**Curriculum Plan : B.Sc(H) Mathematics II Year (III Sem)**

**Riemann Integration**

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| **Ms. Garima Gaur**  Assistant Professor  Department of Mathematics  Kalindi College (University of Delhi)  Delhi- 110008  Mobile: 9953227989  E- mail: garimagaur@kalindi.du.ac.in | |  | **Marks Distribution** | **Theory** | 90 Marks | |
| **Internal Assessment** | 30 Marks | |
| **Continuous Assessment** | 40 Marks | |
| **Classes Assigned** | **Lectures** | 3 lectures per week | |
|  | **References** | 1. **Ross, Kenneth A. (2013). Elementary Analysis: The Theory of Calculus (2nd ed.). Undergraduate Texts in Mathematics, Springer.** 2. **Anton, Howard, Bivens Irl and Davis Stephens (2012). Calculus (10th ed.). John Wiley & Sons, Inc.** 3. **Denlinger, Charles G. (2011). Elements of Real Analysis, Jones & Bartlett India Pvt. Ltd.** 4. **Ghorpade, Sudhir R. and Limaye, B. V. (2006). A Course in Calculus and Real Analysis. Undergraduate Texts in Mathematics, Springer (SIE). Indian Reprint.** | | | | |
|  | **Week** | **Topics** | | | |  |
|  | **1st week** | Definition of upper and lower Darboux sums, Darboux integral. | | | |  |
| **2nd week** | Inequalities for upper and lower Darboux sums. | | | |
|  | **3rd week** | Necessary and sufficient conditions for the Darboux integrability | | | |  |
| **4th week** | Riemann’s definition of integrability by Riemann sum The equivalence of Riemann’s and Darboux’s definitions of integrability. | | | |  |
| **5th week** | The equivalence of Riemann’s and Darboux’s definitions of integrability. | | | |  |
|  | **6th week** | Definition and examples of the Riemann-Stieltjes integral. | | | |  |
|  | **7th week** | Riemann integrability of monotone functions and continuous functions | | | |  |
|  | **8th week** | Properties of Riemann integrable functions. | | | |  |
|  | **9th week** | Definitions of piecewise continuous and piecewise monotone functions and their Riemann integrability; Intermediate value theorem for integrals. | | | |  |
|  | **10th week** | Fundamental Theorems of Calculus (I and II). | | | |  |
|  | **11th week** |  | | | |  |
|  |  | **SEMESTER BREAK** | | | |  |
|  | **12th week** | Methods of integration: integration by substitution and integration by parts; Volume by slicing and cylindrical shells. | | | |  |
|  | **13th week** | Length of a curve in the plane and the area of surfaces of revolution. | | | |  |
|  | **14th week** | Improper integrals of Type-I, Type-II and mixed type. | | | |  |
|  | **15th week** | Convergence of improper integrals, The beta and gamma functions and their properties. | | | |  |