Fourier Integral Theorem (Without proof) – Fourier Sine and Cosine integrals –– Fourier Transforms – Fourier Sine and Cosine transforms. | | | | |
| Textbooks: | 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: | 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 | | | | |