

THE SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY
SAULT STE. MARIE, ON



COURSE OUTLINE

Course Title: Technical Mathematics

Code No.: MTH 6540-4

Semester: Winter

Program: Aviation Technology and Pilot Training

Author: The Mathematics Department

Date: August 2002

Previous Outline Dated: August 2001

Approved: _____
Dean Date

Total Credits: 4

Prerequisite(s): Mth 626-4

Length of Course: 4 hrs./week

Total Credit Hours: 64

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School of Student Success Services, Business and Liberal Studies
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I. COURSE DESCRIPTION:

This course will:

1. Study methods of integration
2. Study McLaurin and Taylor series
3. Study first and second order differential equations

II. LEARNING OUTCOMES**Learning Outcomes:**

Upon successful completion of this course, students will demonstrate the ability to:

1. Integrate trigonometric, logarithmic, and exponential functions and apply results
2. Generate and evaluate McLaurin and Taylor series for various functions and apply results
3. Solve some types of first and second order differential equations and apply results

III. TOPICS:**Hours Allotted**

- | | |
|---------------------------|----|
| 1. Methods of integration | 20 |
| 2. Infinite series | 15 |
| 3. Differential equations | 25 |

IV. LEARNING ACTIVITIES

| TOPIC NUMBER | TOPIC DESCRIPTION | REFERENCE CHAPTER ASSIGNMENTS |
|--------------|--|--|
| 1 | Methods of Integration | Chapter 28 |
| 1.1 | Power formula | <i>Exercise 28-1, Odds</i> |
| 1.2 | Basic logarithmic form | <i>Exercise 28-2, Odds</i> |
| 1.3 | Exponential form | <i>Exercise 28-3. , Odds</i> |
| 1.4 | Various trigonometric forms | <i>Exercise 28-4, Odds</i> <i>Exercise 28-5, Odds</i> <i>Exercise 28-6, Odds</i> |
| 1.5 | Integration by parts | <i>Exercise 28-7, Odds</i> |
| 1.6 | Integration by trigonometric substitutions | <i>Exercise 28-8, Odds</i> |
| 1.7 | <i>Integration by partial fractions</i> | <i>Exercise 28-9, Odds</i> <i>Exercise 28-10, Odds</i> |
| 1.9 | Integration by use of tables | <i>Ex. 28-11, Odds</i> |

IV. LEARNING ACTIVITIES

| TOPIC NUMBER | TOPIC DESCRIPTION | REFERENCE CHAPTER ASSIGNMENTS |
|--------------|---|------------------------------------|
| 2.0 | Arithmetic series | Chapters 19 and 29 |
| 2.1 | Arithmetic series | <i>Exercise 19-1, Odds</i> |
| 2.2 | Geometric series | <i>Exercise 19-2, Odds</i> |
| 2.3 | Infinite geometric series | <i>Exercise. 19-3, Odds</i> |
| 2.4 | Infinite series | <i>Exercise 29-1, Odds</i> |
| 2.5 | McLaurin Series | <i>Exercise 29-2, Odds</i> |
| 2.6 | Certain operations with series | <i>Exercise 29-3, Odds</i> |
| 2.7 | Computations by use of series expansions | <i>Exercise 29-4, Odds</i> |
| 2.8 | Taylor series | <i>Exercise 29-5, Odds</i> |
| 3.0 | Differential equations | Chapter 30 |
| 3.1 | Solutions of ODEs | <i>Exercise 30-1, Odds</i> |
| 3.2 | Separation of variables | <i>Exercise 30-2, Odds</i> |
| 3.3 | Integrable combination | <i>Exercise 30-3, Odds</i> |
| 3.4 | Linear ODEs of first order | <i>Exercise 30-4, Odds</i> |
| 3.5 | Elementary applications | <i>Exercise 30-5, Odds</i> |
| 3.6 | Second order homogenous ODEs | <i>Exercise 30-6, Odds</i> |
| 3.7 | Auxiliary equation with repeated roots | <i>Exercise 30-7, Odds</i> |
| 3.8 | Solutions of non-homogenous equations | <i>Exercise 30-8, Odds</i> |
| 3.9 | Applications of second order ODEs | <i>Exercise 30-9, Odds</i> |
| 3.10 | Laplace Transforms | <i>Exercise 30-10, Odds</i> |
| 3.11 | <i>Solving O.D.E. 's by Laplace Transforms</i> | <i>Exercise 30-11, Odds</i> |

V. REQUIRED RESOURCES / TEXTS / MATERIALS:

1. Basic Technical Calculus with Analytic Geometry, A. J. Washington, **Seventh** Edition, Benjamin Cummings
2. Calculator: (Recommended) SHARP Scientific Calculator EL-531G. ***The use of some kinds of calculators may be restricted during tests.***

VI. EVALUATION PROCESS/GRADING SYSTEM:**MAJOR ASSIGNMENTS AND TESTS**

Regular topic tests will contribute a minimum of **60%** of the overall mark.

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

VI. EVALUATION PROCESS/GRADING SYSTEM (cont'd):

The instructor will provide you with a list of test dates and other required evaluation information for your class section. Tests may be scheduled out of regular class time.

ATTENDANCE

It is your responsibility to attend all classes during the semester. Research indicates there is a high correlation between attendance and student success.

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

Unexcused absence from a test may result in a mark of zero ("0"). Absence may be excused on compassionate grounds such as verified illness or bereavement. On return from an excused absence, you should ask your instructor to schedule the writing of a make-up test. Failure to do so will be considered as an unexcused absence.

METHOD OF ASSESSMENT (GRADING METHOD)

| <u>Grade</u> | <u>Definition</u> | <u>Grade Point Equivalent</u> |
|--------------|---|-------------------------------|
| A+ | Consistently outstanding | (90% - 100%) 4.00 |
| A | Outstanding achievement | (80% - 89%) 3.75 |
| B | Consistently above average achievement | (70% - 79%) 3.00 |
| C | Satisfactory or acceptable achievement in all areas subject to assessment | (60% - 69%) 2.00 |
| R | Repeat - The student has not achieved the objectives of the course, and the course must be repeated. | (less than 60%) 0.00 |
| X | A temporary grade, limited to situations having extenuating circumstances, giving a student additional time to complete course requirements | |
| CR | Credit exemption | |

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.

VI. EVALUATION PROCESS/GRADING SYSTEM (Continued):**Make-Up Test (if applicable)**

An "X" grade may be assigned at the end of the regular semester if you have met **ALL** of the following criteria for the course:

- an overall average between 50% and 59% was achieved
- at least 50% of the tests were passed
- at least 80% of the scheduled classes were attended
- at least 80% of quizzes and assignments were submitted
- all of the topic tests were written

If you are assigned an "X" grade, you may convert it to a "C" grade by writing a make-up test on topics agreed to by the instructor. This test will be available at the time agreed to by your instructor.

At the end of the regular term, it is your responsibility to obtain your results from your instructor and, in the event of an "X" grade, to inquire when the make-up test will be available.

The score you receive on this make-up test will replace your original test score and be used to re-calculate your weighted average. If the re-calculated average is 60% or greater, a "C" grade will be assigned. If the re-calculated average is 59% or less, an "R" grade will be assigned.

"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 be carried into the next semester.

"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.

VII. SPECIAL NOTES:

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities), are encouraged to discuss required accommodations with the professor and/or contact the Special Needs Office.

VII. SPECIAL NOTES (continued):**Advanced Standing**

Students who have completed an equivalent post-secondary course must bring relevant documents to the Coordinator, Mathematics Department:

- a copy of course outline
- a copy of the transcript verifying successful completion of the equivalent course

Note: A copy of the transcript must be on file in the Registrar's Office.

VIII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the instructor or the Prior Learning Assessment Office (E1306).