

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: INTRODUCTORY STATISTICS


CODE NO.: MIH256-j4 SEMESTER! III

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

AUTHOR: D. HEGGART

DATE: JANUARY 1992 PREVIOUS OUTLINE DATED: NEW

APPROVED:

  
DEAN SCHOOL OF SCIENCES &  
NATURAL RESOURCES

DATE

/19\

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

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.

INTRO. STATISTICS

MTH256-4

**COURSE NAME**

**COURSE NUMBER**

**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 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.

INTRO. STATISTICS

MTH256-4

**COURSE NAME**

**COURSE NUMBER**

**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

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

1. Make calculations for  $\mu$  at varying levels of significance when  $N > 30$  and when  $N < 30$ .
2. Make calculations for  $\sigma$  at varying levels of significance when  $N > 30$  and when  $N < 30$ .
3. Determine the size of sample required such that the estimate of  $\mu$  is less than the maximum allowable error.
4. Make calculations involving proportions for  $p$  and 95% CI for  $\mu$ .

INTRO. STATISTICS

MTH256-4

**COURSE NAME**

**COURSE NUMBER**

**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

1. Calculate  $r$  and determine whether it is reliable.
2. Determine the regression line in the form  $Y = b + b.x$
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,

INTRO. STATISTICS

MTH256-4

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. 3-18
		<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. 21-85
		<u>Numerical Methods for Analyzing Data</u> (10% of total time) - summation notations - means and weighted mean - median, mode - range, variance mean deviation - standard deviation - Minitab applications	pp. 87-148
		<u>Probability</u> (5% of total time) - meaning and types of probability - probability computations - permutations - combinations dependent and independent events - (Omit Bayes Theorem)	pp. 149-207

INTRO. STATISTICS

MTH256-4

COURSE NAME

COURSE NUMBER

TOPIC	PERIODS	TOPIC DESCRIPTION	REFERENCE
5	12	<u>Probability Distributions</u> (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	pp. 208-238
6	5	<u>The Normal Distribution</u> <u>and Sampling</u> (15% of total time) - sampling methods, Central Limit Theorem - Minitab applications)	pp. 313-382
		<u>Estimation</u> (15% of total time) - interval estimate of means and proportions, sample size - Minitab applications)	pp. 383-416
		<u>Linear Regression &amp; Correlation</u> (35% of total time) - method of least squares, scatter diagrams, coefficient of correlation, standard error - Minitab applications	pp. 465-525

\*  
Two hours per week are scheduled in the terminal room for Minitab applications. Extra hours will be required to complete assignments.

INTRO. STATISTICS

MTH256-4

**COURSE NAME**

**COURSE NUMBER**

**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", 4th Edition, Newmark (Saunders Publishing)

Minitab Handbook. 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. ^^^m

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