



## **Statistical Analysis for Management Research**

QM 610

Program	MS Public Policy
Semester	Fall 2021.
Credit Hours	03
Duration	15 Sessions of 3:00 hours each
Pre-requisites	A general know-how of Mathematics & Statistics. Qualifications in Mathematics or Statistics would be a bonus.
Resource Person	Mueen-ud-Din Azad
Counseling hours	5:30 to 6:30pm (Thursday)
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A major function of a researcher in the domain of public administration and policy making is to make decisions on the basis of available numerical information. Quantitative methods have always played an important role in enhancing the soundness. However, with recent development in information technology, the role of quantitative techniques in decision making has increased manifold. More and more researchers are using such techniques to complement their experience and expertise in business world.

This course is aimed to provide the necessary tools to researcher in the domain of public administration and policy making. Participants will learn to formulate the real life problems into quantitative models. Teaching of conceptual framework of these tools will be supplemented by hands on application of various software packages that will aide in solving these models. Expertise will be developed in interpretation of these solutions and their use in decision making.

### **1 Learning Objectives**

The purpose of the course is to provide the participants with mathematics, statistical and data analytical tools useful for social science researchers, in general, and policy making, in particular. Future researchers will use these tools in planning, executing and evaluating their research needs. Upon successfully completing this course, the participants will be able to:

- Identify and formulate research problems where quantitative techniques which can have an impact.
- Use statistical tools to solve these problems.
- Apply statistical computing tools to these problems and can interpret the findings.
- Assess data with healthy skepticism and seek expert help when needed.
- Recognize when better data and information are needed for decision making.

## 2 Learning Methodology

Following instructional tools and methodologies would be used during the course.  
Lectures

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Lectures	15 sessions, of three hours each, in total. Each of these lectures is accompanied by detailed description of the technique, pertinent examples from the research world.
Case Studies & Research Papers	The course is heavily dependent upon research articles and papers written in the domain of Public Policy. The participants are expected to be familiar with the use of digital repositories made available by HEC, including JSTOR, Emerald, Springer, etc.
In Class Exercises	Data analyses would be conducted to appreciate numerical aspects of the techniques.
Computing Software	IBM SPSS (preferably version 22) Each student is requested to bring his/her laptop, installed with this computing software, in the class for hands-on practice.

## 3 Suggested Readings

1. Joseph F. Healey **STATISTICS A Tool for Social Research**. 8-Edition, Wadsworth Cengage Learning, 2009
2. Levin, Richard I., and David S. Rubin. **Statistics for management**. Upper Saddle River, NJ: Prentice Hall, 2000.
3. Coakes, Sheridan J., and Lyndall Steed. **SPSS: Analysis without anguish using SPSS version 14.0 for Windows**. John Wiley & Sons, Inc., 2009.
4. Hanke, John E., Arthur G. Reitsch, and Dean W. Wichern. **Business Forecasting**. Upper Saddle River, NJ: Prentice Hall, 1998.

## 4 Evaluation Rubrics

### Quizzes 20%

### Term Paper 20%

A term paper is a research paper written by students over an academic term. These are generally intended to describe an event, a concept, or argue a point. A term paper is a written original work discussing a topic in detail, usually several typed pages in length. Typically, a term paper is composed of following sections;

**Introduction (5%)** section introduces the topic with respect to its definitions, existing concepts and taxonomy. It reasons your attempt on the topic.

**Literature Review (5%)** which scans the available academic literature on the topic to provide theoretical base for the analysis and identify research gap, if there exist any. This research gap would help in carving objectives and research questions for the study while the theoretical base steer the analysis.

**Methodology** section consists of

**Hypotheses Construction:** 15%

**Choice of Analysis along with its rationale:** 15%

**Application of the Analysis:** 15%

**Fulfillment of corresponding assumptions, if there exist any:** 15%

**Inferring Conclusion:** 15%

**Discussion Over the Results (15%)** which translates the results obtained in the previous section into everyday language.

Suggested topics for this semester would be "Water Policy", and "Culture & Religion". However, students may choose other topics of their own choice after prior approval.

### Exams (Mid & Final) 60%

## 5 Cheating & Plagiarism

Participants are expected to do their own work in their Assignments, quizzes and exams. They are always encouraged to discuss with each other but the Assignments, quizzes and exams should be their own work reflecting their own effort and intellect. The School of Business & Economics is VERY STRICT against any action of plagiarism, copying and cheating. So don't put yourself in any embarrassing position that may mar your career. In summary, any or all of these actions may be taken against you in case of cheating.

## **6 Session Plan**

### **Sess. Topics**

1. What is Statistical Analysis?  
Data, its types, Entering data in SPSS.
2. Data Presentation; Graphical Methods
3. Data presentation; Numerical Methods; Averages
4. Data presentation; Numerical Methods; Data Spread and Consistencies
5. Data Models; Probability and Probability Models; Binomial and Poisson Probability Models
6. Data Models; Probability and Probability Models; Normal Probability Model
7. Data Inferences and Generalization; Sampling
8. Data Inferences and Generalization; Hypothesis Testing and Confidence Interval
- 9. Mid-Exam**
10. Regression and Correlation Models; General Regression Analysis
11. Regression and Correlation Models; necessary Assumptions for General Regression Models; Normality, Multicollinearity, Auto-correlation and Heteroskedasticity
12. Regression and Correlation Models; General Regression Analysis; Binomial Regression
13. Regression and Correlation Models; General Regression Analysis; Multinomial Regression
14. Principal Component Analysis
15. Factor Analysis