UNIVERSITY OF ESWATINI

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF ECONOMICS

RE-SIT EXAMINATION JANUARY 2019

TITLE OF PAPER : INTRODUCTION TO ECONOMETRICS I

COURSE CODE : ECO 307

TIME ALLOWED : TWO (2) HOURS

INSTRUCTIONS :

1. ANSWER QUESTION ONE (1) AND ANY OTHER TWO (2) IN THIS PAPER.
2. ONLY SCIENTIFIC NON-PROGRAMMABLE CALCULATORS ARE ALLOWED.
3. ROUND UP YOUR FINAL ANSWERS TO THREE (3) DECIMAL PLACES.
4. IF IT IS NOT SPECIFIED, USE $\alpha = 0.05$ FOR STATISTICAL TESTS.
5. THE REQUIRED PROBABILITY TABLES ARE ATTACHED AT THE BACK OF QUESTION PAPER.

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR

QUESTION 1 (Compulsory   [40 MARKS]

a) Differentiate between cross sectional and panel data.   [6 Marks]

b) State the Gauss-Markov theorem.   [6 Marks]

c) The table below shows sample data of monthly wages (y) in Emalangeni and the education level (x) in years completed:

Education	12	18	14	12	11	16	10	18	15	12
Wage	3845	4040	4125	3250	2810	7000	3000	5405	5770	5000

    i) Use the data to fit a regression line.(Show working for full marks)   [16 Marks]

    ii) Interpret the slope coefficient of the regression.   [6 Marks]

    iii) If the calculated coefficient of determination (R^2) for the above data is 0.3948, interpret what it means.   [6 Marks]

ANSWER ANY TWO QUESTIONS FROM THE FOLLOWING QUESTIONS

QUESTION 2   [30 MARKS]

Consider an estimated model that is used to study the effects of missing lectures on the Grade Point Average (GPA) of the student. $HsAgr$ is High school grade 12 average grade, and $Skip$ is the average number of lectures missed per week.

$$\widehat{GPA} = 1.39 + 0.412\, HsAgr - 0.083\, Skip$$
$$(0.33) \quad (0.094) \quad\quad (0.026)$$
$$n = 141, \quad\quad R^2 = 0.234$$

Note that the values in brackets are standard errors.

a) Interpret the model.   [6 Marks]

b) Briefly explain whether the signs of the coefficients make sense.   [5 Marks]

c) Using the standard normal table approximation, find the 95% confidence interval for β_{HsAgr}.   [8 Marks]

d) Are you able to reject the null hypothesis $H_0 : \beta_{HsAgr} = 0.4$ at the 5% level of significance? [5 Marks]

e) What is the $p-value$ that can be attached on coefficient of the average number of lectures missed per week (β_{Skip}). [6 Marks]

QUESTION 3 [30 MARKS]

a) Briefly explain why in some models it is necessary to include an interaction of the independent variables. [6 Marks]

b) Consider the following model whereby the returns to education depend upon the amount of work experience.

$$log(wage) = \beta_0 + \beta_1 educ + \beta_2 exper + \beta_3 educ * exper + u$$

Where wage $-$ monthly wage,   educ $-$ education in years,   exper $-$ years of work experience

    a) If experience is held constant, what is the effect of education? [6 Marks]

    b) State the null hypothesis that the return to education does not depend on the level of experience. State and **justify** an appropriate alternative hypothesis. [6 Marks]

c) If the model in (b) above is estimated as :

$$\widehat{log(wage)} = 5.9494 + 0.044\ educ - 0.0215\ exper + 0.0032\ educ * exper$$
$$(0.2408)\quad (0.0174)\qquad\quad (0.020)\qquad (0.0015)$$
$$n = 935,\qquad\qquad R^2 = 0.1349$$

d) Test the hypotheses you stated in (b) above. [7 Marks]

e) Is it necessary to include the interaction term $(educ * exper)$ in the model? [5 Marks]

QUESTION 4 [30 MARKS]

In a study on the returns to education, the following model was estimated

$$Wage_i = \beta_0 + \beta_1 Educ_i + \beta_2 Exper_i + \beta_3 female_i + u_i$$

a) Researchers often are interested to see whether there is gender discrimination in the returns to education, how would you test if this problem exists or not. [5 marks]

b) There is evidence in the labour economics literature that postulates that the returns to education are different between males and females. Setup the above model in such a way that you can be able to measure whether the returns to education are the same or not. Also explain how you would test whether the returns to education are the same for males and females. [15 Marks]

c) Structure the model and provide a test for the hypothesis that males and females with the same level of education, receive the same wage. [10 Marks]