



# Course Specification

— (Postgraduate)

**Course Title:** Analysis of variance

**Course Code:** 202674-3

**Program:** M.Sc. in Statistics

**Department:** Mathematics and Statistics

**College:** Science

**Institution:** Taif University

**Version:** 2023

**Last Revision Date:** 7/4/1445



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## A. General information about the course:

### 1. Course Identification:

1. Credit hours: ( 3 )

### 2. Course type

A.  University  College  Department  Track

B.  Required  Elective

3. Level/year at which this course is offered: ( ..... )

### 4. Course general Description:

This course contains some very important topics in statistics. These topics are:

Analysis of variance for one-way - two-way and higher-way classification models - Analysis of standard designs and factorial experiments - Multiple comparisons - orthogonal contrasts and regression - Analysis using concomitant information - Study of non- orthogonal data.

5. Pre-requirements for this course (if any):

6. Pre-requirements for this course (if any):

### 7. Course Main Objective(s):

After careful study of this course, student should be able to do the following:

- 1- Understand analysis of variance for one-way - two-way and higher-way classification models.
- 2- Understand analysis of standard designs and factorial experiments.
- 3- Understand the non- orthogonal data.
- 4- Understand the multiple comparisons.
- 5- Understand the orthogonal contrasts and regression.
- 6- Understand the analysis using concomitant information.

### 2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>		



No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

### 3. Contact Hours: (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify).....	
	<b>Total</b>	<b>45</b>

## B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods:

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	<b>Recognize</b> analysis of standard designs and factorial experiments.	K1		
1.2	<b>Outline</b> analysis of standard designs and factorial experiments.	K2		
1.3	<b>Describe</b> the non-orthogonal data.	K3		
<b>2.0</b>	<b>Skills</b>			
2.1	<b>Apply</b> the analysis of variance for one-way - two-way and higher-way classification models.	S2	<ul style="list-style-type: none"> <li>Lectures</li> <li>Group discussions</li> </ul>	<ul style="list-style-type: none"> <li>Quizzes</li> <li>Exams</li> <li>Assignments</li> </ul>
2.2	<b>Explain</b> the principle of multiple comparisons.	S4	<ul style="list-style-type: none"> <li>Lectures</li> <li>Group discussions</li> </ul>	<ul style="list-style-type: none"> <li>Quizzes</li> <li>Exams</li> <li>Assignments</li> </ul>
2.3	<b>Explain</b> the principle of orthogonal contrasts.	S4	<ul style="list-style-type: none"> <li>Lectures</li> <li>Group discussions</li> </ul>	<ul style="list-style-type: none"> <li>Quizzes</li> <li>Exams</li> <li>Assignments</li> </ul>



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.4	<b>Explain the principle of concomitant information.</b>	S4	<ul style="list-style-type: none"> <li>Lectures</li> <li>Group discussions</li> </ul>	<ul style="list-style-type: none"> <li>Quizzes</li> <li>Exams</li> <li>Assignments</li> </ul>
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	<b>Participate</b> effectively within groups and independently.	V1	Projects	Through the oral presentation of the projects.
3.2	<b>Accept</b> critical thinking, communication skills, and mathematical and statistical methods for solving many problems in other disciplines.	V4	Projects	Through the oral presentation of the projects.
...				

### C. Course Content:

No	List of Topics	Contact Hours
1-3	<b>Analysis of variance for one-way classification models, Analysis of variance for two-way classification models.</b>	9
4-6	<b>Analysis of variance for higher-way classification models, Analysis of standard designs and factorial experiments.</b>	9
7-9	<b>Multiple comparisons, Orthogonal contrasts and regression</b>	9
10-12	<b>Analysis using concomitant information, Study of non- orthogonal data.</b>	9
13-15	<b>Continue non- orthogonal data, Revisions</b>	9
<b>Total</b>		<b>45</b>

### D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes + Homeworks+ oral presentation +written test+ group project	Continues	30%
2.	Final exam	16 th	70%

\*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

### E. Learning Resources and Facilities:

#### 1. References and Learning Resources:



<b>Essential References</b>	<b>Analysis of Variance, Design, and Regression :Linear Modeling for Unbalanced Data, (2016),2 nd edition, CRC Press.</b>
<b>Supportive References</b>	<b>Chihiro Hirotsu, Advanced Analysis of Variance, (2017), Wiley.</b>
<b>Electronic Materials</b>	
<b>Other Learning Materials</b>	<b>Blackboard system</b>

## 2. Educational and Research Facilities and Equipment Required:

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<b>Lecture halls, containing white boards, and electronic monitors - The seats fit the number of students - Laboratories equipped with suitable numbers of computers</b>
<b>Technology equipment</b> (Projector, smart board, software)	<b>Data Show</b>
<b>Other equipment</b> (Depending on the nature of the specialty)	<b>Wi-Fi internet connections</b>

## F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
<b>Effectiveness of teaching</b>	<b>Students</b>	Indirect
<b>Effectiveness of students assessment</b>	<b>Students</b>	Indirect
<b>Quality of learning resources</b>	<b>Peer reviewer</b>	Direct
<b>The extent to which CLOs have been achieved</b>	<b>Peer reviewer</b>	Direct
<b>Other</b>		

**Assessor** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval Data:

<b>COUNCIL /COMMITTEE</b>	<b>Department of Mathematics and Statistics</b>
<b>REFERENCE NO.</b>	
<b>DATE</b>	<b>7-4-1445H</b>