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| Detailed Course Description - Course Plan Development and Updating Procedures/<br>..... Department | QF01/0408-3.0E |
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|                        |         |                            |                                    |
|------------------------|---------|----------------------------|------------------------------------|
| Faculty                | Science | Department                 | Mathematics                        |
| Course number          | 0101443 | Course title               | Applied Statistics                 |
| Number of credit hours | 3       | Pre-requisite/co-requisite | Mathematical Statistics<br>0101442 |

### Brief course description

| Course goals and learning outcomes |   |
|------------------------------------|---|
| <b>Goal 1</b>                      | Understanding and using the measures of central tendency and variations.  |
| Learning outcomes                  | 1.1 Students will be able to calculate the measures (mean, median, percentiles,...)<br>1.2 Students will be able to calculate the measures (variance, standard deviation,...)<br>1.3 Students will be able to analyze the group of data.  |
| <b>Goal 2</b>                      | Knowledge and understanding the probability distributions and sampling distributions.   |
| Learning outcomes                  | 2.1 Students will be able to use the probability distributions.<br>2.2 Students will be able to obtain the sampling distributions.  |
| <b>Goal 3</b>                      | Using the statistical tests and analysis of variance.   |
| Learning outcomes                  | 3.1 Students will be able to design a Chi-square tests for the variance.<br>3.2 Students will be able make One way analysis of variance.<br>3.3 Students will be able make Two way analysis of variance   |
| <b>Goal 4</b>                      | Understanding and studying the correlation between random variables.  |
| Learning outcomes                  | 4.1 Students will be able to design a Linear regression model.<br>4.2 Students will be able to study a Regression analysis of variance and the F-test.<br>4.3 Students will be able to use some non-parametric tests.   |
| <b>Textbook</b>                    | 1. - Applied Statistical Method by William L. Carlson and Betty Thorne, Prentice Hall, 1997.<br>2. - Understandable Statistics by Charles H. Brase and Corrine P. Brase, Houghton Mifflin Company 2003, seventh edition.  |
| <b>Supplementary references</b>    | 1. - Mathematical statistics with applications, seventh edition, by John E. Freund's (2004), Pearson Prentice Hall.<br>2. - Mathematical Statistics with applications, 7 <sup>th</sup> edition. By Dennis Wackerly, William Mendenhall and Richard Schaeffer, Publisher Thomson Brooks/Cole 2008. |

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| Course timeline |                 |  |                  |        |
|-----------------|-----------------|--|------------------|--------|
| Week            | Number of hours | Course topics  | Pages (textbook) | Notes  |
| 01              | 1               | EXPLORATORY DATA ANALYSIS Populations and sampling, simple random sample   | 24-28<br>38-41   |        |
|                 | 1               | Descriptive statistics: Measures of data location and spread Mean  |                  |        |
|                 | 1               |  |                  |        |
| 02              | 1               | median, mode, range variance and standard deviation, percentiles and quartile Inter-quartile range ,Grouped data, frequency histograms, symmetry and skewness(left/right) s, | 41-47            |        |
|                 | 1               |  |                  |        |
|                 | 1               |  |                  |        |
| 03              | 1               | Chebychev and empirical rules. Graphical methods: Stem-and-leaf plots, Box-and-whisker plots. Linear coding of data and its effect on measures of location and dispersion.   | 47-55            |        |
|                 | 1               |  |                  |        |
|                 | 1               |  |                  |        |
| 04              | 1               | SAMPLING DISTRIBUTIONS<br>Distribution of the sample mean from the normal population   | 352-366          |        |
|                 | 1               | Central Limit Theorem and large sample mean distribution   |                  |        |
|                 | 1               |  |                  |        |
| 05              | 1               | Distribution of the sample proportion. Standard error and error margin of an estimator.  | 366-376          |        |
|                 | 1               |  |                  |        |
|                 | 1               |  |                  |        |
| 06              | 1               | CHI-SQUARED TESTS<br>Goodness of fit tests for uniform, binomial, Poisson and normal distributions.  | 634-667          | Text 2 |
|                 | 1               | First Exam (20%)   |                  |        |
|                 | 1               |  |                  |        |
| 07              | 1               | Tests of homogeneity, independence for contingency tables. Marginal and Conditional distributions.   | 634-667          | Text 2 |
|                 | 1               |  |                  |        |
|                 | 1               |  |                  |        |
| 08              | 1               | ANALYSIS OF VARIANCE<br>Completely randomized design and One way analysis of variance.   | 595-605          |        |
|                 | 1               |  |                  |        |
|                 | 1               |  |                  |        |
| 09              | 1               | Two way analysis of variance with one and more than one observation per cell.  | 606-618          |        |
|                 | 1               |  |                  |        |
|                 | 1               |  |                  |        |
| 10              | 1               | Tests on Main effects and Interactions.  | 667-705          | Text 2 |

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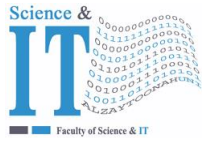
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|    | 1<br>1      |   |         |        |
| 11 | 1<br>1<br>1 | LINEAR REGRESSION<br>Linear regression model, scatter grams, Least Squares Method Of Estimation of the intercept and slope and their tests of hypothesis.                                       | 629-640 |        |
| 12 | 1<br>1<br>1 | Regression analysis of variance and the F-test<br>.Coefficients of correlation and determination.<br>Second Exam (20%)  | 645-653 |        |
| 13 | 1<br>1<br>1 | Predictions and prediction intervals.<br>Multiple and polynomial regressions and their ANOVA.   | 781-796 |        |
| 14 | 1<br>1<br>1 | NON-PARAMETRIC TESTS<br>Selection of non-parametric tests from the following list when parametric statistical inference about one or two populations fails.                                     | 717-745 | Text 2 |
| 15 | 1<br>1<br>1 | Sign test, Mann-Whitney test, Wilcoxon signed rank test. The use Kruskal-Wallis test to compare multiple populations instead of usual one-way ANOVA, Kolmogorov-Smirnov test of data Normality. | 717-745 | Text 2 |
| 16 | 1<br>1<br>1 | <b>Final Exam (50%)</b>   |         |        |

|   |  |   |   |
|---|--|---|---|
| <b>Theoretical course evaluation methods and weight</b> | Participation = 10%<br>First exam 20%<br>Second exam 20%<br>Final exam 50% | <b>Practical (clinical) course evaluation methods</b> | Semester students' work = 50%<br>(Reports, research, quizzes, etc.)<br>Final exam = 50% |
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|                                |  |                  |  |
|--------------------------------|--|------------------|--|
| Approved by head of department |  | Date of approval |  |
|--------------------------------|--|------------------|--|

Extra information (to be updated every semester by corresponding faculty member)

|                 |                     |               |     |
|-----------------|---------------------|---------------|-----|
| Name of teacher | D, Abdulkarim Farah | Office Number | 127 |
|-----------------|---------------------|---------------|-----|



جامعة الزيتونة الأردنية  
Al-Zaytoonah University of Jordan  
كلية العلوم وتكنولوجيا المعلومات  
Faculty of Science and Information  
Technology



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| Phone number<br>(extension) | 380 | Email | <a href="mailto:karim.farah@zug.edu.jo">karim.farah@zug.edu.jo</a> |
| Office hours                |     |       |  |