SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE	CALCULUS
CODE NO.	MTH370-4 **SEMESTER** V
PROGRAM;	MECHANICAL TECHNOLOGY
AUTHOR:	JOHN REAL
DATE:	JULY 1992 **PREVIOUS OUTLINE DATED** AUGUST 1991

APPROVED

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COURSE NAME   **COURSE NUMBER**

TOTAL CREDIT HOURS: 64

PREREQUISITE(S): MTH577 or MTH578

I. PHILOSOPHY/GOALS:

This advanced course in calculus contains some special methods of
integration, various types of first and second order differential
equations, solutions using Laplace transforms and applications related
to mechanical areas.

II   STUDENT PERFORMANCE OBJECTIVES

The basic objectives are that the student develop an understanding of
the methods studied, demonstrate a knowledge of the facts presented and
show an ability to use these in the solution of problems. To
accomplish these objectives, exercises are assigned. Test questions
will be of near equal difficulty to questions assigned in the
exercises. The level of competency demanded is the level required to
obtain an overall passing average on the tests. The material to be
covered is listed below.

III. TOPICS TO BE COVERED: **TIME FRAME**

1. Methods of Integration   2 2 periods

2. Multivariable Functions   8 periods

3. Differential Equations   2 8 periods

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IV. LEARNING ACTIVITIES: **REQUIRED RESOURCES**

1.0 Methods of Integration   Chapter 2 7

1.1 The general power formula. Questions i - 24, p. 843

1.2 Integration by use of   Questions 1 - 32, p. 872
     tables.

1.3 The basic logarithmic form. Questions 1 - 28, p. 846
     (review)

1.4 The exponential form.   Questions 1 - 24, p. 850
     (review)

1.5 Basic trigonometric forms. Questions 1 - 24, p. 853
     (review)

1.6 Other trigonometric forms. Questions 1 - 28, p. 858
     (review)

1.7 Inverse trigonometric forms. Questions 1 - 28, p. 862

1.8 Integration by parts.   Questions 1 - 16, p. 866

1.9 Integration by trigonometric Questions 1 - 16, p. 870
     substitution.

1.10 Integration by partial   Questions 1 - 12, p. 992
     fractions   1 - 12, p. 997

1.11 Review exercise.   Questions 1 - 36., p. 875

2.0 Multi-variable Functions   Supplementary Topics

2.1 Functions of two variables. Questions 1 - 13, p. 972

2.2 Partial derivatives.   Questions 1 - 17, p. 983

2.3 Double integration.   Questions 1 - 8, p. 988

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IV. LEARNING ACTIVITIES(cont'd)   **REQUIRED RESOURCES:**

3-0 <u>First Order Differential</u>   Chapter 2 9
    <u>Equations</u>

3.1 Solutions of differential   Questions 1 - 24, p. 812
    equations.

3.2 Separation of variables.   Questions 1 - 30, p. 917

3.3 Integrable combinations.   Questions 1 - 30, p. 919

3.4 Linear first order DE.   Questions 1 - 32, p. 922

3.5 Elementary applications.   Questions 1   40, p. 927
                                        Handout

4.0 <u>Higher Order Differential</u>   Chapter 2 9
    <u>Equations</u>

4.1 Homogeneous equations with   Questions 1 - 28, p. 933
    constant coefficients.

4.2 Auxiliary equations with   Questions 1 - 32, p. 937
    repeated or complex roots.

4.3 Solutions of nonhomogeneous   Questions 1 - 28, p. 941
    equations.

4.4 Applications of second-   Questions 1 - 10, p. 947
    order differential   Hand-out
    equations.

4.5 Laplace transforms.   Questions 1 - 24, p. 953

4.6 Solving DE using Laplace   Questions 1 - 16, p. 956
    transforms.

4.7 Review exercise   Questions 1 - 43, p. 957

V.   METHOD OF EVALUATION:

1.   Three - four tests per semester.

2.   Final grade is a weighted average of these tests

$$85 - 100 = A+$$
$$75 - 84 = A$$
$$65 - 74 = B$$
$$55 - 64 = C$$
$$0 - 54 = R \text{ (or}$$

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.   If a student is prevented from writing a test by illness, the instructor should be notified before the time of the test. Upon return to class, the student should see the instructor immediately to arrange a time for a make-up test. The student should have a note from the college nurse or a doctor.

VI. REQUIRED STUDENT RESOURCES:

Washington, <u>Basic Technical Mathematics With Calculus</u>, Fifth edition, metric version. Benjamin/Cummings Pub. Co. 1990

VII. 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.

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