



# Course Specification

— (Postgraduate)

<b>Course Title:</b> Regression Analysis
<b>Course Code:</b> 202595-3
<b>Program:</b> M.Sc. in Statistics
<b>Department:</b> Mathematics and Statistics
<b>College:</b> Science
<b>Institution:</b> Taif University
<b>Version:</b> 2023
<b>Last Revision Date:</b> 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: (Second level/ First year)

### 4. Course general Description:

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

Linear and multiple linear regression - Residuals analysis - Polynomial regression - Indicator variables - Model building and variable selection - Non-linear and robust regression. Generalized linear models (GLM).

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. Determine the linear and multiple linear regression models.
2. Determine the polynomial regression model.
3. Determine the residuals.
4. Understand the Indicator variables.
5. Understand model building and variable selection.
6. Understand non-linear and robust regression.
7. Understand generalized linear models (GLM).

### 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>		
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. 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	Recognize the linear and multiple linear regression models.	<b>K1</b>	<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>
1.2	Recognize generalized linear models (GLM).	<b>K1</b>	<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>
1.3	Outline the polynomial regression model.	<b>K1</b>	<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>
1.4	Outline the Indicator variables.	<b>K2</b>	<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>
1.5	Describe the model building and variable selection.	<b>K3</b>	<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>
1.6	Describe the non-linear and robust regression.	<b>K3</b>	<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>2.0</b>	<b>Skills</b>			
2.1	<b>Apply</b> the studied methods to find the	<b>S2</b>	<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
	residuals.			
2.2	<b>Evaluate</b> , and compare between regression models.	<b>S4</b>	<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.	<b>V1</b>	Projects	Through the oral presentation of the projects.
3.2	<b>Express</b> mathematical and statistical ideas orally and in writing	<b>V4</b>	Projects	Through the oral presentation of the projects.

### C. Course Content:

No	List of Topics	Contact Hours
1.	<b>Linear regression, Multiple linear regression.</b>	<b>9</b>
2.	<b>Residuals analysis, Polynomial regression.</b>	<b>9</b>
3.	<b>Indicator variables, Model building and variable selection.</b>	<b>9</b>
4.	<b>Non-linear and robust regression, Non-linear and robust regression.</b>	<b>9</b>
5.	<b>Generalized linear models (GLM).</b>	<b>9</b>
<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	<b>30%</b>
2.	Final exam	16 th	<b>70%</b>

\*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>	John O. Rawlings Sastry G. Pantula David A. Dickey, Applied Regression Analysis, A Research Tool , 1989, 2nd Ed., Springer.
<b>Supportive References</b>	John Fox, APPLIED REGRESSION ANALYSIS and GENERALIZED LINEAR MODELS,( 2016), 3d Ed, Sage
<b>Electronic Materials</b>	





Other Learning Materials

Blackboard system

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

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

## F. Assessment of Course Quality:

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

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

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval Data:

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

قسم الرياضيات والإحصاء  
Mathematics and Statistics  
Department

