SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: INTRODUCTORY STATISTICS
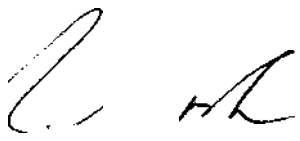
CODE NO.: MTH256-4   **SEMESTER:** III

PROGRAM: PULP & PAPER / WATER RESOURCES / ENVIRONMENTAL ENG.

'AUTHOR! D. HEGGART/S. VERMA

DATE: AUGUST 1996   **PREVIOUS OUTLINE DATED:** JUNE 1992

APPROVED:

DEAN, SCHOOL OF SCIENCES &
NATURAL RESOURCES

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DATE

INTRO. STATISTICS   MTH256-4

COURSE NAME   **COURSE NUMBER**

TOTAL CREDIT HOURS: 64

PREREQUISITE(S): MTH 120 (TECHNICAL MATHEMATICS)

I. **PHILOSOPHY/GOALS:**

This course will help the student to develop an understanding of
statistical techniques and procedures by solving statistical problems.
The student will be able to carry out basic statistical tasks and
better understand the use of statistics in industry. An introduction
to Minitab software will help the student make use of the computer to
complete statistical problems.

II. **STUDENT PERFORMANCE OBJECTIVES:**

^^Upon successful completion of this course the student will be able to:

UNIT I Introduction
        Newmark Chapter 1

1. Discuss the nature of statistics; how data can be analyzed using
    descriptive statistics.

2. Distinguish between a sample and a population.

UNIT II Descriptive Statistics
        Newmark Chapter 2
        RJR Chapter 2,3

1. Analyze data using grouping techniques and draw the histogram.

2. Use other graphical methods for describing qualitative data.

3. To use the available software to perform the following tests:
    entering data, describing data, displaying data.

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II. STUDENT PERFORMANCE OBJECTIVES: (continued...)

UNIT III Numerical Methods for Analyzing Data
        Newmark Chapter 3

1. Calculate the mean, median and mode of given data as well as the range, standard deviation and variance.

2. Make calculations as above for grouped data.

3. Compute Z-scores and percentiles and make use of these.

UNIT IV Probability
        Newmark Chapter 4

1. Use the concept of probability and make calculations involving permutations and combinations.

^)2. Determine the probability of events involving cards, dice and lottery games.

UNIT V Probability Distributions
        Newmark Chapter 5

1. Use the probability rules and apply them to problems for events which are mutually exclusive, conditional and independent.

2. Use binomial probability and make calculations for events which follow a binomial distribution.

UNIT VI The Normal Distribution & Sampling
        Newmark Chapter 7 and Chapter 8
        RJR Chapter 6

1. Make calculations involving the standardized normal distribution.

2. Discuss the properties of a random sample and how one is obtained.

3. Discuss the properties of a stratified sample and how one is obtained.

4. Make calculations involving the Central Limit Theorem.

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II.   STUDENT PERFORMANCE OBJECTIVES: (continued...)

UNIT VII   Estimation
          Newmark Chapter 9
          RJR Chapter 7

1. Make calculations for 5 at varying levels of significance when N>30
    and when N<30.

2. Make calculations for s at varying levels of significance when N>30
    and when N< 3 0.

3. Determine the size of sample required such that the estimate of 5
    is less than the maximum allowable error.

4. Make calculations involving proportions for s and 95% CI for p.

UNIT VIII   Linear Regression & Correlation
          Newmark Chapter 11
          RJR Chapter 10

1. Calculate r and determine whether it is reliable.

2. Determine the regression line in the form $Y = b_o + b_l x$

3. Use transformations to obtain the best straight line.

4. Obtain the quadratic equation for non-linear data.

5. Make calculations using the regression line.

6. Plot the regression line on the given data.

7. Analyze the regression line as to its usefulness as a valid model.

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III. TOPICS TO BE COVERED:

TOPIC	WEEKS	TOPIC DESCRIPTION	REFERENCE
	0.5	<u>Introduction</u> (5% of total time) - definition, development and scope of statistics	pp. 3-21

	1.5	<u>Descriptive Statistics</u>
		(10% of total time)
		- quantitative and qualitative data
		- discrete and continuous variables
		- frequency tables, histograms,
		  frequency polygon, cumulative
		  frequency polygon
		- Minitab applications - Histogram,
		  Stem & Leaf, Dot Plot Box Diagram
			pp. 23-98

	2.0	<u>Numerical Methods for Analyzing</u> <u>Data</u> (15% of total time) - summation notations - means and weighted mean - median, mode - range, variance mean deviation - standard deviation - Minitab applications, Z-score, percentile	pp. 99-172
	2.0	<u>Probability</u> (15% of total time) - meaning and types of probability - probability computations - permutations - combinations dependent and independent events - (Omit Bayes Theorem)	pp. 173-233

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TOPIC	WEEKS	TOPIC DESCRIPTION	REFERENCE
5	3.0	Probability Distributions (20% of total time) - definition, binomial distribution, mean and standard deviation - normal distribution and normal approximation of the binomial - (Omit Poisson and Hypergeometric) - Minitab introduction and assignment	pp. 234-285
	1.5	The Sampling Distribution (10% of total time) - sampling methods, Central Limit Theorem - Minitab applications)	pp' 353-398 399-434
	1.5	Estimation (10% of total time) - interval estimate of means and proportions, sample size - Minitab application(s)	pp. 435-474
	2.0	Linear Regression &. Correlation (15% of total time) - method of least squares, scatter diagrams, coefficient of correlation, standard error - Minitab applications	pp 465-525 533-596

One hour per week (2 hours every second week) are scheduled in the terminal room for Minitab applications. Extra hours will be required to complete assignments.

IV. EVALUATION METHODS:

Grades:

The student's final mark for this course will be based on the following:

          Assignment, Lab Test   40%
          3 Term Tests 620%   60%

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IV. EVALUATION METHODS: (cont'd)

Grades reported on your transcript are based on an average of test scores
on the following basis:

>   A+ = 90 - 100%
>   A = 80 - 89%
>   B = 70 - 79%
>   C = 60 - 69%

A term test will be held at the end of each major segment of the course.

All tests are scheduled in advance. Hence, attendance is mandatory.
Unexcused absence from a test will result in a mark of zero for that test.
A student may be prevented from attending a test by illness or bereavement.
Upon return to classes, the student must see the instructor at the end of
the first class attended to arrange a time and place for a make up test.
In addition, if the absence is due to illness, the student must present a
note from the student's doctor or from the College nurse.

V. REQUIRED STUDENT RESOURCES:

TEXTBOOK:

"Statistics and Probability in Modern Life", 5th Edition, Newmark
(Saunders Publishing)

Minitab Quick Reference, 2nd e.d, Minitab Inc.

Minitab Manual by Blaisdell

VI. SPECIAL NOTES:

Students with special needs (e.g. physical limitations, visual impairments,
hearing impairments, learning disabilities) are encouraged to discuss
required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems
necessary to meet the needs of students.