Birla Institute of Technology & Science, Pilani
Hyderabad Campus

06/01/2019

In addition to Part I (General Handout for all courses appended to the time table) portion:

Course Number   : **MATH F113**
Course Title   : **PROBABILITY & STATISTICS**
Instructor-In charge   : **Manish Kumar**
 Instructors   : D K Satpathi, B Mishra, K Venkata Ratnam, PTV Praveen Kumar, Manish Kumar, J.Jaganmohan, Sumit Kumar V, Santanu Koley, G Murali Mohan Reddy, Debopam Chakraborthy, Nirman Ganguly, Sabyasachi Dey, A. Kartik, Basu Debananda, T. Ranjan Panigrahi, Tusharakanta Pradhan, Sanjay Mandal, N.S. Gopal, Agrawal Amarkumar Shyamsunder, Tapaswini Patro

1. **Scope and objective of the course:**

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

2. **Text Books:**

   Jay L Devore, Probability and Statistics for Engineering and the Sciences, 8th Edition, Cengage Learning, 2012.

3. Reference Books:

   1. Johnson, R.A.: Miller & Freund's Probability and Statistics for Engineers, 8th. Ed., Pearson, 2011.
   2. Sheldon M. Ross: Introduction to Probability and Statistics for Engineers and Scientists, Fourth Edition, Elsevier, Academic Press, 2010.
   3. Walpole, R.E., Myers R.H., Myer S.L., Ye K.: Probability and Statistics for Engineers and Scientists, 8th Edition, Pearson Education, 2008.

4. Lecture Plan:

Lecture	Learning Objectives	Topics to be covered	Chapter in the Text Book
1-3	Probability theory makes predictions about experiments whose outcomes depend upon chance. How to state the three axioms of probability and use them to derive basic facts about a probability function. Learn about three approaches of defining probabilities and their interpretations. Introduce conditional Probability and its applications	Introduction to probability, sample spaces and events , Axioms, Interpretations and Properties of Probability, Counting Techniques(Self Study), Conditional Probability, Independence.	2.1-2.5
4-6	To gain knowledge on how to define a random variable and identify various important and commonly used discrete distributions.	Random Variables, Probability Distributions for Discrete Random Variables, Expected Values, Moment Generating Function (MGF)	3.1, 3.2, 3.3, 5.11 (R-1)
7-10		The Binomial Probability Distribution, Hypergeometric and Negative Binomial Distributions, Geometric Distribution, The Poisson Probability Distribution	3.4, 3.5, 3.6
11-13	To gain knowledge on various	Continuous Random Variables,	4.1, 4.2,

	important and commonly used continuous distributions	Probability Density Functions, Cumulative Distribution Functions and Expected Values, MGF	5.11(R-1)
14-18	To gain knowledge on most important continuous distribution (Normal distribution) and its applications in real life.	The Normal Distribution, The Exponential and Gamma Distributions, Chi-Square , Log Normal Distributions and Transformation Methods to Obtain Distributions.	4.3, 4.4, 4.5, 6.7 (R-1)
19-20	Introduce simulation and how to simulate complex systems.	Simulation – Discrete and Continuous random variables	4.10, 5.14 (R-1)
21-23	Develop probability models involve several random variables simultaneously	Jointly Distributed Random Variables, Expected Values, Covariance, and Correlation	5.1, 5.2
24-26	Introduce Statistics and their distributions.	Statistics and Their Distributions, The Distribution of the Sample Mean, The Distribution of a Linear Combination	5.3, 5.4, 5.5
27-28	How to estimate population's parameters.	Some General Concepts of Point Estimation, Methods of Point Estimation	6.1, 6.2
29-32		Basic Properties of Confidence Intervals, Large-Sample Confidence Intervals for a Population Mean, and Proportion Intervals Based on a Normal Population Distribution, Confidence Intervals for the Variance and Standard Deviation of a Normal Population	7.1, 7.2, 7.3, 7.4
33-35	Introduce concepts of hypothesis testing and its applications in real world problems	Hypotheses and Test Procedures, Tests About a Population Mean	8.1, 8.2
36-38		Tests Concerning a Population Proportion, P-Values	8.3, 8.4
39-41	Objective is how to exploit the relationship between two or more variables by introducing predictive models.	The Simple Linear Regression Model, Estimating Model Parameters	12.1-12.2

5. Evaluation Scheme:

Evaluation Component	Duration	Weightage	Date & Time	Nature of Component
Quiz 1	To be announced in the class	10%	To be announced in the class	Closed Book
Mid Semester	90 mins	35%	2/3 9.00 - 10.30AM	Open book
Quiz 2	To be announced in the class	10%	To be announced in the class	Closed Book
Comprehensive Examination	3 Hours	45%	01/05 FN	Closed Book

* The total marks of all the components, taken together will be 300.

6. Chamber consultation hour: To be announced in the class.
7. Notices: The notices concerning this course will be displayed on the CMS Notice Board only.
8. Make-up Policy:
Make-up will be given only for very genuine cases and prior permission has to be obtained from the I/C.
Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor In charge
MATH F113