

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: MATHEMATICS
Code No.: MTH 551-4
Program: MECHANICAL TECHNOLOGY
Semester:
Date: MAY 11, 1983
Author: J. SUFADY

New;

Revision

APPROVED:



'Chafr^on^o ^

Date

MECHANICAL TECHNOLOGY
MTH 551-4
MATHEMATICS

CALENDAR DESCRIPTION

<u>MATHEMATICS</u>	MTH 551-4
Course Name	course Number

PHILOSOPHY/GOALS:

Students studying mathematics at this level are those individuals where a certain degree of originality, a sense of logic and an ability to learn independently are required of them in their major subject area- This course serves to exercise these 3 requirements and to also give them a theoretical knowledge for their academic subjects-

METHOD OF ASSESSMENT (GRADING METHOD):

1. 3 - 4 tests per semester
2. Final Grade is a weighted average of these tests.
3. A failing grade at the end of the semester can be upgraded by writing a 2 hour comprehensive examination.

TEXTBOOK(S):

Washington, Allan, J., Technical Calculus With Analytic Geometry

MECHANICAL TECHNOLOGY
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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 other 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 on the following page(s).

Topic Number	<u>Periods</u>	Topic Description	Reference
		<u>Number Systems (Electrical & Electronic only)</u> Binary, Octal, binary coded decimal systems Change of base Addition & Multiplication tables Algebra of elements	Major subject test ^ Maivino & Leach Ch. 2, 3, 4
		<u>Boolean Algebra (Electrical & Electronic only)</u> Definitions of Z elements & 2 operations Truth Tables Derivation of simple Identities Negation - the not operator Application to logic & switches	
		<u>Empirical Equations (Aviation only)</u> Linear empirical equations Non-linear empirical equations	See text booklists Ref. #12 Ch. 5
			Rice & Knight 2nd Edition Ch. 6, p. 131-136 Ch. 14, p. 334-352

MECHANICAL TECHNOLOGY
MTH 551-4
MATHEMATICS

Topic Number	Periods	Topic Description	Reference
4	4	<p>Interpolation (Aviation only) (tabulated performance charts) Review basic Interpolation trends In tabulated data (4 place logarithm & natural trig tables) Use of Aviation CR-3 type computers In Interpolation (proportions) Multiple Interpolation procedures Practical Problems <i>in</i> assorted performance tables take-off landing, climb & cruise performance charts.</p> <p><u>Graphical (Performance Charts)</u> (Aviation only) Reading graphical charts Normal critical path through multiple graph charts Reverse path through multigraph charts given conditions Practical problems</p> <p><u>Graph Preparation (Aviation only)</u> Procedures for making engineering graphs Selection of axis, names, labelling techniques Multiline graphs from tabulated performance charts Interpolation in multiline graphs Winds aloft graph on CR-3 computer Practical assignments</p> <p><u>Graphical Methods of Calculus</u> Gradients of curves, rate of change Slopes of graphs of linear & non- linear functions Average & instantaneous rates of change</p>	<p>Any 4 place log & trig table</p> <p>Cessna 172M Cessna 180 Cessna 182</p> <p>Cessna 172M</p> <p>Cessna 172M</p> <p>Piper Twin Comanche</p> <p>Rice & Knight Ch, 24</p>

MECHANICAL TECHNOLOGY
 MTH 551-4
 MATHEMATICS

Topic Number	Periods	Topic Description	Reference
8		<u>Introduction to Differential Calculus</u> Functional notation Limiting value of a function Differentiation-delta method Practical applications-rectiline motion	Washington p, 45-64 Blakely, Ch. 3 p. 31-53 Person, Ch. 2, 8, 9, 10, 11. 12
	12	<u>Differentiation by Rule</u> Differentiation formulas Composite function & the chain rule Implicit differentiation Electrical applications Successive differentiation	Washington p. 64-84 Blakely. Ch, 5 & 6 p. 80-110 Person Ch. 13, 14, 15. 16
10	10	<u>Practical Application of Differentiation</u> Gradients Tangents to curves Maxima and minima (Aviation should finish the semester here) Related rate problems	Washington p. 85-112 Blakely, Ch, 4 p, 54-79 Person Ch- 15, 17, 18, 20
11	5	<u>Differential and Integral</u> (for Mechanical, give more application time) Differential formulas Applications of differential Integration as anti-differentiation Applications of indefinite integration Algebraic substitution (Electrical/Electronic should finish the semester here)	Washington p. 113-127 Blakely, Ch. 7 p. 111-120 Person Ch. 21, 22, 23
12	9	<u>Definite Integration</u> Areas under a curve Fundamental theorem of integral calculus Computations with definite integrals Application to areas, volume, motion electrical problems (Mechanicals should finish the semester here)	Washington p. 128-153 Blakely p. 121-141 Person Ch. 24, 25. 26