JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATION FOR BACHELOR OF LOGISTICS AND SUPPLY CHAIN MANAGEMENT FOR SECOND YEAR FIRST SEMESTER

COURSE: BBM 3214: BUSINESS MATHEMATICS

DURATION: 2HOURS **APRIL 2017**

MAIN CAMPUS

Instructions: Answer Question ONE and any other TWO Questions in this Paper

QUESTION ONE (30 MARKS)

a) The following data relate to a given stock item

Normal usage	1300 per day
Minimum usage	900 per day
Maximum usage	2000 per day
Lead time	15 – 20 days
EOQ	30,000

Calculate the various control levels

i. Reorder level (2mks)
ii. Minimum level (2mks)
iii. Maximum level (2mks)

b) given that matrix $x = \begin{bmatrix} 3 & 11 & 6 \\ 9 & -3 & 8 \\ 5 & 0 & 9 \end{bmatrix}$ and $y \begin{bmatrix} 1 & 2 & 0 \\ 0 & -4 & 5 \\ 5 & -8 & 7 \end{bmatrix}$

Calculate (i) $2X + 3Y$ (3mks)
(ii) $3XY$ (4mks)

c) State four main components of time series (4mks)

d) Differentiate $y = \dfrac{x^3 + 2x^2 + x}{2x^2 + 3x - 7}$ (4mks)

Determine the present value of £125 payable at the end of each of the year and subjected to a discount rate of 8% (4mks)

e) plot the graphs of

i. $y = 2x^2 - 4x - 5$
ii. $y = 9 + 5x - x^2$

between $x = -2$ and $x = 4$ and find the x values of their point of intersection (9mks)

QUESTION TWO (20 MARKS)

If 4,000 is deposited into an account paying 6% annual interest compound quarterly , how much will be in the account after 5 years (4mks)

b) Show on a graph paper the region represented by

$2x + y > 3$, $x - y \geq 4$ and $y \leq 3$(10mks)

c. evaluate

$\int_2^4 (x3 + 6x2 - 4x + 1)\, dx$ (6mks)

QUESTION THREE (20 MARKS)

A firm is considering two separate capital projects with cash flows as follows

Year	0	1	2	3	4	5
Project 1	(80000)	18000	20000	25000	38000	45000
Project 2	(120000)	30000	50000	50000	50000	15000

i. using the NPV criterion and a discounts rate of 15% choose the project that is more profitable (6mks)

ii. find the NPV using a discount rate of 20% and use the result to estimate the IRR for each project (10mks)

iii. verify that , using the IRR criterions the discussion in (i) is reversed and attempt to explain why (4mks)

QUESTION FOUR (20 MARKS)

a. Solve by matrix inverse method (10mks)

$x_1 + 2x_2 + 3x_3 = 3$

$2x_1 + 4x_2 + 5x_3 = 4$

$3x_1 + 5x_2 + 6x_3 = 8$

b. Two machines A and B are being used to process certain items. The cost function for each machine is

machine A. $y = 15 + 3x$, machine B : $y = 18 - x + x^2$

where y = cost of producing x items (£) and x = number of items processed per hour (hundreds)

if the maximum speed at which both machines can run is 400 items / hour

i. plot the graph of the two cost functions on the same diagram (6mks)

ii. use the graphs to find the range of production for which each item is produced more cheaply

   a. machine A (1mk)
   b. machine B (1mk)

iii. use the graph to find the total cost during one hour

   a. of producing 150 items on machine A (1mk)
   b. of producing 350 items on machine B (1mk)

QUESTION FIVE (20 MARKS)

a. Find the derivative of
$y = (x^2 + 3)(2x^3 + x^2 - 3)$ (4mks)

b. State six importance of time series analysis (6 mks)

c. Below are given the figures of production (in thousand quintals) of a sugar factory

Year	1989	1990	1991	1992	1993	1994	1995
Production (In '000'q + 1)	80	90	92	83	94	99	92

I. Fit a straight line tend to these figures (8 mks)

II. Estimate the likely sales of the company during 1996 (2 mks)

JARAMOGI OGINGA ODINGA UNIVERSITY SCHOOL OF BUSINESS AND ECONOMICS
BBM 3214 BUSINESS MATHEMATICS Y2 S1 (MAIN REGULAR-LOGISTICS)

COURSE OUTLINE **JAN-APRIL 2017**

COURSE INSTRUCTOR **AMOS ASEMBO**

CLASS MEETS ON **WEDNESDAYS**

TIME **10-12PM**

COURSE DESCRIPTION

This course is intended to impart knowledge and skills to the learners in areas of mathematic applicable to business management. The students are required to grasp the concept in functions and graphs, linear inequalities, financial arithmetic, matrices, differentiation and integration, time series and stock control 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 analyses the various business variables to assist him /her come up with the right business management.

Expected learning outcomes

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

- Understand the concept of functions and graphs
- Understand linear inequalities
- Apply financial arithmetic
- Solve problems involving matrices
- Be able to differentiate and integrate functions
- Be able to understand financial application of calendars
- Solve problems concerning time series
- Understand stock control

Topics covered

WEEK	TOPICS
One	Functions and graphs
Two	Function and graphs
Three	Linear inequalities
Four	Financial arithmetic
Five	Matrices
Six	Matrices
Seven	Differentiation a and integration
Eight	Maximum and minimum values
Nine	Financial application of calendars
Ten	Time series
Eleven	CAT

Twelve	Time series
Thirteen	Stock control

Teaching methodology

Lecture, discussion and presentation

Grading

Assignment 10%

Sit-in-test 20%

Semester examination 70%

Main text

1. Andre Francis (8th edition)
   Business, mathematics and statistics

Required readings

1) Terry Lucas (2002) quantitative techniques
2) N.A Saleemi (2011) quantitative techniques simplified
3) Murray R. Spigel (2008) theory and problems of statistics
4) Gerald Kether (1993) statistical for management and economics
5) Douglas A Lind, William G Marchel, Samuel A Watter 13th edition (2008) , statistical techniques in business and Economics
6) Any other relevant resource material in statistics including relevant websites

NB: please consult the libraries for more E-books

Signed…….

Course instructor Dean SBLS