Course Title:	Decisions Analysis in Supply Chains
Course Code:	SM618
Department:	Operations and Supply Chain

HSM Vision

HSM envisions its success in the sustainable contribution that it will make to the industry, academia and research in public and private sector. HSM will lead by providing professionally competent and ethically conscious human resources engaged in the global and local context to foster socio-economic growth and sustainability for the society. HSM envisages having faculty with high research potential and a deep desire for cutting edge research including collaboration with national and international partners.

HSM Mission

Being a research-oriented and student-centric business school, we emphasize research publications in impact journals as well as state-of -the-art learning methodologies. We will prepare our students to become the future ethical business leaders and the guiding post for the society, while equipping them with the knowledge and skills required by world-class professionals. We will be the leading choice for organizations seeking highly talented human resource. HSM will foster internationalization with key stakeholders and actively work to exchange best practices with business schools across Pakistan through collaborations, workshops, conferences and other means.

CAPSULE STATEMENT

Research in the field of in Operations Management (OM) and Supply Chain Management (SCM) is frequently based on quantitative decision models. Publications in the leading journals such as "Journal of Supply Chain Management", "International Journal of Operations & Production Management", "Journal of Operations Management" and "Supply Chain Management: an International Journal" contain articles using a range of techniques including techniques as simple as hypothesis testing regarding means to (somewhat) complex ones such as structural equation modelling. As a researcher you need to understand and evaluate the prior

research in the leading journals of your field. Conducting research projects based on *quantitative research strategy* (as many of you will do for your MS Thesis) at the graduate level requires formulation of relevant research questions and answering these research questions by developing/ testing hypotheses regarding the variables of interest. Testing these hypotheses may require advanced knowledge of decision models based on quantitative data. Since populations in most cases are inaccessible, commonly known descriptive techniques do not suffice. Knowledge about identification and testing relationships between variables of interests and being able to draw inferences regarding the underlying populations is a requisite for graduate research. This course provides students with the understanding of quantitative decision models as they are applicable to various operations & supply chain related problems.

In this course we shall emphasize more on the development and interpretation of results, and not on the underlying mathematics. Practical issues such as selecting the appropriate analysis, preparing data for analysis, interpreting output, and presenting results to answer the research questions shall be discussed. Participants of this course should have some understanding of basic descriptive and inferential statistics upon which the foundations of this course can be built (undergraduate courses in mathematics or statistics are sufficient!). Examples will be taken from the SC and OM literature. However your understanding will allow you to apply these techniques to other areas as well. This course will have a strong research focus. Developing an understanding about these techniques will help you make more sense out of your data while conducting data analysis for your MS dissertation.

This course will end at the end of the semester however your learning of the quantitative decision models will continue. The research questions in your theses might require application of techniques other than the ones discussed in this course. I am available to you during and after the course in order to provide support regarding your final dissertation.

LEARNING OBJECTIVES

"Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write" H. G. WELLS

"It is easy to lie with statistics, but it is easier to lie without them" F. MOSTELLER Learning Objectives of this course include;

- A conceptual organization of the various quantitative SC decision models, with respect to the types of research questions & hypotheses;

- Developing an understanding of model building and testing using statistical techniques;

- Understanding how to use and interpret the results of each technique, including, for each technique, a conceptual overview, list of assumptions, diagnostics for assessing the assumptions, sample size requirements, mechanics of performing the analysis using widely available softwares, and how to interpret the statistical output of the analysis

LEARNING OUTCOMES

Outcomes of this course include;

- Ability to apply the quantitative decision models to the range of industry problems

- More accessibility to existing quantitative research in areas of OM & SCM

- Ability to develop *Methods* & *Data Analysis* sections of the thesis given that the participant uses a "quantitative research strategy"

TEACHING METHODOLOGY

The course will employ various pedagogical approaches such as lecture, practical exercises, group discussion, and student presentations. The course will move quickly after the basic topics and cover a range of material that is cumulative in nature. Hence the concepts learned in the first part of the course will be used again and again during the semester. It is absolutely necessary to put in extra bit of effort in the beginning by preparation through coverage of recommended reading materials before the class and carrying out practice problems.

COURSE ASSESSMENT

Weekly Assignments	20%
Class Participation	5%
Presentations	5%

Term Paper	25%
Short Test 1	15%
Short Test 2	15%
Short Test 3	15%

TEXT BOOK   (Strongly Recommended)

1. Multivariate Data Analysis (MDA) 7e   by Hair et a

ADDITIONAL REFERENCES

1. Using Multivariate Statistics 7e   by Tabachnick, B. G., & Fidell
2. Discovering Statistics using SPSS,   by A. P. Field
3. Business Statistics: A Decision Making Approach   by Groebner et al

Decision Analysis in Supply Chain

No	Topics to be covered in the course	Learning Objective of this topic	Expected Outcomes from Students	Teaching Method	Assessment Criteria
1	Quantitative Research Design In supply chain (SC) Research	Review the methods already covered by students in quantitative courses previously and related them to research	Understanding the role of quantitative methods in SC research	Lecture	
2	Sampling Techniques in SCM research	To understand different sampling techniques	Ability to apply different sampling techniques	Lecture	Presentation
3	Descriptive Research in SCM	Learn how to describe data	Describe data using descriptive techniques of central tendency, variation, and shape	Lecture, class exercise	Presentations, Assignment
4	Inferential statistics basics	To understand basic inferential techniques	Understand and apply hypotheses testing and estimation	Lecture, class exercise	Presentations, Assignment
5	**SHORT TEST 1**				
6	Model Specification: Preparing data for Theory Testing	Testing assumptions of multivariate quantitative data analysis	Learn and apply testing assumptions related to linearity, homoscadasticity, normality etc.	Lecture, class exercise	Presentations, Assignment
7 & 8	Model Validation: Validating constructs for theory testing	Understand different types of validity	Confirm construct validity and criterion validity. Apply Exploratory factor analysis while considering assumptions	Lecture, class exercise	Assignment
9 &10	Model Formulation: Testing Models	Introducing model building procedure and developing basic regression models	Understand the basics of regression model assumptions Test relevant assumptions and validate models	Lecture, class exercise	Presentations, Assignment
11	**SHORT TEST 2**				
12	Advanced topics in quantitative Research	Understand basics of Structural Equation	Building structural models using partial	Lecture, class	Assignment

		Modeling (SEM).	least squares SEM	exercise	
13	Advanced topics in quantitative Research	Validating models & testing hypotheses using PLS-SEM	Ability to test construct validity using PLS-SEM	Lecture, class exercise	Assignment
14	Advanced topics in quantitative Research	Understand the basics of covariance based SEM	Building structural models using Covariance based SEM	Lecture, class exercise	
15	**SHORT TEST 3**				

CLASS POLICY

Each participant is expected to participate fully in class activities. You are expected to contribute significantly to in-class analysis. Presence in every class and discussion of readings are two of the most important components of class participation.

ORAL PRESENTATIONS

Since this course has a strong focus on research, different ways will be used to make the participants more accustomed to reading research. Presentations will be based on research papers that provide an application of the technique being covered in the class. All these presentations will have a strong focus on presenting the *Methods, Data Analysis* and *Discussion* sections of chosen papers. You are encouraged to show your presentations to me before the presentation date.

ASSIGNMENTS

"I hear; I forget. I see; I forget. I do; I remember." **(Chinese proverb)**

To help you develop familiarity with the data analysis, Group and/or individual assignments may be assigned related to each session. It is important for you to become a competent user of statistical packages such as SPSS, AMOS, and SmartPLS. *The more proficient you are using a statistical package (it's likely that) the more effective you will be as a research scholar*. In almost every class I will be demonstrating, how to perform data analysis using these statistical packages. If you have a laptop, you can also do in-class practice exercises. You also get to apply these concepts in your assignments. Problems might be challenging sometimes. If you are unable to solve a problem in 2-3 hours than it is recommended that you contact me to discuss your issues.

These assignments are to be uploaded on the course page on "Moodle" before the specified time. In case of genuine issues, you may contact me individually for extension. All of you should enroll yourself on the course page immediately.

TERM PROJECT

As the final assignment of the course you are required to conduct a complete quantitative research project. The project will include sections typically found in articles based on quantitative research strategy from methods section onward. This will be the preparation for your final thesis. An essential part of project is primary data collection. Data analysis will be

created by the whole class as a team and then variables will be divided for the project. Of course, you will be using techniques learned in this course for the data analysis.

ACADEMIC INTEGRITY

Participants are expected to observe high standards of academic integrity and refrain from activities that may impede their and other participants learning.

Few examples of academic dishonesty are:

- engaging in any form of plagiarism or cheating;
- presenting falsified results;
- handing in an assignment that was not authored, in whole or in part, by the stude nt;
- copying material from internet
- submitting the same assignment in more than one course, without the written co nsent of concerned faculty

I suggest you do not use open source material from the web for the sake of learning.

Assignments may be subjected to plagiarism check through Turnitin software. In case of Academic Dishonesty actions will be taken as per the university policy.

USEFUL LINKS

Some links for learning more about (or revising) concepts covered in the course are as follows;

1- The best link to self-learn all about multivariate statistical techniques;

http://statwiki.kolobkreations.com/wiki/Main_Page

2- A useful website that covers very advanced topics and contains macro's for the

techniques that are not available in SPSS menu; http://www.spsstools.net/

3- A page that contains basic stuff about lot of concepts
http://www.psychwiki.com/wiki/Analyzing_Data

5- Pages about some special topics;
http://www.afhayes.com/
http://davidakenny.net/cm/causalm.htm
http://www.psychwiki.com/wiki/Mediation
6- Youtube channel about SPSS: https://www.youtube.com/user/how2stats/videos
Links to the leading journals in the area of operations and supply chain are as follows;

Journal of Supply Chain Management

http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291745-493X

Journal of Operations Management

http://www.journals.elsevier.com/journal-of-operations-management/

International Journal of Operations & Production Management

http://www.emeraldinsight.com/journals.htm?issn=0144-3577

Supply Chain Management: An International Journal

http://www.emeraldinsight.com/journals.htm?issn=1359-8546