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SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE, MARIE, ONTARIO

COURSE OUTLINE

Course Title: MATHEMATICS

Code No.:   MTH 220-4

Program: ELECTRICAL AND ELECTRONIC TECHNICIANS

Semester: II

Date   DECEMBER, 1986

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New: Revision:

APPROVED: _____

            Chairperson   Dat *V*
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CALENDAR DESCRIPTION

MATHEMATICS   MTH 220-4

COURSE NAME   COURSE NUMBER

ELECTRICAL AND ELECTRONIC TECHNICIANS

PHILOSOPHY/GOALS:

The coures begins with number systems and Boolean algebra followed
by complex numbers. These topics are needed in certain major
subject areas. The course continues with a review of secondary
school algebra and trigonometry and extends each of these topics a
bit beyond the level of many secondary school programs.

METHOD OF ASSESSMENT (GRADING METHOD):

The students will be assessed by tests. These tests will include
periodic tests based upon blocks of subject matter and may, at the
instructor's discretion include unannounced surprise tests on
current work and/or a final test on the whole course. A letter
grade will be based upon a student's weighted average of his test
results. See also the mathematics department's annual publication
"To the Mathematics Student" which appears as the last two pages of
this course outline.

As in any other subject, the student is preparing to be a
technologist or technician as well as studying the subject- Hence,
on tests the student is expected to produce neat, legible, well laid
out solutions which show clearly how the answer is obtained. If
anything less is required, this will be indicated in the test.
Failure to show such solutions may render correct answers worthless-
As happens in the workplace, if anything you put on paper can be
misread, it will be! In addition to loss of marks on individual
questions, up to 25% of the marks available on a test can be
subtracted as a penalty for untidiness. Marks lost in such
penalties can be redeemed by a student willing to put forth the
required effort.

Proper solutions as described above should be produced for all your
assigned work. Such practice will make it easier for you to produce
the required quality of work on tests. If when you look at a page
of your work it makes you feel proud of its appearance, then you are
probably on target.

Marks allotted to each question on a test are usually shown. Please
enguire if they are not.

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TENTATIVE INSTRUCTIOH AND TEST SCHEDULE

TOPIC NO.	APPROX- NO. OF PERIODS	TENTATIVE TEST DATE	TOPIC WEIGHT
1	15	To be	30
2	12	announced	24
3,4	12	early in	24
5	12	the term.	24
6	9		18
TOTALS	60		120

Before recording, test results will be adjusted to reflect the value indicated under "TOPIC WEIGHT". The average required for each letter grade is listed below for your convenience. Please note that in addition to a minimum total mark, there are additional requirements to qualify for a grade of "I" or "X".

LETTER GRADE	MINIMUM AVERAGE REQUIRED
A+	90%
A	80%
B	65%
C	55%
I or X	44%

The notes on the last two pages, entitled "TO THE MATHEMATICS STUDENT" are applicable to all mathematics courses at Sault College

TEXTBOOK(S):

   Calter: Technical Mathematics with Calculus

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NOTE:

The electrical course differs from the parallel mechanical course by
the inclusion of the topics "Complex Numbers" and "Number Systems and
Boolean Algebra". The two courses are out of step throughout the
semester.

ENTRY TO COURSES:

Entry to MTH 220 can be earned by passing one of the first semester
math courses, either MTH 413 or MTH 120.

In special circumstances a student who has failed one of these
courses and who is otherwise a very good student, may be permitted to
take MTH 120 and MTH 220 in the same semester. For details see the
course outline for the first semester math course taken by the
student under consideration (MTH 413 or MTH 120).

ENTRY TO SUBSEQUENT COURSES:

Satisfactory completion of MTH 220 is required for admission to third
semester technician math courses.

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ELECTRICAL AND ELECTRONIC TECHNICIANS
SEMESTER TWO

TOPIC OBJECTIVES;

1. Number Systems and Boolean Algebra

    The student will be required to:

    - Be able to express any number as a binary, octal, hexadecimal or binary coded decimal number-

    - Be able to perform arithmetic manipulations with numbers in any of the above forms.

    - Be able to subtract using complements.

    - Be able to write a Boolean expression corresponding to any logic current.

    - Be able to draw a logic circuit corresponding to any Boolean expression.

    - Be able to generate a truth table for any logic circuit.

    - Be able to simplify logic circuits by use of Boolean algebra.

2. Complex Numbers:

    The student will be required to:

    a) Express a complex number in rectangular, polar or trigonometric form.

    b) Convert from any form to any other form.

    c) Perform arithmetic and algebraic operations with complex numbers including multiplication, division, addition, subtraction, use of brackets, powers and roots.

3. Radicals:

    The student will be required to;

    a) Simplify algebraic expressions involving powers and radicals.

TOPICAL OBJECTIVES - Continued

4. Quadratic Equations:

    The student will be required to;

    a) Recognize and solve quadratic equations by quadratic formula.

    b) Be able to use the discriminant to identify the kind of roots a quadratic equation has without solving the equation.

    c) Be able to solve radical equations including the rejection of extraneous roots*

5. Angles and Oblique Triangles:

    The student will be required to:

    a) Be able to find any trigonometric function of any anqle.

    b) Be able to find the angles corresponding to any given function vali

    c) Be able to use radian angle measure in solving problems.

    d) Be able to solve problems involving scalene triangles by use of th* sine and cosine laws.

6. Graphs of Trigonometric Functions;

    The student will be required to;

    a) Understand and use the concepts of amplitude, period, frequency an(

       phase angle-

    fa) Plot curves of trigonometric and inverse trigonometric functions-

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SEMESTER TWO

OBJECTIVES;

The basic objective is for the student to develop an understanding of
the methods studied, knowledge of the facts presented and an ability to
use these in the solution of problems. For this purpose exercises are
assigned. Tests will reflect the sort of work contained in the
assignments. The level of competency demanded is the level required to
obtain an overall passing average in the tests. The material to be
covered is listed below:

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	ASSIGNMTS	REF
1	15	NUMBER SYSTEMS ^ BOOLEAN ALGEBRA		
		- Binary, octal, hexadecimal		
		- Change of base, algebra of elements	PRINTED SHEETS	
		- Addition, multiplication, subtraction & division		
		- Definition of elements & operators		
		- Truth tables, derivation & use of simple identities		
		- Application to logic & switching circuits		
	12	COMPLEX NUMBERS	TEXT EX 18-1,2 3,5,6 (pt)	TEXT, 18 oramitt •ing Sec. 18
		- Complex Numbers		
		- Operations with Complex Numbers in Rectangular Form		
		- Graphing Complex Numbers		
		- Trigonometric and Polar Forms of Complex Number		
		- Vectors		
		- Alternating-Current Calculations		
		RADICALS	TEXT EX. 10- lr2 3	TEXT, CHAPTER 1
		- Simplification of Radicals		
		- Operations with Radicals		
		- Radical Equations		

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		QUADRATIC EQUATIONS	TEXT EX 11-5	TEXT CHAPTER 11,SEC. 5 only
		- Solution by Formula		
		- Fractional and radical equations		
	12	ANGLES AND OBLIQUE TRIANGLES	TEXT EX 12-1 TO 12-3, EX 13-1 TO 13-4	TEXT CHAPTERS 12 & 13
		- Trigonometric Functions of any Angle		
		- Radian Measure and Arc Length		
		- Law of Sines		
		- Law of Cosines		
		- Applications		
		- Addition of Vectors		
		GRAPHS OF TRIGONOMETRIC	TEXT EX 14-1 14-4	TEXT CHAPTER 1
		- The Sine Curve Cosine and Tangent Curves Polar Co-oridinates Two Applications of Sine or Cosine Waves		

Part of the marks for topic #6 will be based upon a class assignment
For an assignment to be accepted, the student must have full
attendance while the topic is being covered.

TO THE MATHEMATICS STUDENT   September, 1986

GRADES

Each Mathematics grade is based upon a weighted average of test scores on the following basis:

80%-89%	A
65%-79%	B
55%-64%	C
45%-54%	I, X, OR R (See #5 & 6)
0% -44%	R

First semester students who are proceeding into second semester Electrical, Electronic or Mechanical Technician Programs may have a different set of grade requirements, which will be defined in class-

The method of calculating your weighted average will be defined by your instructor. Since grades are based upon averages, it follows that good marks in some tests can compensate for a failing mark in another test. If there are extenuating circumstances, an instructor can make an exception and assign an "I" or "X" grade even if the average is below 45%.

TESTS

While regular tests will normally be scheduled and announced beforehand, there can be an unannounced test on current work at any time. Such tests, at the discretion of the instructor, can be used for up to 30% of the overall mark.

At the discretion of the instructor, there can be a final test which can be used for up to 30% of the overall mark. Anything included in the work of the semester is fair game on such a final test.

ABSENCE FROM CLASS

If you are absent from class, it is your responsibility to find out from another student what work was covered and assigned and to complete this work before the next class. Your absence indicates your acceptance of this responsibility.

TO THE MATHEMATICS STUDENT.- continued

4. TEST ABSENCE

    Unexcused absence from a scheduled test will result in a zero mark. Absence may be excused on compassionate grounds such as verified illness or bereavement. On return from an excused absence, you should ask your instructor about writing a make-up test.

    If your instructor uses short unannounced tests, the following will apply. Unexcused absence from such a test will result in a zero mark. If absence from such a test is excused, then, at your request, the marks for that test will be excluded from the calculation of your course average.

    MAKE-UP PERIOD (IF APPLICABLE)

    An "X" grade may be assigned at the end of the regular semester if your have achieved an overall average between 45%-54% and your attendance and effort on the course have been satisfactory. Satisfactory attendance and effort ' will include writing all the topic tests and attending at least 80% of the scheduled classes• If you are assigned an "X" grade, you may convert it to a "C" grade by passing a make-up test on the whole course. This test will be available only at the time specified by your instructor. At the end of the regular term, it is the student's responsibility to obtain his/her results from his/her instructor and, in the event of an "X" grade, to inquire when the make-up test will be available. At the discretion of the instructor, a topic make-up test may be used instead of an overall test in special circumstances. No student will be permitted more than one such topic make-up test.

6. "R" AND "X" GRADES - AT THE END OF THE SEMESTER

    If an "X" grade is not cleared by the specified date, it will become an "R" grade. Except for extenuating circumstances, an "X" grade in Math will not carry on into the next semester.

7. "R" GRADES DURING THE SEMESTER

    A student with a failing grade and poor attendance (less than 80% attendance) may be given an "R" at any time during the semester.