



College of Science
Department of Mathematics
Course syllabus: Regression Analysis
First semester 2019/2020

1. Instructor Information:

Instructor Name	Loai AlZoubi		
Office Hours	Sunday ,Tuesday, Thursday	١:٠٠-١٢:٠٠	
	Monday, Wednesday	11:00-12:30	
Office Number and Telephone Extension	51 Bukhary		
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2. Course Description:

Regression analysis course is intended to be an introduction to regression analysis techniques. Its focus will be on the application of linear regression models in practice but will also cover basic theory of the linear model.

3. Course Information:

Course number: 401235	Course Title: Bio-Statistics	Level : Third year
Course Nature: Theoretical	Prerequisite: None	Lecture time: Sun. Tue. Thu. 1:00-2:00
Academic year: 2019 – 2020	Semester: First	Credit Hours: 3

4. Course Objectives:

By the end of the course, you should:

- Understand the motivation of regression analysis
- Understand the theoretical assumptions behind the linear model and their importance in properly conducting a regression analysis
- Know how to estimate the parameters in regression models
- Be able to validate the modeling assumptions with formal tests and visual diagnostic tools
- Know how to make inferences regarding the linear model
- Be able to build and validate regression models in a principled manner
- Be able to apply the above knowledge and techniques in on your own data or problems

5. Intended Student Learning Outcomes:

Upon successful course completion, a student will be able to:

- Demonstrate understanding of the concepts that underly modern methods of linear regression.
- Demonstrate familiarity with the assumption associated with different statistical models.
- Use the statistical methods covered in this course to analyze data in R.
- Critically evaluate the results of these analyses and apply remedial measures as needed.
- Interpret and discuss the results of those analyses in a broader scientific context.

6. Course Content:

Week	Chapter	Subject	Pages and Assignments
1+2+3 +4+5 +6	<p style="text-align: center;"><u>Chapter 1</u> Linear Regression with One Predictor Variable</p>	1.1 Relations between Variables 1.2 Regression Models and Their Uses 1.3 Simple Linear Regression Model with Distribution of Error Terms 1.4 Data for Regression Analysis 1.5 Overview of Steps in Regression Analysis 1.6 Estimation of Regression Function 1.7 Estimation of Error Terms Variance 1.8 Normal Error Regression Model	1-39 end of sections exercise
6+7 +8	<p style="text-align: center;"><u>Chapter 5</u> Matrix Approach to Simple Linear Regression Analysis</p>	5.1 Matrices 5.2 Matrix Addition and Subtraction 5.3 Matrix Multiplication 5.4 Special Types of Matrices 5.5 Linear Dependence and Rank of Matrix 5.7 Some Basic Results for Matrices 5.9 Simple Linear Regression Model in Matrix Terms 5.10 Least Squares Estimation of Regression Parameters 5.11 Fitted Values and Residuals 5.12 Analysis of Variance Results 5.13 Inferences in Regression Analysis	176-212 end of sections exercise
9+10 +11	<p style="text-align: center;"><u>Chapter 6</u> Multiple Regression I</p>	6.1 Multiple Regression Models 6.2 General Linear Regression Model in Matrix Terms 6.3 Estimation of Regression Coefficients 6.4 Fitted Values and Residuals 6.5 Analysis of Variance Results 6.6 Inferences about Regression Parameters 2	213-229 end of sections exercise
12+13 +14	<p style="text-align: center;"><u>Chapter 7</u> Multiple Regression II Distributions</p>	7.1 Extra Sums of Squares 7.2 Uses of Extra Sums of Squares in Tests for Regression Coefficients 7.3 Summary of Tests Concerning Regression Coefficients	256-268 end of sections exercise

15+16	<u>Chapter 8</u> Regression Models for Quantitative and Qualitative Predictors	8.1 Polynomial Regression Models	294-305 end of sections exercise
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7. Teaching and learning Strategies and Evaluation Methods:

Learning Outcomes	Teaching Strategies	learning Strategies	Evaluation Methods
1) Learn the general concept of simple linear regression (SLR) analysis. 2) Learn how to make inference about regression coefficients. 3) Learn how write regression model in matrix form.	- Writing on the blackboard - Ask students questions and discuss them - Solve various issues	Give: * homework * assignments	- Classroom presentations - Discussion - First exam
1) Learn the general concept of multiple linear regression (MLR) analysis. 2) Learn how to make inference about MLR coefficients. 3) Learn how write MLR model in matrix form.	- Writing on the blackboard - Ask students questions and discuss them - Solve various issues	Give: * homework * assignments	- Classroom presentations - Discussion - Second exam

8. Assessment:

Assessment	Grade Proportion	Week/Dates
Class Work (Quizzes, Homework and Attendance of the lecture)		
First exam	25 %	7th Week
Second exam	25 %	12th Week
Final exam	50 %	End of Semester
Total	100 %	

9. Text Book:

The main reference	Applied Linear Statistical Models
Author(s)	Kutner, M. Nachtsheim, C. Neter, J. and Li, W.
Publisher	McGraw-Hill
Year	2005
The edition	Fifth edition
The reference website	file:///C:/Users/win10-a/Downloads/Applied Linear Statistical Models Fifth.pdf

10. References and additional resources:

1)	Stapleton, J., Linear Statistical Models, 1995, file:///C:/Users/win10-a/Downloads/epdf.pub_linear-statistical-models.pdf
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