National University of Sciences & Technology (NUST)
School of Electrical Engineering and Computer Science (SEECS)
Department of Humanities & Sciences

Probability and Statistics			
Course Code:	MATH-361	**Semester:**	5th
Credit Hours:	3+0	**Prerequisite Codes:**	Nil
Instructor: Ansar Shahzadi		**Class:**	BEE-12ABCD
Office: A-303, SEECS, Faculty Block		**Telephone Ext:**	051-90852361
Lecture Days:	Monday to Friday	**E-mail:**	ansar.shahzadi@seecs.edu.pk
Class Rooms: 1,7,10,12,13 and 14		**Consulting Hours:** Wednesday (10-1050), Thursday (11-1150**)**	
Lab Engineer:		**Lab Engineer Email:**	
Knowledge Group:	Computational Mathematics	**Updates on LMS:**	Every week

Course Description:

This course covers probability theory and various descriptive statistical techniques for collecting analyzing and interpreting data. The course also covers inferential statistics that includes sampling, estimation of parameters and testing of hypothesis.

Course Objectives:

The successful completion should develop understanding of the systems which involve uncertainty. Further, it should lay down the analyzing and evaluating techniques for these systems.

Course Learning Outcomes (CLOs):		
After successful completion of the course, the students should be able to:	**PLO**	**BT Level***
CLO-1: Explain the basic concept of Statistics and Probability and their need in engineering/Sciences.	1	C-2
CLO-2: Analyze random variables, probability distributions and sampling distributions.	1	C-4
CLO-3: Apply different probability and statistics techniques in engineering problems.	2	C-3

* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain
Knowledge (C-1), Comprehension (C-2), Application (C-3), Analysis (C-4), Synthesis (C-5), Evaluation (C-6)
Perception (P-1), Set (P-2), Guided Response (P-3), Mechanism (P-4), Complete Overt Response (P-5), Adaption (P-6), Organization (P-7)

Mapping of CLOs to Program Learning Outcomes

PLOs/CLOs	CLO-1	CLO-2	CLO-3
PLO 1 (Engineering Knowledge)	√	√	
PLO 2 (Problem Analysis)			√
PLO 3 (Design/Development of Solutions)			
PLO 4 (Investigation)			
PLO 5 (Modern tool usage)			
PLO 6 (The Engineer and Society)			
PLO 7 (Environment and Sustainability)			
PLO 8 (Ethics)			
PLO 9 (Individual and Team Work)			
PLO 10 (Communication)			
PLO 11 (Project Management)			
PLO 12 (Lifelong Learning)			

Mapping of CLOs to Assessment Modules and Weightages (In accordance with NUST statutes)

To be filled in at the end of the course.

Assessments/CLOs	CLO-1	CLO-2	CLO-3
Quizzes: 10%			
Assignments & Class Presentation: 10%			
Mid Term: 30%			
End Semester Exam:50%			
Total : 100 %			

Books:

Text Books:

- Advanced Engineering Mathematics (9th Edition) by Ervin Kreyszig.
- Probability and Statistics for Engineers, Sixth Edition by Richard A. Johnson Calculus (6th Edition) by Swokowski, Olinick and Pence.

Reference Books:

- Introduction to Statistical Theory (Part I & II), Seventh Edition by Prof Sher Muhammad Chaudhry& Dr. Shahid Kamal.
- Probability and Statistics for Engineers & Scientists, Seventh Edition by Walpole Myers.

Probability and Statistics by Murray R. Spiegel.

Sr. No	Main Topics to be covered	Estimated Contact Hours
1	Graphical Representation of Data: Stem-and-Leaf Plot, Histogram, Boxplot;	3
2	Mean, Standard Deviation, Variance	3
3	Sample Space, Experiment Outcomes, and Sampling with and without replacement, Set theory	3
4	Introduction to theory of Probability, Theorems of Probability, Conditional probability	3
5	Permutations and Combinations	3
6	Random Variables and Probability Distributions	3
7	Mean and Variance of a Distribution, Expectation, Moments	3
8	Binomial, Poisson & Hypergeometric distributions	3
Mid Term		
10	Normal distribution	3
11	Normal Distribution	3
12	Distributions of several Random Variables	3
13	Random Sampling, Point estimation of Parameters	3
14	Confidence intervals, Testing of hypothesis. Decisions	3
15	Quality control, Control chart, Goodness of Fit, Chi-square test	3
16	Acceptance sampling, errors & rectification.	3
17	Regression Analysis.	3
	ESE	

Grading Policy:	
Quiz Policy:	The quizzes will be unannounced and normally last for ten minutes. The question framed is to test the concepts involved in last few lectures. Number of quizzes that will be used for evaluation is at the instructor's discretion. Grading for quizzes will be on a fixed scale of 0 to 10. A score of 10 indicates an exceptional attempt towards the answer and a score of 1 indicates your answer is entirely wrong but you made a reasonable effort towards the solution. Scores in between indicate very good (8-9), good (6-7), satisfactory (4-5), and poor (2-3) attempt. Failure to make a reasonable effort to answer a question scores a 0.
Assignment Policy:	To develop comprehensive understanding of the subject, assignments will be given. Late assignments will not be accepted / graded. All assignments will count towards the total (No 'best-of' policy). The students are advised to do the assignment themselves. Copying of assignments is highly discouraged and violations will be dealt with severely by referring any occurrences to the disciplinary committee. The questions in the assignment are meant to be challenging to give students confidence and extensive knowledge about the subject matter and enable them to prepare for the exams.
Plagiarism:	SEECS maintains a zero tolerance policy towards plagiarism. While collaboration and group wok in this course is highly encouraged, you must ensure that you do not claim other people's work/ ideas as your own. Each student is required to submit his/her own contribution(s). Your writings must be your own thoughts. Plagiarism occurs when the words, ideas, assertions, theories, figures, images, programming codes of others are presented as your own work. You must cite and acknowledge all sources of information in your assignments. Failing to comply with the SEECS plagiarism policy will lead to strict penalties including zero marks in assignments and referral to the academic coordination office for disciplinary action.