**Curriculum Plan (ODD SEM 2022): B.Sc. (H) Mathematics III Year (Semester V)**

**Paper: Probability Theory and Statistics**

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| **Dr. Tajender Kumar**Assistant ProfessorDepartment of MathematicsKalindi College (University of Delhi)Delhi- 110008Mobile: +91 7417837644**E- mail**: tajenderkumar@kalindi.du.ac.in  |  | **Marks Distribution**  | **Theory** |  75 Marks |
| **Internal Assessment** | Assignments 10 Marks |
| Home Exams 10 Marks |
| Attendance 5 Marks |
| **Classes Assigned** | **Lectures** | 5 per week (**Theory**) |
| **Tutorial** | 1 per week |
| **References** |  | 1. Robert V. Hogg, Joseph W. McKean and Allen T. Craig, Introduction to Mathematical Statistics, Pearson

Education, Asia, 2007.1. Irwin Miller and Marylees Miller, John E. Freund’s Mathematical Statistics with Applications (7th Edition), Pearson Education, Asia, 2006.
2. Sheldon Ross, Introduction to Probability Models (9th Edition), Academic Press, Indian Reprint, 2007.
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|  | **Week** | **Topics** |  |
|  | **1st week (**16-19AUG) | Sample space, Probability axioms ([1] Chapter 1 Sections 1.1 & 1.3) |  |
|  | **2nd week (**21-26 AUG) | Real random variables (discrete and continuous) , Probability mass/density functions , Cumulative distribution function ([1] Chapter 1 Section 1.5) |  |
|  | **3rd week (**28 AUG-02 SEP) | Discrete distributions: Uniform, Binomial, Poisson, Negative binomial, Geometric ([1] Chapter 1 Section 1.6, [2] Chapter 5 Section 5.1, 5.2,5.3,5.4,5.5 & 5.7) |  |
|  | **4th week (**04-09 SEP) | Continuous distributions: Uniform, Normal, Exponential, Chi-square and Beta. ([1] Chapter 1 Section 1.7, [2] Chapter 6 Section 6.2, 6.3,6.5). |  |
|  | **5th week (**11-16 SEP) | Some special expectations: Mean, Variance, Standard deviation, Moment generating function, Characteristic function ([1] Chapter 1 Section 1.8 and 1.9). |  |
|  | **6th week (**18-23 SEP) |  Some special expectations: Mean, Variance, Standard deviation, Moment generating function, Characteristic function ([1] Chapter 1 Section 1.8 and 1.9). |  |
|  | **7th week (**25- 30 SEP) | Random vector: Discrete and continuous, Joint probability mass/density functions, Joint cumulative distribution function and its properties ([1] Chapter 2 Section 2.1). |  |
|  | **8th week (**02-07 OCT) | Marginal probability mass function, and expectation of two random variables, Joint moment generating function, Conditional distributions and expectations ([1] Chapter 2 Section 2.2 & 2.3). |  |
|  | **9th week (**09-14 OCT) | Correlation coefficient, Covariance, Calculation of covariance from joint moment generating function, Independent random variables ([1] Chapter 2 Section 2.4 & 2.5). |  |
|  | **10th week**. (16 OCT-21 0CT) | Normal approximation to the binomial distribution ([2] Chapter 6 Section 6.6). |  |
|  | **11th week (**23-28 0CT) | Linear regression for two variables, and the method of least squares ([2] Chapter 14 Section 14.1 to 14.3).  |  |
|  | **12th week (**30 OCT-04 NOV) | Bivariate normal distribution ( [2] Chapter 6 Section 6.7). |  |
|  | **13th week (**06-11 NOV) | Chebyshev’s inequality ([2] Chapter 4 Section 4.4 and [3] Exercise 76, Page 89 ). |  |
|  | **14th week (**20-25 NOV) | Statement and interpretation of (weak) law of large numbers and strong law of large numbers ([3] Chapter 2 Section 2.8 ). |  |
|  | **15th week** (27 NOV-02 DEC) | Central Limit theorem for independent and the weak law of large numbers ([3] Chapter 2 Section 2.8 ) |  |
|  | **16th week/with 2 Days** (04-09, 11 and 12 DEC) | Revision |  |
| Dispersal of classes, preparation leave and practical examination begin- 13 December, 2023. |