Module (Course Syllabus) Catalogue

2023-2024

College/ Institute	Erbil Technical Engineering College
Department	Technical Mechanical and Energy Engineering
Module Name	Advanced Statistics
Module Code	ADS105
Degree	Technical Diploma ☐ Bachler ☐ High Diploma ☐ Master ☐ PhD ■
Semester	First Semester
Qualification	PhD. (Doctor of Philosophy)
Scientific Title	Assistant professor
ECTS (Credits)	5
Module type	Prerequisite ■ Core ☐ Assist. ☐
Weekly hours	
Weekly hours (Theory)	(2)hr Class (2) Total hrs Workload
Weekly hours (Practical)	(1)hr Class (1) Total hrs Workload
Number of Weeks	15
Lecturer (Theory)	Assist. Prof. Dr. Paree khan Abdulla Omer
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Lecturer (Practical)	Assist. Prof. Dr. Paree khan Abdulla Omer
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Websites	

Course Book

Course Description	The general purpose of this course is to study the basic concepts of Statistics; it is divided into several parts. The first part deals with measures of central tendency and dispersion or variability of the data that are very commonly using in all sciences. Other parts describe statistical testing, how can researcher collecting and analysing the data to get the results after that how to make the statistically testing for their hypotheses in order to making better decisions depending on the some statistically models beside of using a most powerful package like SPSS V26.
Course objectives	Advanced Statistics is a set of models used to estimate the relationships among variables, using sample data to understand or construct the future by modelling, analysing the data and answer questions or to draw conclusions about a population.
Student's obligation	1. Attendance 2. Seminar 3. Report 4. Quiz 5. Midterm Final Exam
Required Learning Materials	trying to use different way to reaching the main objectives, and in order to take the advantage and try to interpreting the theories and connecting them with reality in order to delivery information to the students easily, using the software like SPSS and (Power Point Presentation), where the offer includes the following aspects: 1. The basic address and subsidiary subjects required. 2. The definitions and basic notes. 3. Shapes and graphs

Evaluation	Task	Weight (Marks)	Due Week	Relevant Learning Outcome
	Attendance	%5		
	Seminar	%10		
	Report	%5		
	Quiz	%10		
	Midterm Exam	%20		
	Final Exam	%50		
	Total	%100		

Specific learning outcome:	1. Students are expected to be confidence from collecting data and analyzing the data. 2. They will be able to formulate the modeling and distinguish the types of variables and relationships. 3. Interpreting the conclusions and consequences after making decisions. 4. The students should have the ability to work without any Disturbances. 5. Beside of that learning a powerful software programing SPSS.
Course References:	1. Foster, J. & Barkus, E. & Yavorsky, C. (2006). UNDERSTANDING AND USING ADVANCED STATISTICS. British Library Cataloguing in Publication data, ISBN 1 4129 0013 1 2. Landau S. & Everitt, B. S. (2004). A Handbook of Statistical Analyses using SPSS. London New York Washington, D.C. www.crcpress.com 3. Montgomery, D. C. & Runger, G. C. (2018). Applied Statistics and Probability for Engineers. Seventh Edition, Wiley, ePub ISBN 978-1-119-40036-3. 4. Montgomery, D. C., Runger, G. C. & Hubele, N. F. (2011), (Engineering Statistics), Fifth Edition, John Wiley & Sons, Inc. 5. DEVORE, J. L. (2012). Probability and Statistics for Engineering and the Sciences. Eight edition, California Polytechnic State University, San Luis Obispo, SBN-13: 978-0-538-73352-6. 6. Montgomery, D. C. & Runger, G. C. (2003), (Applied Statistics and Probability for Engineers), third Edition, John Wiley & Sons, Inc.

Course topics (Theory)	**Week**	**Learning Outcome**
Ch. 1. Overview and Descriptive statistics • Concept of Engineering Statistics • Three fundamental components of statistics • Probability • Probability Theory	W1	
Ch. 2. Random variable • Types of variable • Data Collection and Organization • Statistical Data analysis • Graphical summaries of data	W2	
Ch. 3. Measures of central tendency (location) • Measures of variation or Dispersion • Distribution (skewness and kurtosis) • Quartiles	W3	
Ch. 4. Point Estimation and testing hypotheses • Point Estimation • Null and Alternative Hypothesis. • Significance	W4	

• Accept and reject.		
Ch. 5. Grouped Frequencies and Graphical Descriptions • Testing for Normality Graphically • Stem and leaf Displays • Box Plot • Frequency Graphs and discrete Data	W5	
Ch. 6. T-test and Chi-Square test • Student's t- test for one variable. • Student's t- test for two populations • Student's t test for paired data	W6	
• Chi- square test for frequency distributions • Goodness of fit • Contingency tables	W7	
Ch. 7. Correlation Coefficient • Pearson's correlation coefficient • Spearman's rank correlation coefficient • Kendall's rank correlation coefficient	W8	
Ch. 8. Regression model • Simple linear regression model. • Multiple linear regression model • Logistic regression model	W9	
Ch. 9. Analysis of Variance • One- way ANOVA table • Two-way ANOVA table	W10	
Ch. 10. Factor Analysis • Principal component analysis	W11	
Ch. 11 Cluster Analysis	W 12	
Practical Topics	**Week**	**Learning Outcome**
Steps of how installing and using SPSS V. 26	W1	
Steps of using SPSS for bar-chart and pie- chart	W2	
using SPSS for Measures of central tendency, Measures of variation or Dispersion and Distribution	W3	
Quick Steps of using SPSS for histogram	W4	

Steps of using SPSS for Explore, testing normality and box plot	W5	
Using SPSS for t-test	W6	
Steps of using SPSS how Obtain Cross tabulations (chi-square test)	W7	
Quick Steps of using SPSS for (correlation) (Pearson, Spearman rank, Kendall) coefficient.	W8	
Quick Steps of using SPSS for regression types of simple and multiple linear regression model	W9	
Steps of using SPSS Analysis of Variance	W10	
Quick Steps of using SPSS for Factor Analysis and cluster analysis	W11	
Review all that we applied by SPSS	W12	

Questions Example Design

Extra notes:

External Evaluator