

## COURSE OUTLINE

Course No: MATH 357

Course Title: Probability and Statistics

Credit hours: 3.0                      Contact hours: Office Time

Level/Term: L-2/T-2

Academic Session: 2019-2020

Course Teacher(s):

Name:	Office/Room	E-mail and Telephone: <i>(optional)</i>	Class routine	
<b>1. Afroza Akter</b>				
<b>2. Khondoker  Nazmoon Nabi</b>	Ga-24,  OAB Building  (Ground Floor)	khnabi@math.buet.ac.bd	<b>Sec A</b>	<b>Sunday: 9.00-9.50 a.m</b> <b>Monday: 10.00-10.50 a.m</b>
			<b>Sec B</b>	<b>Sunday: 8.00-8.50 a.m</b> <b>Monday: 8.00-8.50 a.m</b>
			<b>Sec C</b>	<b>Sunday: 10.00-10.50 a.m</b> <b>Monday: 9.00-9.50 a.m</b>

Course Contents: *(To be filled from the course handbook)*

Introduction. Sets and probability. Random variables. Properties describing distributions. Treatment of grouped sample data. Some discrete probability distributions. Normal distribution. Sampling theory. Estimation theory. Tests of hypotheses. Regression and correlation. Analysis of variance.

### Learning Outcomes/Objectives:

At the end this course, students will be able to:

- i. provide the basics to measure the central tendency of statistical data
- ii. learn techniques to derive standard deviation and other measures of dispersion
- iii. calculate moments, skewness and kurtosis of statistical data
- iv. provide the basic idea of probability theory including discrete probability distributions and continuous probability distributions
- v. provide the basics required for sampling theory including estimation

- vi. carryout hypothesis testing.
- vii. provide the elementary background for regression analysis, correlation coefficients

**Assessment**

Class Participation/Attendance: 10%

Homework Assignment and Quizzes: 20%

Term Final Exam: 70%

**Text Book:**

- i. Probability and Statistics for Engineers and Scientists – Walpole, Myers, Myers, and Ye, Pearson Education, Inc., Ninth Edition, 2012.

**Reference Books:**

- i. Element of Probability and Statistics, By Frank L. Wolf.
- ii. Probability and Statistics with Applications, By Y. Leon Maksoudian.
- iii. Probability and Statistics for Engineers, By Erwin Miller & John E. Freund.

**Weekly schedule**

<b>Week</b>	<b>Topics</b>	<b>Teacher's Initial/Remarks</b>
Week-1	Probability theory.	
Week-2	Conditional probability, partitions, total probability, Bayes' theorem.	
Week-3	Random Variables and related probability distribution, Discrete random variables, Mathematical expectation, variance, standard deviation; binomial distribution, use of statistical tables.	
Week-4		
Week-5	Poisson distribution, Multinomial distribution, Continuous random variables, probability density function, cumulative distribution function, expected values.	
Week-6		
Week-7	<b>Class Test</b>	
Week-8	Normal distribution, normal approximation to binomial, Exponential distribution, Uniform distribution, Gamma distribution.	
Week-9		
Week-10	Functions of random variables, expected value, variance, standard deviation, Two dimensional random vectors.	

Week-11	Joint-distribution functions, Marginal distributions, Conditional distributions.	
Week-12	Covariance, correlation, conditional expectation, central limit theorem.	
Week-13	Special mathematical expectations, properties of variances, Sampling theory, sampling distribution, sampling with and without replacement.	
Week-14	<b>Class Test</b>	