



# The Islamia University Bahawalpur

Rahim Yar Khan  
Department of Statistics

Class: M.Sc.: Statistics

Semester: 4<sup>th</sup>

Season: Fall 2018 -20

Instructor	Muhammad Riaz	E-Mail: muhammad.riaz@iub.edu.pk	
Course Title	Statistical Inference-II & Application-II	Program	M.Sc
Course Number	STAT-21401 and STAT-21404	Credit Hours	3
Lecture Timings	Monday (08:30 am to 1130 am)		
<b>Description:</b> This course is designed to develop theoretical (mathematical) skills in the students at the master's. The course includes fundamental of statistical inference. Different techniques of interval estimations and testing of hypothesis.			
<b>Pre-requisite:</b> The students must be familiar with the fundamentals of testing and finding best critical region. They should also have a sound grip in deriving the testing hypothesis of different probability distributions.			
<b>Course Objective:</b> The objective of this course is to familiarize the student with a through understandings of the art of drawing statistical inference (in theoretical manner). After the end of this course, the students will be able to prove problems theoretically and will also be familiar with its practically in real life problems.			
<b>Teaching Methodology:</b> 1. The lectures will be delivered to the students in the class, which will be full of discussions. The use of slides multimedia projector which also help students in understandings lengthy derivations. Students will be asked in the class to explain the rationale behind the problem and its appropriate solution (theoretically) 2. The class will be conducted in a lecture, discussion environment where the class instructor will lead discussions and students will be encouraged to participate and ask question at the end of each class session. Three days will be for theory and Three days will be for application. 3. Students are expected to read the topic of the day in advance which will be told a day before by the instructor.			
<b>Assessment:</b> The course will be initially assessed through tests organized after mid-term and final term examination.			

## Tentative Study Plan for the Semester

Week	Topics
1	Tests of Hypotheses, Simple and composite hypotheses, critical regions, acceptance region, level of significance , power test, power function, one sided, two sided test, P value, O.C Curve and its interpretation, numerical examples.
2	Neyman-Pearson Lemma theorem and related theoretical examples.
3	Neyman-Pearson Lemma theorem and related theoretical examples.
4	Neyman-Pearson Lemma theorem and related theoretical examples.
5	Uniformly most powerful tests and related theoretical examples.
6	Uniformly most powerful tests and related theoretical examples.
7	Likelihood ratio tests and their asymptotic properties and related theoretical examples.
8	Likelihood ratio tests and their asymptotic properties and related theoretical examples.
<b>Mid Term Exam</b>	
9	Sequential Tests: SPRT and its properties, A.S.N. and O.C. functions and related theoretical examples.
10	Deriving tests of Hypothesis concerning parameters in normal and exponential.
11	Deriving tests of Hypothesis concerning parameters in gamma and uniform distributions.
12	Randomized Tests and Unbiased tests with and related theoretical examples.
13	Randomized Tests and Unbiased tests with and related theoretical examples.
14	Interval Estimation: Pivotal and other methods of finding confidence interval.
15	Confidence interval in large samples, shortest confidence interval, optimum confidence interval.
16	Bayes' Interval estimation.

**Please Note:** Each session consists of the number of lectures delivered in a weak. Any random absence by the instructor, the material to be covered during that class will be shifted to the next class meeting. In case of any necessary planned absence, information on schedule changes will be provided in advance.

**Appointment with Instructor:**

- 1. Instructor will be available for meeting class students immediately before & after each class for 15 minutes. However this time after the class may be extended if necessary.
- 2. Any other problem pertaining with the study, any student may contact on contact number mentioned above.

**Books Recommended**

- 1. Stuart, A and Ord, J.K. (1998). *Kendall’s’ “Advanced Theory of Statistics” Vol. II.* Charles Griffin, London.
- 2. Lindgren, B.W. (1998). *“Statistical Theory”*. Chapman and Hall, New York.
- 3. Mood, A.M. Gray Bill, F.A. and Boss, D.C. (1997). *“Introduction to the Theory of Statistics”*. McGraw Hill, New York.
- 4. Lehman, E.L. (1997). *“Testing Statistical Hypotheses”*. Springer - Volga, New York.
- 5. Hogg, R.V. and Craig, A.T. (1996). *“Introduction to Mathematical Statistics”*. Prentice Hall, New Jersey.
- 6. Zacks, S. (1973), *“Parametric Statistical Inference”*, John Wiley, New York.
- 7. Rao, C.R., (1973). *“Linear Statistical Inference and its Applications”*, John Wiley, New York.

**Marks Distribution:**

Activity	Marks
Classroom participation/general behavior/group work	5
Quiz/surprise test	5
Assignments	5
Presentation/Seminar	5
Mid-term Exam	30
Final Exam	50
Total	100

**Student Responsibilities**

- i) Students must attend class. At least 80% attendance is mandatory. Students are also responsible for doing all assigned work on time.
- ii) Students must also arrive on time and remain in class for the entire period.
- iii) Cellular Phones and Beeper must be turned off.
- iv) Test question may be taken from textbook reading, additional material discussed in the class and / or other assigned readings.