

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY  
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: APPLIED STATISTICS

Code No.: PPE 345-4 SEMESTER: V

Program: ENVIRONMENTAL/WATER RESOURCES  
PULP AND PAPER ENGINEERING TECHNOLOGY

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Date: DECEMBER 1992 Previous Outline Dated: MAY 1988

APPROVED:

Dean



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Prerequisite: MTH 2 56

Total Credit Hours: 6 8

**I. PHILOSOPHY/GOALS;**

Applied Statistics is a problem-solving course in which the software program 'MINITAB' is used. The course provides the student with an opportunity to become more familiar with the mainframe computer. Most of the problems are or can be applied directly to the student's main field of study. In addition, many students will be able to apply what they learn in this course to the manipulation of data collected while doing their technical project.

**II. STUDENT PERFORMANCE OBJECTIVES:**Analysis of Variance

1. To analyze several sample means using Single Factor Analysis of Variance.
2. To set up ANOVA tables, determine  $F_{exp}$  and subject this value to critical analysis.
3. To analyze data using two-way analysis of variance.

Chi-Square and Contingency Tables

1. To present chi-square tests which provide the basis for testing whether more than two populations can be considered as equal.
2. To develop contingency tables of given data, and subject this data to chi-square.
3. To analyze expected frequencies, and determine  $X^2_{exp}$ , and subject this value to critical analysis.

Correlation, Regression and Transformations

1. To determine if there is a relationship between two parameters.
2. To calculate the value of  $r$ , and determine the reliability of this value.
3. To calculate the regression line for the parameters, determine the residuals, and analyze these residuals for simple relationships.
4. To apply the same technique to data, using multiple regression.
5. To transform the data, using simple transformations and polynomials.

Hypothesis testing

1. To state the null and alternate hypothesis in a mathematical manner and also in a sentence.
2. To analyze data and reject or accept  $H_0$ .
3. To identify the two errors that can be made using sample data to accept or reject  $H_0$ .
4. To use the correct statistical analysis for a given set of data.

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**III. TOPICS TO BE COVERED:**

1. Introductory MINITAB commands including MEAN, MEDIA, STANDARD DEVIATION, etc.
2. Plotting data, including log plots
3. Manipulation of data using MINITAB commands such as OMIT, CHOOSE, PICK, JOIN, SAVE, etc.
4. Confidence intervals for
5. Test of hypotheses for
6. Comparing two means, paired t-test TWOS.
7. Application to simple hydraulic problems.
8. Analysis of chemical data.
9. Correlation and simple regression, fitting a straight line.
10. Multiple regression, interpreting residuals.
11. Transformations.
12. Analyses of variance using AOVO.
13. CHI-SQUARE TESTS AND CONTINGENCY TABLES.
14. Additional problems using combination of the above.
15. Statistical Process Control - including control charts, (X + R) histograms, percentage out of specification, capability **concept**, p-chart, interpretation of control charts.

Minitab Chapters (RJR)  
5,6,7,8,9,10,11,12

Newmark Chapters  
6,10,12,13,14

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**IV. EVALUATION METHODS:**

90%            A+  
80%            A  
70%            B  
60%            C

		Approx. Weight
Based on the following:	Tests (including a mid-term) )	80%
	Assignments & Quizzes )	20%

Applied Statistics is a continuation of MTH 256. The student is introduced to hypothesis testing, multiple regression, chi-square and analysis of variance. In addition to calculations done using a hand calculator, extensive work using MINITAB software program is required.

A number of assignments are required (approximately 15-20) of which certain ones are to be submitted for marking. These assignments contribute to the term work. A mid-term test, as well as additional short tests and quizzes complete the evaluation.

The course outline is keyed to MINITAB Handbook, 2nd Edition, and uses any standard statistics text as a supplement.

Students will write a final examination. However, all students having 70% overall are exempt from the final. The final mark will be 50% of the overall grade, while the term work will account for the remaining 50%. A student having selected the option will have his/her grade based on the above.

ATTENDANCE: It is expected that all students at this level will have regular attendance (80%) of all theory classes and that any missed computer time will be made up by the student. Additional hours on the terminal will be required outside of those regularly scheduled.

**V. REQUIRED RESOURCES:**

Minitab Student Handbook, 2nd Edition. Ryan, Jorner, Ryan, Duxbury Press (1985)

Statistics Text from MTH 256 - Statistics & Probability in Modern Life, 5th Edition. Newmark, Saunders (1992)

Minitab Manual for Statistics & Probability in Modern Life - Blaisdell, Saunders 1992.

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**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.