



Probability and Statistics

Course Code:	MATH-361	Semester:	3 rd
Credit Hours:	3+0	Prerequisite Codes:	MATH-101
Instructor:	Ms. Ansar Shahzadi	Class:	BESE-5AB
Office:	A-303, faculty block, SEECs	Telephone:	051 90852361
Lecture Days:	Tuesday, Wednesday, Friday	E-mail:	ansar.shahzadi@seecs.edu.pk
Class Room:	CR-8, CR-10	Consulting Hours:	Wednesday(10AM-12AM), Friday(9AM-11AM)
Lab Engineer:		Lab Engineer Email:	Not applicable
Knowledge Group:	Computational Maths	Updates on LMS:	After 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):

At the end of the course the students will be able to:	PLO	BT Level*
1. Identify the systems which involve uncertainty	1	C-1
2. Describe such systems	1	C-2
3. Analyze such systems	2	C-4
4. Evaluate such systems	2	C-5
* BT= Bloom's Taxonomy, C=Cognitive domain, P=Psychomotor domain, A= Affective domain		

Mapping of CLOs to Program Learning Outcomes

PLOs/CLOs	Level of Emphasis of PLO (1: High, 2: Medium, 3: Low)	CLO1	CLO2	CLO3	CLO4
PLO 1 (Engineering Knowledge)	3	√	√		
PLO 2 (Problem Analysis)	3			√	√
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)					



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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	CLO1	CLO2	CLO3	CLO4
Quizzes: 10%				
Assignments: 10%				
OHT-1: 15%				
OHT-2: 15%				
End Semester Exam: 50%				
Total : 100 %				

Books:

Text Book: Probability and Statistics for Engineers, Sixth Edition by Richard A. Johnson

Reference Book: 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 Myers Ye

Topics to be Covered:

1. Dealing with Data
2. Measures of Central Tendency
3. Fractiles/Quantiles
4. Measures of Dispersion, Skewness and Kurtosis
5. Probability
6. Random Variables
7. Probability Distributions
8. Regression and Correlation
9. Sampling and Sampling Distributions
10. Estimation of Parameters
11. Testing of Hypothesis
12. Statistical Quality Control

Lecture Breakdown:

Week No.	Topics	Sections	Remarks
1	Why Study Statistics, Modern Statistics, Statistics and Engineering, Population and Sample, Dot Diagram, Frequency Distributions, Graphs of Frequency Distributions, Stem and Leaf Displays, Measures of Central Tendency : Mean, Median, Mode, Geometric Mean and Harmonic Mean		
2	Measures of Non-Central Tendency : Quartiles, Deciles, Percentiles, Measures of Dispersion : Range, Inter Quartile Range, Mean Deviation,		



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	Measures of Dispersion : Variance, Standard Deviation, Coefficient of Variation
3	Counting, Random Experiments, Sample Spaces and Events
4	Probability
5	Conditional Probability, Bayes' Theorem
6	OHT-1
7	Random Variables, Mathematical Expectation, Mean and Variance of a Probability Distribution, Chebyshev's Theorem
8	Moments and Moment Ratios, Bernoulli's Distribution, Binomial Distribution, Poisson Distribution
9	Geometric Distribution, Continuous Random Variables, Uniform Distribution
10	Normal Distribution, Exponential Distribution
11	Moment Generating Function, Cumulative Distribution Function
12	OHT-2
13	Regression, Fit a Straight Line, Goodness of Fit Test
14	Covariance and Correlation, Sampling, Probability Sampling
15	Non-Probability Sampling, Sampling Distributions, Testing of Hypothesis - Concepts
16	Z-Test, t-Test, Chi Square Test
17	Estimation - Concepts, Confidence Intervals, Statistical Quality Control
18	ESE

Tools / Software Requirement:

Microsoft Office

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.

Assignment Policy: In order 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 in this course is highly encouraged, you must ensure that you do not claim other people's work/ ideas as your own. 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.