



University of Kelaniya – Sri Lanka  
 Centre for Distance & Continuing Education  
 Bachelor of Science (General) External  
 First year First semester examination – 2019  
 (New Syllabus)  
 2022 August  
 Faculty of Science

Statistics

STAT 16521 – Statistical Laboratory

No. of questions: Four (04)

No. of pages: Three (03)

Duration: Two (2) hours

Answer all the questions.

You are required to submit,

- A pdf document with all the outputs, answers and interpretations saved in your exam folder. (Name this document with your student number: Include the student number as the header and the page number as the footer)
- Minitab worksheets and the project.
- MAC files (Save in your exam folder).
- Question paper.

Consider the Data described in Table 1 to answer the questions 1-4 appropriately.

A study has been conducted to analyze Academic and Employability factors influencing job placement of post-graduate students in a university. The collected data set is given in the excel sheets: "JobPlacementData". The description of variables is given below:

*Table 1:*

Variable Name	Description
GS ID	Student Number of the student
Gender	Gender of the student: M=Male, F=Female
A/LStream	Subject stream in A/L: Arts, Commerce, Science
School Type	Type of the School: Government, Others
UGUniversityType	Type of the undergraduate university(board of education): Government, Others
UG GPA	Undergraduate GPA
UG DegreeType	Type of the undergraduate degree: Commerce & Management, Science & Technology, Other
FinalSemAttendance	No. of days attended school during the final semester
No.ofAwards	Number of awards received

Variable Name	Description
WorkExp	Work Experience: Yes, No
EmpTest	Employability test percentage (conducted by the university)
CommunicationSkills	Communications skills test percentage (conducted by the university)
GeneralIQ	General IQ test percentage (conducted by the university)
GS Specialisation	Post-Graduation Specialization Computer Science, Statistics, Finance, Management
GS GPA	Post graduate GPA
JobStatus	Status of placement: Placed, Not placed
Salary	Salary offered by corporate to candidates

(1) Perform below tasks:

- (a) Import the excel file "JobPlacementData" to a Minitab worksheet and save the project as "JobPlacement.MPJ". (10 Marks)
- (b) Obtain the frequency tables and percentages for all the categorical variables. (20 Marks)
- (c) If there are any different entries on the "UGUniversityType" column other than the specified categories in Table 1, identify and correct them. (10 Marks)
- (d) Using a macro, group the subjects as follows and save it in a new variable called "Board".

CdSchoolType	CdUGUniversityType	Board
Government	Government	1
Government	Others	2
Others	Government	3
Others	Others	4

(40 Marks)

- (e) Using an interval plot or a suitable plot, explain any similarities and dissimilarities of undergraduate GPA for the categories of "Board". (20 Marks)

2)

(a)

- (i). Show that the estimated proportion of getting a job placement is approximately 69%. (10 Marks)
  - (ii). Based on the above estimated probability in part (i), estimate the probability at least two third (2/3) of the students will get a placement at the end of the degree, if 300 students register to the graduate program next year. (30 Marks)
- (b) Consider the general IQ score: "GeneralIQ", of the students.
- (i). Obtain the mean and the standard deviation of the "GeneralIQ". (20 Marks)
  - (ii). Assuming "GeneralIQ" is normally distributed with the estimated mean and the standard deviation from the part (i), estimate the probability that the general IQ of a randomly selected student will be less than 50. (20marks)
  - (iii). Assume, 15% of the students with the lowest IQ level are to repeat the IQ test, then identify the minimum level of IQ a student should achieve to pass the test. (20 Marks)

3)

- (a) Using boxplots, examine, compare and interpret the relationship of each of the following sets of variables with the job status.
  - (i). "EmpTest", "CommunicationSkills", "GeneralIQ". (20 Marks)
  - (ii). "MBA\_GPA", "UG\_GPA" (20 Marks)
- (b) Using a stack bar chart describe the distribution of "UG\_DegreeType" and "GS\_Specialisation" by "JobStatus". (20 Mark)
- (c) Using a suitable chart visualize and interpret whether the board of education: "Board" affects the job placement: "JobStatus". (10 Marks)
- (d) Write a Macro called "Experience.MAC" to fulfil following tasks (i) and (ii).
  - (i). Create a new categorical variable "ExpNoJob" as described below, (20 Marks)
    - 1- students who had a work experience but did not get a job placement.
    - 0- students who did not have a work experience but did get a job placement.
  - (ii). Count the students under the above categories and display the results appropriately. (10 Marks)

4)

- (a) Write a macro called "Missing.MAC" to replace the missing values in the "Salary" variable by zeros and save all the salary values in a new column called "SalaryNew". (20 Marks)
- (b) Split the worksheet by the variable "JobStatus". (10 Marks)

Carry out the following tasks to the worksheet with "JobStatus"="Placed" obtained in part (b). If you couldn't successfully split the worksheet as in part (b), ask help from the exam supervisor.

- (c) Divide the variable "Salary" by 1000 and save it in a new variable called "ScaledSalary". (10 Marks)
- (d) Estimate and interpret the linear correlation coefficients of the below variables with the "ScaledSalary".
- (i). "EmpTest"
  - (ii). "CommunicationSkills"
  - (iii). "GeneralIQ"
  - (iv). "MBA\_GPA"
  - (v). "FinalSemAttendance"
  - (vi). "Number of Awards" (30 Marks)
- (e) Compare and discuss the effectiveness of the variables in part (d) in predicting the placement salary and justify that "EmpTest" is the best variable in predicting the placement salary. (10 Marks)
- (f) Obtain the simple linear regression summary to predict the placement salary (scaled salary variable) using the employment test score. Comment on the significance and the overall strength of the model. (20 Marks)

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End

### THE HISTORY OF THE UNITED STATES

