SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

COURSE TITLE: TECHNICAL MATHEMATICS

CODE NO-: MTH654-4   **SEMESTER:** IV   3 HRS/WK

PROGRAM: AVIATION TECHNOLOGY AND PILOT TRAINING

AUTHOR: W. MACQUARRIE

DATE: JULY 1993   **PREVIOUS OUTLINE DATED** JULY 1992

APPROVED

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TECHNICAL MATHEMATICS   MTH654-4

COURSE NAME   COURSE NUMBER

TOTAL CREDIT HOURS: 64

PREREQUISITE(S):   MTH626-4

I.   PHILOSOPHY/GOALS:

1) Review the analytic geometry of the straight line and conic
    sections.

2) Study various methods of finding empirical equations from raw lab
    data.

3. Formatting and use of graphical aircraft performance charts as
    found in Cessna and Piper Aircraft operators' manuals.

4. Review derivatives of trig, log and exponential functions.

5. Methods of integration (continued from MTH626).

II.   STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will be able to:

1. Layout graphs and find the general equations of various straight
    lines, circles, parabolae, ellipses and hyperbolae.

2. Find the empirical equations for any set of raw lab data by various
    methodsf 2 pt method, method of averages for linear relationships,
    method of selected points on general polynomials.

3. Create and/or use multiline graphs to determine flight parameters
    of the Piper Twin Commanche.

4. Differentiate and integrate various trig, log exponential and other
    functions.

III.   TOPICS TO BE COVERED: TIME ALLOTTED

1. Analytic Geometry.   6
2. Empirical Equations.   11
3. Twin Commanche Performance Graphs.   6
4. Derivatives of Trig, Log Exp. Functions. (Review)   6
5. Methods of Integrating Trig, Log Exp. Functions, etc. 18

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COURSE NAME	**COURSE NUMBER**

IV.   LEARNING ACTIVITIES   **REQUIRED RESOURCES**

Topic
No.   PERIODS DESCRIPTION

1	6	ANALYTIC GEOMETRY -	Washington Text - Chapter 20

-Properties, formulae and applications of the straight line, circle, parabola ellipse, and hyperbola.

Washington Text - Chapter 20
Pages 558-600
Problems from:
Exercise 20.1
Exercise 20.2
Exercise 20-3
Exercise 20-4
Exercise 20-5
Exercise 20-6
Review Exercise P . 609-61
20-7

2	11	EMPIRICAL EQUATIONS -	Handout Notes - Teacher Assigned Problems, Assignments

-Linear empirical equations
 Two point method and method of averages
-Non-linear empirical equations
 (1) General polynomial function-method of selected pts
 (2) Power function
-2-pt method
-Method of averaging logs
-Graphical method

GRAPHICAL PERFORMANCE CHARTS -

Piper Aircraft Twin Commanche Manual

Reading graphical charts
•Normal critical path through multi-graph charts
•Interpolation in multiline graphs
•Reverse path through multi-graph charts
•Double entry into multi-graph charts
•Simulated flight planning.

Teacher Assigned Flight Planning Projects

TECHNICAL MATHEMATICS   **MTH654-4**

COURSE NAME   **COURSE NUMBER**

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

Topic
 No.   PERIODS DESCRIPTION

	REVIEW OF DERIVATIVES OF EXPONENTIAL AND LOGARITHMIC FUNCTIONS -	Washington Text - Chapters 12,26 Pages 349-361, 805-839 Problems from: Exercise 12.1
	•Exponential and log functions	Exercise 12.2 Exercise 12.3
	•Derivatives of logarithmic functions	Exercises 25-5 p,825
	•Derivatives of exponential functions	Exercises 26-6 p.829 Exercises 26-7 p.833
	-Application of above	Review Exercises
18	METHODS OF INTEGRATION -	Washington, Chapter 27
	-Power Formula	Exercise 27-1 p.843
	-Basic logarithmic form	Exercise 27-2 846
	-Exponential form	Exercise 27-3 850
	-Various trigonometric forms	Exercise 27-4 853
		Exercise 27-5 858
		Exercise 27-6 p.862
		Review Exercises

V. METHOD OF EVALUATION:

The student will be assessed by written tests, including up to five major periodic announced tests based on large blocks of subject matter, and several unannounced short quizzes on current work, the latter being given at the discretion of the instructor. Up to two assignments on empirical equations and/or aircraft graphs may be included in the course. A final test on the entire course may also be included, counting up to 30% of the final semester grade. A letter grade will be determined based upon an average of the above.

GRADING: A+ = 90 - 100%
                    A = 80 - 89%
                    B = 65 - 79%
                    C = 55 - 64%
                    1/ X or R = less than 55%**

** See also the "ATL DEPT. EVALUATION GUIDELINES" publication for complete procedures and policies.

VI. REQUIRED STUDENT RESOURCES:

Basic Technical Calculus with Analytic Geometry; A.J. Washington, 5th edition - Benjamin Cummings.

VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY BOOK SECTION:

None available.

VIII. 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.