Course Title:	Probability & Probability Distributions- II
Course Code:	STAT-306
Semester:	VI
Credit Hours:	3 Credit Hours
Pre-requisites:	Probability & Probability Distributions- I

Learning Outcomes

By the end of this course, students will be able to:

1. Learn the theoretical and mathematical basis of Bivariate distributions including Bivariate normal distribution.
2. Derive chi-square, t and F distributions along with their properties.
3. Grasp the concept of Order statistics and their distribution

Course Outline

Unit 1

1.1 Bivariate Distributions

Marginal distribution. Conditional distribution and independence. Conditional expectation and conditional variance. Bivariate normal distribution and its properties.

1.2 Transformation of Random Variables

Sum, product and quotient of random variables. Moment generating function techniques. Derivations of chi-square, t and F distributions and their properties.

1.3 Order Statistics

Distribution of the rth-order statistics. Distribution of sample range, sample median and sample mid-range.

- **Teaching-learning Strategies:**

Class Lecture method, which includes seminars, discussions, assignments and projects. (Audio-visual tools are used where necessary)

- **Assignments-Types and Number with calendar:**

According to the choice of respective teacher.

- **Assessment and Examinations:**

According to the University's Semester Rules.

Sr. No.	Elements	Weightage	Details
1	Midterm Assessment	35%	It takes place at the mid-point of the semester.
2	Formative Assessment	25%	It is continuous assessment. It includes: Classroom participation, attendance, assignments, and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc.
3	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term

			paper, research proposal development, field work and report writing etc.

Text Book
1. Ross, S.M. (2003). *Introduction to Probability Models*. Academic press.

Suggested Readings
1. Hirai, A.S. (2002). *A Course in Mathematical Statistic.* Ilmi Katab Khana, Lahore.
2. Hogg, R.M., McKean, J., and Craig, A.T. (2013). *Introduction to Mathematical Statistics*. Prentice Hall, New Jersey, USA.
3. Milton, J.S. and Arnold, J.C. (2003). *Introduction to probability and statistics*", McGraw Hill, 2003.
4. Mood, A.M., Graybill, F.A. and Boes, D.C. (2007). *Introduction to the Theory of Statistics.* McGraw Hill, New York, USA.