

# *DEPARTMENT OF STATISTICS*

FORMAN CHRISTIAN COLLEGE, LAHORE  
(A Chartered University)

**Fall 2021**

<b>Instructor Information</b>	
Name	Dr Mujahid Rasul Professor
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<b>Online Office Hours</b>	12:15pm-1:15pm(Monday, Tuesday, Wednesday, Thursday)
Course Material/ Announcements	Will be shared via email/uploaded on Moodle
<b>Course Information</b>	
Title	Probability and Probability Distributions
Code	STAT 102/MATH 105
Credits	3
Prerequisite	None
Section	B
Course Objectives	The field of statistics deals with the collection, presentation, analysis, and use of data to make decisions, solve problems, and design products and processes. This course is designed to give students, a conceptual knowledge of probability and its many applications. Most of the contents included in the course are fundamental to probability theory in the disciplines, such as business and management, the life sciences, the computer sciences, pure sciences and the social sciences etc. It is expected that after successful completion of course students would be able to concentrate on the many applications of probability theory in their respective disciplines.
Text Books & Reference Material	<ol style="list-style-type: none"><li>1. Hogg, R.M. and Craig, A.T. "Introduction to Mathematical Statistics" Prentice Hall, Engle Wood Cliffs, New Jersey.</li><li>2. Mood, A. M, Graybill, F. A. and Boss, D. C. "Introduction to the theory of statistics" Mc Graw Hill, New York</li></ol>

	<p>3. Stirzaker, D. “<i>Probability and Random Variables</i>”. Cambridge University Press, Cambridge.</p> <p>4. Walpole, R. E., Mayer, R. H., Mayer, S. L. and Ye K. E. (2018) “Probability and Statistics for Engineer and Scientists” Prentice Hall, New York. 9th Edition.</p>
<p>Course Requirements &amp; Important things to know</p>	<p>Students must:</p> <ul style="list-style-type: none"> <li>● be able to use mathematical skills and have analytical aptitude.</li> <li>● be active in participation and discussion during the class.</li> <li>● be able to customize the learned methods and techniques to their discipline.</li> <li>● have command over the use of scientific calculator and MS Excel</li> <li>● prepare the lecture in advance.</li> <li>● submit the homework and assignments well in-time.</li> <li>● All assignments are to be submitted by 5:00 p.m. on the due date.</li> </ul> <p><u>Academic Honesty:</u></p> <ul style="list-style-type: none"> <li>○ Late submission of the assignments will result in deduction of marks.</li> <li>○ All work that you submit in this course must be your own.</li> <li>○ Academic dishonesty and / or plagiarism will result in the assignment of ‘F’ for the course grade and other university sanctions as they may apply.</li> <li>○ Medium of instructions is English. All discussions inside or outside the online class will be in English only.</li> <li>○ You are guilty of academic dishonesty if you examine another's solution, allow (actively or passively) another student to examine your solution, or you copy from the Internet without complete understanding of what you have done. University policy of plagiarism will be applicable in the case.</li> </ul>
<p>Assessment</p>	<p><b><u>Assessment will be based on:</u></b></p> <ul style="list-style-type: none"> <li>○ Five Assignments.</li> <li>○ One Project will be based on the applications of the course in daily life problems.</li> <li>○ Mid Term</li> <li>○ Final Term</li> <li>○ Class Participation</li> </ul>

Assessment Criteria	Assignments	25%		
	Project	10%		
	Mid Term	25%		
	Final Term	30%		
	Class Participation	10%		
Topics	<ul style="list-style-type: none"> <li>• Introduction and basic set theory.</li> <li>• Different approaches and laws of probability.</li> <li>• Conditional probability and independence, Bayes' theorem.</li> <li>• Discrete and continuous random variables. Probability distribution of RVs. and properties.</li> <li>• Discrete and continuous probability distributions: Binomial, Poisson, Hyper-geometric, Normal distributions and their Properties and applications.</li> </ul>			
Lesson Plan	<b>Week No.</b>	<b>Topics</b>	<b>Assignment/ Exam</b>	
	<b>1.</b>	<ul style="list-style-type: none"> <li>• Introduction and basic set theory</li> <li>• rules of counting and probability theory</li> </ul>		
	<b>2.</b>	<ul style="list-style-type: none"> <li>• Different approaches of probability and their applications.</li> </ul>		
	<b>3.</b>	<ul style="list-style-type: none"> <li>• Laws of probability and their uses.</li> </ul>		
	<b>Content to be Covered in Online Classes</b>			
	<b>Week No.</b>	<b>Topics</b>	<b>Assessment</b>	<b>Due date</b>
	4.	<ul style="list-style-type: none"> <li>• Understand the definition of conditional probability.</li> <li>• Learn how to use the formula for conditional probability.</li> </ul>	Assignment#1	25 <sup>th</sup> Nov 2021
	5.	<ul style="list-style-type: none"> <li>• Learn how the multiplicative rule</li> </ul>		
	6.	<ul style="list-style-type: none"> <li>• Learn the Bayes rule, theorem and applications</li> </ul>	Assignment#2	<u>14<sup>th</sup> Dec 2021</u>
	7.	<ul style="list-style-type: none"> <li>• Random variables</li> <li>• Distributions of discrete random variables and properties</li> </ul>		

	8	<ul style="list-style-type: none"> <li>Distributions of discrete random variables and properties</li> </ul>		
	9	<ul style="list-style-type: none"> <li>Bivariate distribution</li> <li>Distribution of two discrete random variables and properties</li> <li>Distribution of two discrete random variables and properties</li> </ul>	Assignment#3	17 <sup>th</sup> Jan 2021
	10	<ul style="list-style-type: none"> <li>Discrete distributions with applications</li> <li>Binomial distribution</li> </ul>		
	11	<ul style="list-style-type: none"> <li>Discrete distributions with applications</li> <li>Poisson distribution</li> </ul>	Assignment#4	5 <sup>th</sup> Feb 2021
	12	<ul style="list-style-type: none"> <li>Discrete distributions with applications</li> <li>Hypergeometric distribution</li> </ul>	Project	15 <sup>th</sup> Feb 2021,
	13	<ul style="list-style-type: none"> <li>Discrete distributions with applications (continue)</li> <li>Geometric distribution, Negative binomial distribution</li> </ul>	Assignment#5	18 <sup>th</sup> Feb 2021
	14	<ul style="list-style-type: none"> <li>Continuous distribution with applications</li> <li>Normal distribution</li> </ul>		
	15	<ul style="list-style-type: none"> <li>Continuous distribution with applications</li> <li>Normal distribution</li> </ul>		
	16	Final Term		

**The Grading Criteria:**

<b><u>Grades</u></b>	<b><u>Quality Pts</u></b>	<b><u>Numerical Value</u></b>	<b><u>Meanings</u></b>
A	4.00	93-100	Superior
A-	3.70	90-92	
B <sup>+</sup>	3.30	87-89	
B	3.00	83-86	Good

B <sup>-</sup>	2.70	80-82	
C <sup>+</sup>	2.30	77-79	
C	2.00	73-76	Satisfactory
C <sup>-</sup>	1.70	70-72	
D <sup>+</sup>	1.30	67-69	
D	1.00	60-66	Passing
F	0.00	≤59	Failing
I	---	---	Incomplete