SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE:	INTRODUCTORY STATISTICS
CODE NO-:	MTH25 6-4 **SEMESTER:** III
PROGRAM	PULP & PAPER / WATER RESOURCES / ENVIRONMENTAL ENG
AUTHOR	D. HEGGART
DATE	JUNE 1992 **PREVIOUS OUTLINE DATED:** JAN, 1992

APPROVED: _____
DEAN, SCHOOL OF SCIENCES &
NATURAL RESOURCES

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...)

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

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 make use of these.

UNIT ly 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.

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

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

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.

UNIT VII   Estimation
        Newmark Chapter 9
        RJR Chapter 7

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

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

3. Determine the size of sample required such that the estimate of $\ddot{\mu}$
    is less than the maximum allowable error.

4. Make calculations involving proportions for a and 95% CI for TT.

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

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

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 $\hat{Y} = b_o + b_1 X$

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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COURSE NAME   **COURSE NUMBER**

III, TOPICS TO BE COVERED

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

	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. 2 3-9 8

	8	<u>Numerical Methods for Analyzing</u> <u>Data</u> (10% of total time) - summation notations - mdans and weighted mean - median, mode - range, variance mean deviation - standard deviation - Minitab applications	pp. 99-172
	8	<u>Probability</u> (5% 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   PERIODS TOPIC DESCRIPTION   REFERENCE

  5   12   Probability Distributions   pp. 234-285
                      (5% 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

                      The Normal Distribution
                      and Sampling   pp   353-398
                      (15% of total time)   399-434
                      - sampling methods, Central Limit
                        Theorem
                      - Minitab application(s)

                      Estimation   pp. 435-474
                      {15% of total time)
                      - interval estimate of means and
                        proportions, sample size
                      - Minitab application{s)

                      Linear Regression & Correlation pp. 465-525
                        (35% of total time)   533-596
                      -'method of least squares, scatter
                        diagrams, coefficient of
                        correlation, standard error
                      - Minitab applications

Two hours per 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, Quizzes, Term Tests   50%
    Final Exam (2 Parts)   50%

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 Handbook, 2nd ed., RJR

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.   ^