Lambton College

SCHOOL OF BUSINESS & CREATIVE DESIGN

MARKETING AND MANAGEMENT DEPARTMENT

Course Outline – Winter 2014

Course Code: MAN 2003   **Course Title: MANAGEMENT SCIENCE**

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Approved By: Yvonne Clarke, Associate Dean

Prerequisite: STA 1103

Corequisite: None

Prerequisite for: MAN 1033

1. **Course Description**

   This course introduces the learner to quantitative problems faced by managers and the methods used for solving them. These problems include forecasting, decision-making under certainty, queuing, inventory and production control, and mathematical programming.

2. **General Education and Essential Employability Skills**

   This course provides the following provincial Essential Employability Skills:

   #1: Communication
   #2: Numeracy
   #3: Critical Thinking and Problem Solving
   #4: Information Management
   #6: Personal

   Is this course approved as a General Education course?

   ☒ *No*   ☐ *Yes*
   Students should refer to their program's restricted
   General Education courses for final determination.

3. **Learning Outcomes**

   Upon successful completion of this course, the learner will be able to:

   1.   Understand structure of decision making and role of modeling.

   2.   Apply linear programming methods as a problem-solving tool across disciplines.
   3.   Apply forecasting methods by calculating future values in a time series.

   4.   Describe the nature and effect of inventory control on business organizations.
   5.   Carry out decision analysis to determine optimal strategies when faced with alternatives and uncertainty.
   6.   Solve the operating characteristics of waiting line models and interpret the outcomes of waiting line analysis.
   7.   Apply PERT/CPM techniques in planning, scheduling and controlling projects.
   8.   Solve network, transportation, and assignment problems using modeling techniques.
   9.   Perform a break-even analysis.

4. Course Objectives

Unit 1   Introduction

1.1	Describe structure of decision making.	[1]
1.2	Describe the role of modeling.	[1]
1.3	Perform break-even analysis.	[9]

Unit 2   Forecasting

2.1	Describe the use and importance of forecasting in the day-to-day and long-term planning of a business organization.	[3]
2.2	Discuss the techniques of inference, estimation and regress as forecasting tools.	[3]
2.3	Describe the components of a time series.	[3]
2.4	Construct a time series using given data.	[3]
2.5	Describe forecasting using smoothing methods.	[3]
2.6	Present a forecast using moving average, weighted moving average, and exponential smoothing.	[3]
2.7	Explain the effect of seasonality on forecast.	[3]
2.8	Construct a forecast with seasonal and trend components.	[3]

Unit 3   Linear Programming

3.1	Describe the objective function of a stated problem.	[2]
3.2	Describe the constraints of a stated problem.	[2]
3.3	Describe the graphical method of linear programming.	[2]
3.4	Describe the graphical solution to a stated problem, using maximization or minimization criteria.	[2]
3.5	Describe the use of extreme points in a graphical solution to linear programming.	[2]
3.6	Present the optimal solution to a maximization or minimization problem using the above methods.	[2]
3.7	Explain the role of slack/surplus analysis.	[2]
3.8	Use linear programming to solve marketing, network, transportation, assignment, financial and production management applications.	[2,8]

Unit 4   Decision Analysis

4.1   Describe the structure of decision problems using payoff tables [5]
       and decision trees.

4.2   Describe the optimistic, conservative, and minimax   [5]
       regret approach for decision making.

4.3   Describe the expected value method of decision making.   [5]

4.4   Calculate outcomes using the above method.   [5]

4.5   Describe the value of information in decision making.   [5]

4.6   Calculate outcomes using perfect and sample information.   [5]

Unit 5   Inventory Management

5.1   Describe the nature and effect of inventory control on   [4]
       business organizations.

5.2   Describe the EOQ model.   [4]

5.3   Use the EOQ model to calculate optimal order quantities   [4]
       and when-to-buy times.

5.4   Describe the economic production lot size.   [4]

5.5   Calculate the economic production lot size.   [4]

5.6   Describe the effect of quantity discounts on the EOQ model. [4]

5.7   Calculate quantity discounts for the EOQ model.   [4]

5.8   Describe the backorder model of EOQ.   [4]

5.9   Calculate costs associated with this model.   [4]

5.10   Explain the manager's use of the inventory analysis results. [4]

Unit 6   Queuing Theory

6.1   Describe the nature of waiting line problems including   [6]
       queue discipline, arrival and service time distribution.

6.2   Describe a single-channel model with Poisson arrivals and   [6]
       exponential service times.

6.3   Describe a multi-channel model with Poisson arrivals   [6]
       and exponential service times.

6.4   Calculate operating characteristics of the waiting-line models. [6]

6.5   Calculate costs associated with the above parameters.   [6]

6.6   Explain general relationship for waiting line models.   [6]

Unit 7   PERT/CPM Models

7.1   Describe PERT/CPM models.   [7]

7.2	Perform project scheduling using PERT/CPM.	[7]
7.3	Identify and evaluate the critical path.	[7]
7.4	Perform and evaluate project scheduling with uncertain activity times.	[7]
7.5	Evaluate the effect of crashing activity times.	[7]
7.6	Plan and schedule project costs.	[7]

5. Resources and Supplies

a. Required

An Introduction to Management Science: Quantitative Approaches to Decision Making. Revised 13th edition, South-Western. ISBN- 13⊗978-1-11-53222-2).

b. Supplemental

N/A

6. Methodology

Instruction is in the form of lectures, augmented with classroom discussions of problems and cases, and in-class work may be used. Any cases will be used whenever possible as a means of providing actual problems for evaluations.

7. Student Evaluation

A grade of D (50%) is the passing grade for this course. Some programs, however, may require a higher grade in order to progress through and graduate from the program. Students should check the program requirements for their particular program.

The following elements will determine the student's final grade:

3 tests (3 x 30% each)	90%
In-class assignments (10 x 1% each)	10%
Total	**100%**

The round off mathematical principle will be used. Percentages are converted to letter grades and grade points as follows:

Mark (%)	Grade	Grade Point	Mark	Grade	Grade Point
94-100	A+	4.0	67-69	C+	2.3
87-93	A	3.7	63-66	C	2.0
80-86	A-	3.5	60-62	C-	1.7
77-79	B+	3.2	50-59	D	1.0
73-76	B	3.0	0-49	F	0.0
70-72	B-	2.7			

Tests may be comprised of multiple choice, true/false and calculation-based questions. Additional work may be assigned by way of review.

Learners will write tests on dates specified, and submit any assignments as due. Exceptions to these conditions must be approved by the instructor in advance. The student may be asked to write the test or submit the assignment at an alternative time, the final grade may be pro-rated, or the test or assignment given a value of zero in the grade.

Dates for testing and material to be covered during the semester will be detailed in an outline to be provided to the student at the start of the course.

Plagiarism is a serious academic offence subject to disciplinary action as described in the Lambton College policy Students' Rights and Responsibilities: Cheating Policy. Plagiarism means representing the work of others as one's own and is an act of academic dishonesty. Plagiarism includes:
- Submitting as one's own work material which was wholly or in part written by someone else
- Failing to give proper credit for information retrieved from print and electronic sources
- Presenting the ideas of others as if the ideas were new and original
- Downloading material from the Internet and presenting this information without giving proper credit

To avoid plagiarism, learn how to incorporate material appropriately in your writing and provide proper documentation.

8. Academic Integrity

Lambton College is committed to high ethical standards in all academic activities within the College, including research, reporting and learning assessment (e.g. tests, lab reports, essays).

The cornerstone of academic integrity and professional reputation is principled conduct. All scholastic and academic activity must be free of all forms of academic dishonesty, including copying, plagiarism and cheating.

Lambton College will not tolerate any academic dishonesty, a position reflected in Lambton College policy. Students should make themselves familiar with the Students Rights and Responsibilities Policy, located on the MyLambton website for details concerning academic dishonesty and the penalties for dishonesty and unethical conduct.

Questions regarding this policy, or requests for additional clarification, should be directed to the Lambton College Centre for Academic Integrity

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9. **Related Items**

   ### Students with Disabilities
   If you are a student with a disability please identify your needs to the professor and/or the Accessibility Centre so that support services can be arranged for you. You can do this by making an appointment at the SSD, Room L103 ext.3427 or by arranging a personal interview with the professor to discuss your needs.

   ### Student Rights and Responsibility Policy
   Acceptable behaviour in class is established by the instructor and is expected by all students. Any form of harassment or violence will not be tolerated. Action will be taken as outlined in Lambton College policy.

   Cheating and plagiarism are serious academic offences subject to disciplinary action. It is the student's responsibility to be aware of the cheating policy as described in the Lambton College Student Rights and Responsibilities policy. For further information on all of these policies, links may be found on the Lambton College website.

   ### Prior Learning Assessment Statement
   This course is eligible for Prior Learning Assessment

   ☒ **Yes** ☐ **No**

   If yes has been selected, you may choose to contact the Counselling Department for advice on Prior Learning Assessment.

   ### Date of Withdrawal without Academic Penalty
   Please consult the Academic Regulations and Registrar's published dates.

   ### Waiver of Responsibility
   Every attempt has been made to ensure the accuracy of this information as of the date of publication. The content may be modified, without notice, as deemed appropriate by the College.

   Note: It is the student's responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.