SECOND SEMESTER 2017-2018
COURSE HANDOUT (Part II)

In addition to Part I (General Handout for all courses appended to the time table) portion here give specific details regarding the course.

Course Number	**:**	**MATH F113**
Course Title	**:**	**Probability & Statistics**
Instructor-In-Charge	**:**	**PRADIPKUMAR H. KESKAR**
Instructors	**:**	**C. B. Gupta, Chandra Shekhar, Jitender Kumar, Krishnendra Shekhawat, Priyanka Kumari, Rajesh Kumar, Rajiv Kumar, Santosh Kumar Yadav, Satyendra Singh, Shivi Agarwal, Shruti, Sumanta Pasari, Suresh Kumar, Swati Sharma**

1. Scope and objective of the course:

Probability theory deals with many real life problems, which either inherently involve the chance phenomena or describe the behavior of the system explicitly with statistical properties. Interpretation of the system behavior in many engineering aspects depends on concept of probability and statistics that familiarize with the computational aspects. The course deals with basic properties of various distributions and other related things.

2. Text Books:

1. Milton, J. S. and Arnold, J. C.: Introduction to Probability and Statistics Principles and Applications for Engineering and the Computing Sciences, 4th edition, Tata McGraw-Hill, 2007.

3. Reference Books:

1. Meyer, P. L.: Introduction to Probability & Statistics, 2nd edition, Oxford & IBH, 1970.
2. Ross, Sheldon M.: Introduction to Probability Models, 3rd edition, Elsevier, 2009.
3. Walpole, R. E., Myers, R. H., Myers, S. L., Ye, K.: Probability & Statistics for Engineers and Scientists, 8th edition, Pearson Education, 2007.
4. Johnson, R. A.: Miller Freund's Probability and Statistics, 7th edition, PHI, 2005.

4. Lecture Plan:

Module	Lecture session	*Sections*	Learning Outcome
1. Various Concepts in Probability Theory	**L 1** Introduction to probability, sample spaces, events, permutations and combinations **L 2-4** Axioms of probability, conditional probability, independence and the multiplication rule, Bayes' theorem	1.1, 1.2, 1.3 2.1, 2.2, 2.3, 2.4	Formulating the foundations for probability vis a vis practical notions
2. Discrete Distributions	**L 5-8** Random variables, discrete probability densities, cumulative distribution, expectation, variance and standard deviation, geometric distribution, moment generating function **L 9-11** Binomial distribution, hypergeometric distribution, Poisson distribution	3.1, 3.2, 3.3, 3.4 3.5, 3.7, 3.8	Understanding basic theory of discrete distributions and studying important discrete distributions
3. Continuous Distributions	**L 12-15** Continuous densities, cumulative distribution and distribution parameters, uniform distribution, gamma distribution, exponential and chi-squared distribution. **L 16-20** Normal distribution, standard normal distribution, Chebyshev's inequality, normal approximation to binomial distribution	4.1, 4.2, 4.3 4.4, 4.5, 4.6	To understand theory of continuous distributions and study some important continuous distributions
4. Joint Distributions and Simulation	**L 21-24** Joint densities and independence, marginal distribution: discrete and continuous, expectation, conditional densities (discard regression) **L 25-26** Simulation of discrete and continuous random variables	5.1, 5.2, 5.4 3.9, 4.9	Simultaneous behavior of several random variables and simulating a random experiment
5. Descriptive Statistics and Estimation	**L 27-28** Random sampling, sample statistics **L 29-31** Point estimation, method of moments & maximum likelihood, functions of random variables, central limit theorem.	6.1, 6.3 7.1, 7.2, 7.3, 7.4	Concepts of sampling and their applications to estimate population parameters

6. Statistical Inference	**L 32-35** Interval estimation of variability, estimating the mean and Student-t distribution, hypothesis testing, hypothesis tests on the mean **L 36-38** Estimating proportions, hypothesis tests on a proportion	8.1, 8.2, 8.3, 8.4, 8.5 9.1, 9.2	Applications to estimation of intervals and testing of hypotheses on population parameters
7. Simple Linear Regression and Correlation	**L 39-40** Model and parameter estimation, correlation	11.1, 5.3, 11.6	To study nature of relationship between random variables

5. Evaluation Scheme:

EC No.	Evaluation Component	Duration	Weightage (%)	Marks	Date & Time	Remarks
1	Mid-Semester	90 mins	35	105	8/3 11:00 - 12:30 PM	Closed Book
2	Class Tests (quizzes)	15 minutes each	20	60	Unannounced	Closed Book (Best 3 out of 4)
3	Comprehensive	180 mins	45	135	8/5 AN	Closed / Open Book

6. Announcements:

All notices in relation to the above course will be posted on NALANDA and Department of Mathematics notice board.

7. Make-up policy:

Make-up for the mid-semester/comprehensive examination will be given to genuine cases with prior permission only. For Class Tests component, there will be **NO** make-up under **any circumstances**.

8. Chamber consultation hour :

To be announced in the respective tutorial class by the respective instructor.

Instructor-In-Charge
MATH F113