

Portfolio Project

Quantitative Applications in Security Sciences

In Portfolio Project Unit 1 (week 10), you will complete these two tasks:

Task 1

In this task, you will work on choosing your portfolio topic, creating a research question and carrying out data planning and collection.

Follow these steps and document all your work in a journal:

1. Choose your portfolio topic from the given topics.
2. Create your research question (that is clearly stated, focused, and interesting). Your topic must be approved by your instructor.
3. Collect your data in the form of a table.

Your topic must be chosen from the table below:

Topic Number	Description
1	Effect of a new medication to treat disease
2	The impact of learning time on academic achievement
3	Effect of memory supplements on students' exam performance
4	Compare the traffic accident rates (number of traffic accidents per inhabitant) in various cities of Saudi Arabia, over several years

Task 2

In this task, you will work on checking assumptions, transforming data, and performing statistical tests calculations by hand.

Follow these steps and document all your work in a journal:

1. Identify multiple assumptions relevant to the one-way ANOVA test. Perform tests for these assumptions and fully discuss the results of the tests (*CILO 1.1 – Assumptions*).
2. Describe the most appropriate options for data transformation for the data, apply the selected transformation, and explain why that particular choice of transformation was selected (*CILO 1.2 – Transformation*).
3. Complete all mathematical calculations needed to perform the statistical test, showing all working in a clear and standardized format (*CILO 2.1 – Arithmetic*).
4. Draw the graph or table as appropriate, including all data points and all appropriate labels, and providing any summary statistics (*CILO 2.2 – Graphs*).

In Portfolio Project Unit 2 (week 11), you will complete these two tasks:

Task 1

In this task, you will work on performing statistical tests using statistical software packages (EXCEL or PSPP).

Follow these steps and document all your work in a journal:

1. Load the data into the software (EXCEL or PSPP), set up the correct model and explain all selections (*CILO 3.1 – Model*).
2. Generate accurate outputs of multiple forms (descriptive statistics to check that the ANOVA test assumptions are met, and one-way ANOVA test after choosing an appropriate level of significance). Display the results as graphs or tables. Finally, briefly explain the test results (*CILO 3.2 – Output*).

Task 2

In this task, you will work on formulating testable hypotheses and interpreting test outcomes.

Follow these steps and document all your work in a journal:

1. Set out the research question. Formulate appropriate null and alternative hypotheses mathematically, based on the research question. Justify the choice of statistical test, specifying what the dependent variable is, and what the independent variable or factor is (*CILO 4.1 – Question*).
2. Draw multiple conclusions from the test results, focusing on the assumptions of the ANOVA test that should be verified, but also the various ANOVA statistics. Discuss these conclusions in light of the original research question. Highlight areas of uncertainty regarding the test results, that may require further research (*CILO 4.2 – Interpretation*).