Department of Statistics

College of Administration&Economy

University of Salahaddin

Subject: Decision Theory

Course Book – (Year 4)

Lecturer's name:Huda Qardagh Yalda

Academic Year: 2022/2023

Course Book

1. Course name	**Decision Theory**
2. Lecturer in charge	**Huda Qardagh Yalda**
3. Department/ College	**Statistics – Administration & Economics College**
4. Contact	**e-mail:Huda.yalda @Yahoo.com** **Tel.0750 4874330**
5. Time (in hours) per week	**Theory: 2 hours** **Practical: 1houes**
6. Office hours	**2 per week**
7. Course code	**SAE102**
8. Teacher's academic profile	**I born in Erbil- Iraq on 1967 . At Administration & Economics College – Salahad** **Salahaddin** **-MSC (Statistic Department) (College Administration & Economics– Salahaddi** **Salahaddin) 2000** **Assistant lecturer (2001) The university of Salahaddin Erbil** **Lecturer (2014) The university of Salahaddin- Erbil** **Teaching from (16) years at The university of Salahaddin- Erbil** **The Subjects That I taught** **-(Statistic – 1th Stage) (Account dep.)** **-(Computer-1th Stage) (Account dep. And Administration dep.)** **-(Linear Al-gerbera- 2 th stage) (Stat. dep.)** **-(Math. Stats.- 3th stage) (Stat. dep.)** **-Decision Theory-3th stage) (Stat. dep.)** **Multivariate Aanlysis -4th stage) (Stat. dep.)** **The Number of researches that I had accomplished (2)** **The Language** **Arabic** **Kurdish** **English**
9. Keywords	Multivariate Normal Dist. Var.-Cov.Matrix Correlation (Multiple and partial corr

10. Course overview:

Multivariate analysis consists of a collection of methods that can be used when several measurements a
individual or object in one or more samples. We will refer to the measurements as variables and to the i
as units (research units, sampling units, or experimental units) or observations. In practice, multivariate
common, although they are not always analyzed as such. But the exclusive use of Univariate procedures
longer excusable, given the availability of multivariate techniques and inexpensive computing power to
Historically, the bulk of applications of multivariate techniques have been in the behavioral and biologica
However, interest in multivariate methods has now spread to numerous other fields of investigation. Fo
collaborated on multivariate problems with researchers in education, chemistry, physics, geology, engine
business, literature, religion, public broadcasting, nursing, mining, linguistics, biology, psychology, and m
The statistical prerequisites are basic familiarity with the normal distribution, t-tests, confidence interva

regression, and analysis of variance. These techniques are reviewed as each is extended to the analogou
procedure. This is a multivariate methods text. Most of the results are given without proof. In a few case
provided, but the major emphasis is on heuristic explanations. Our goal is an intuitive grasp of multivaria
same mode as other statistical methods courses. Some problems are algebraic in nature, but the majorit
to be

11. Course objective:
**After completing the study of this subject through the academic year the students will be
understanding these subjects (In English language):**

I have formulated three objectives that I hope this lectures will achieve for the student. These objectives
experience teaching a course in multivariate methods, consulting on multivariate problems with researc
and guiding statistics graduate students as they consulted with similar clients.

The first objective is to gain a thorough understanding of the details of various multivariate techniques, t
assumptions, their limitations, and so on. Many of these techniques are related; yet they differ in some
emphasize these similarities and differences.

The second objective is to be able to select one or more appropriate techniques for a given multivariate
Recognizing the essential nature of a multivariate data set is the first step in a meaningful analysis.

Ministry of Higher Education and Scientific research

The third objective is to be able to interpret the results of a computer analysis of a multivariate data

12. Student's obligation

• Students commitment to come to the lecture by the times specified in the weekly schedule, and is loca
responsibility to cooperate with the teacher in the discussion of the ideas raised during the lecture. As w
collective participation by students to solve the questions and exercises that put on the lecture in additi
that are required to be resolved outside the times of the lecture (Homework).

• The student should be preparing for sudden exams (Quizzes) that may accrue by the teacher to ascerta
follow-up of article was dominate in time of need.

13. Forms of teaching

To get best understanding to the students the lecturer use different forms of teaching such as:

• Power point presentation for the head titles, definitions, figures, summary of conclusions.

• The traditional method of teaching (Chalk and talk).

• Solving the examples by shearing the students to get them will understand.

• Classroom discussions.

14. Assessment scheme

During the study , the students are required to do two closed book examinations ; there will be an examination i
marks , and the second examination in the second course of 20 marks , and 3 marks to write a report analy
quizzes . The remaining marks scores for daily activities .There will be a final examination of 60 marks.

15. Student learning outcome:

Student learning that each data type has extensions and various combinations of the four are possible.

A few examples of analyses for each case are as follows:

1. A single sample with several variables measured on each sampling unit:

(a) Test the hypothesis that the means of the variables have specified values.

(b) Test the hypothesis that the variables are uncorrelated and have a common variance.

(c) Find a small set of linear combinations of the original variables that summarizes most of the variation in the data (principal components).

(d) Express the original variables as linear functions of a smaller set of underlying variables that account for the original variables and their intercorrelations (factor analysis).

2. A single sample with two sets of variables measured on each unit:

(a) Determine the number, the size, and the nature of relationships between the two sets of variables (can
For example, you may wish to relate a set of interest variables to a set of achievement variables. How mu
correlation is there between these two sets?

(b) Find a model to predict one set of variables from the other set (multivariate multiple regression).

3. Two samples with several variables measured on each unit:

(a) Compare the means of the variables across the two samples (Hotelling's T 2-test).

(b) Find a linear combination of the variables that best separates the two samples (discriminant analysis).

(c) Find a function of the variables that accurately allocates the units into the two groups (classification an

4. Three or more samples with several variables measured on each unit:

(a) Compare the means of the variables across the groups (multivariate analysis of variance).

(b) Extension of 3(b) to more than two groups.

(c) Extension of 3(c) to more than two groups.

16. Course Reading List and References :

1- Benz´ecri, J.-P. (1992), *Correspondence Analysis Handbook*, New York: Marcel Dekker.

2- Bock, R. D. (1963), ―Multivariate Analysis of Variance of Repeated Measurements,‖ in *Problems of l*
C. W. Harris (ed.), Madison, Wis.: University of Wisconsin Press, pp. 85–103.

3- Bock, R. D. (1975), *Multivariate Statistical Methods in Behavioral Research*, New York: McGraw-Hil

4- Box, G. E. P. (1954), ―Some Theorems on Quadratic Forms Applied in the Study of Analysis of Varia
The Effect of Inequality of Variance and of Correlation between Errors in the Two-Way Classification,‖ *A*
Mathematical Statistics.

5- Burdick, R. K. (1979), ―On the Use of Canonical Analysis to Test MANOVA Hypotheses,‖ Presented
Meeting of the American Statistical Association, Washington, D.C., August 1979.

6- Chambers, J. M., and Kleiner, B. (1982), ―Graphical Techniques for Multivariate Data and for Cluster
of Statistics, Vol. 2, P. R. Krishnaiah and L. N. Kanal
Ministry of Higher Education and Scientific research
(eds.), New York: North-Holland.

7- Cramer, E.M., and Nicewander,W. A. (1979), ―Some Symmetric, Invariant Measures of Multivariate

Psychometrika.

8- Davidson, M. L. (1972), ―Univariate versus Multivariate Tests in Repeated Measures Experiments,‖ *Psychological
Bulletin*.
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17. The Topics:

Lecturer's name

Subject : Decision Theory

Week	Subject
Week (1) :	o **Introduction** Random Variables\ Discrete Random Variables o
Week (2) :	Continuous Random Variables
Week (3) :	Special Case of Gamma dist
. **Week (4)**	decision Theory : Elements of Taking the decision operation
Week (5)	Worth Function
Week (6)	DO The Utility Table and the Standard Utility
Week (7)	The decision theory consist two theory 1- Non – Baysain decision theory 2- Baysain decision theory
Week (8)	Problems for The Principle of max. Min. Utility
Week (9)	Criterion of regret

Week (10)	problems for the principle of the criterion of regret
Week (11):	Random Decision Procedure A – The Principle of max. Min. Expected Utility :
Week (12)	Problems