



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE
AND TECHNOLOGY**

UNIVERSITY EXAMINATION FOR THE DEGREE IN BUSINESS

ADMINISTRATION (ACCOUNTING OPTION)

YEAR4 SEMESTER 1 2018/2019 ACADEMIC YEAR

MAIN CAMPUS REGULAR

ABA 402 : QUANTITATIVE TECHNIQUES II

TIME: 2 HOURS

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO

QUESTION ONE

a) Define the following terms as used in linear programming

- i) Feasible solution (2mks)
- ii) Transportation problem (2mks)
- iii) Assignment problem (2mks)

b) Given the following information

- i) Arrivals and service follow poisson process
- ii) Calls arrive at a rate of 10 per hour
- iii) Service rate of calls is 15 per hour

Answer the following questions on the basis of this information

- a) What is the average number of calls waiting for service? (2mks)
- b) What is the average time for a caller to complete a call? (2mks)
- c) What is the average time a caller must wait before taken for service? (2mks)
- c) State four assumptions of transportation problem (4mks)
- d) State four applications of simulation in business (4mks)

e) The following data have been collected regarding sales and advertising expenditure

Sales (£'m)	Advertising expenditure (£'000)
8.5	210
9.2	250
7.9	290
8.6	330
9.4	370
10.1	410

Calculate the correlation coefficient for the above data and interpret your result (10mks)

QUESTION TWO

a) Find the multiple linear regression equation of X_1 on X_2 and X_3 from the data relating to three variables given below: (10mks)

X_1	4	6	7	9	13	15
X_2	15	12	8	6	4	8
X_3	30	24	20	14	10	4

b) A company has a fleet of vehicles for use in its operations. The following information relates to the vehicles

Age of the vehicle (years)	Maintenance cost p.a (kshs. '000')
(x)	(y)
2	20
8	120
6	85
8	135
10	150
3	45
4	50
5	48
7	120

- i) Using the least square method, determine the regression of y on x (8mks)
- ii) Based on the equation determined in (i) above, estimate the maintenance cost of a 9 year old vehicle. (2mks)

QUESTION THREE

- a) A shop manager has four employees and four tasks to be performed. His estimate of the time in hours that each employee would take to perform each task is given as follows:

Tasks	Employees			
	John	Hassan	Mary	Alice
I	16	52	54	22
II	26	56	18	52
III	76	38	36	30
IV	38	52	48	20

- I) Determine how the tasks, should be assigned in order to minimize the total man hours. (8mks)
 - II) Calculate the minimum total time taken (2mks)
- b) A timber merchant manufactures three types of plywood. The data below give the production hours per unit in each of three production operations, maximum time available, and profit per unit.

Plywood	Operation (Hours)			Profit per unit (£)
	I	II	III	
Grade A	2	2	4	40
Grade B	5	5	2	30
Grade C	10	3	2	20
Max. Time available	900	400	600	

How many units of each grade of plywood would be produced to maximize the total profit?
Write the dual and use it to check the optimal solution. (10mks).

QUESTION FOUR

- a) A company produces sugar in four factories P, Q, T and S. The sugar is supplied to three destinations I, II and III. The following information relates to the costs that will be incurred to transport sugar from each factory to each destination.

Factory	Destination			Availability (Tonnes)
	Cost per tone (Ksh '000)			
	I	II	III	
P	8	6	4	20
Q	10	12	2	16
R	12	8	6	12
S	6	10	8	12
Requirements (Tonnes)	28	24	8	

- i) Using the North West Corner method, determine the basic solution to the transportation problem. (8mks)
- ii) Calculate the minimum total cost of transportation (2mks)
 - b) Explain the meaning of simulation and state its usefulness in business decision making (5mks)
 - c) Outline the limitations of simulation (5mks)

QUESTION FIVE

- a) The Association of Accountants is investigating the relationship between performance in Quantitative Methods and hours studied per week and the general level of intelligence of candidates. The Association has data on ten students which are

Student	Hours	I.Q.	Examination Grade
	X1	X2	y
1	9	99	56
2	6	100	45
3	12	119	80
4	14	95	73
5	11	110	71
6	6	117	55
7	19	98	95
8	16	101	86
9	3	100	34
10	9	115	66

Calculate the separate regressions, the multiple regressions and the coefficient of determination (15mks)

- b) Write short notes on the following
- i) Queue discipline (1mk)
 - ii) Slack variables (1mk)
 - iii) Dummy destination (1mk)
 - iv) Service mechanism in queuing theory (1mk)
 - v) Jockeying (1mk)

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SCHOOL OF BUSINESS AND ECONOMICS
ABA402: QUANTITATIVE TECHNIQUES 11
Y4 S1 (MAIN REGULAR BBA)

COURSE OUTLINE SEPT-DEC 2018

COURSE INSTRUCTOR	AMOS ASEMBO
CLASS MEETS ON	WEDNESDAYS
TIME	7.00Am-9.00Am

COURSE DESCRIPTION

This course is intended to impart knowledge and skills to the learners in areas of mathematics applicable to business management. The students are required to grasp the concept on Linear programming 11, Transportation models, Assignment models, Correlation and Regression, Simulation and Queuing Theory and be able to apply these skills in solving daily business problem in the society.

Learning objectives: The objective of this course is to equip students with necessary mathematical skills required in daily business management. It enables students to compare and critically analyse the various business variables to assist him /her come up with the right business management decisions.

Expected learning outcomes

At the end of the learning exercise the learner is expected to:

- Solve mathematical problems using linear programming by simplex method
- Develop and apply transportation models in solving problems
- Develop and apply assignment models in solving problems
- Solve problems by regression and correlation analysis
- Solve problems by simulation
- Solve problems concerning queuing theory

Course content

1. LINEAR PROGRAMMING II

- Simplex method
 - Minimization
 - Maximization
 - Sensitivity Analysis

2. TRANSPORTATION MODELS

- Structure
- Solving transportation problem
- Dummy variables
- Degeneracy Test
- Maximization and Minimization cases
- Optimality Test

2. ASSIGNMENT MODEL

- General structure
- Minimization and Maximization
- Unequal sources and destinations

3. CORRELATION AND REGRESSION ANALYSIS

- Bivariate frequency distribution
- Scatter diagrams
- Correlation Analysis
- Regression Analysis
- Autocorrelation
- Non- linear regression and linearization
- Multiple- regression analysis

4. SIMULATION

- Introduction
- Model construction
- Assessing a model's suitability
- Monte Carlo Simulation
- Variable in a simulation model
- Application of simulation

5. QUEUING THEORY

- Introduction
- Queuing structure
- Analysis of single and multi- channel
- Queuing with exponential arrival and service process
- Queuing models

Teaching methodology

Lecture, discussion and presentation

Grading

Assignment	10%
Sit-in-test	20%
Semester examination	70%

Main text

1. ND VOHRA (4th edition) Quantitative Techniques in Management (2014)

Required readings

- 1) Terry Lucas (2002) quantitative techniques
- 2) Sagwa Philip Ndeda (Revises syllabus CPA Section 4 Study Text) Quantitative Analysis
- 3) N.A Saleemi (2011) quantitative techniques simplified
- 4) Murray R. Spiegel (2008) theory and problems of statistics
- 5) Gerald Kether (1993) statistical for management and economics
- 6) Douglas A Lind, William G Marchel, Samuel A Watter 13th edition (2008) , statistical techniques in business and Economics
- 7) Any other relevant resource material in statistics including relevant websites

NB: please consult the libraries for more E-books

Signed.....

Course instructor

Dean SBLs