SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO

Sault College

COURSE OUTLINE

COURSE TITLE: Technical Mathematics

CODE NO. :   MTH 654-4   **SEMESTER:**   Winter

PROGRAM: Aviation Technology and Pilot Training

AUTHOR: The Mathematics Department

DATE: January 2006   **PREVIOUS OUTLINE DATED:**   January 2005

APPROVED:

_____   _____
                  DEAN   **DATE**

TOTAL CREDITS: 4

PREREQUISITE(S):   MTH 626-4

HOURS/WEEK: 4

I.   COURSE DESCRIPTION:

This course will:

1. Study methods of integration
2. Study Maclaurin 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 Maclaurin 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
1.0	**Methods of Integration**	**Chapter 28**
1.1	Power formula	Exercise 28-1
1.2	Basic logarithmic form	Ex. 28-2
1.3	Exponential form	Ex. 28-3
1.4	Various trigonometric forms	Ex. 28-4 Ex. 28-5 Ex. 28-6
1.5	Integration by parts	Ex. 28-7
1.6	Integration by trigonometric substitutions	Ex. 28-8
1.7	Integration by partial fractions	Ex. 28-9, 28-10
1.8	Integration by use of tables	Ex. 28-11 Review exercises

IV.   LEARNING ACTIVITIES (cont'd):

TOPIC NUMBER	TOPIC DESCRIPTION	REFERENCE CHAPTER ASSIGNMENTS
2.0	**Arithmetic series**	**Chapters 19 and 29**
2.1	Arithmetic series	Ex. 19-1
2.2	Geometric series	Ex. 19-2
2.3	Infinite geometric series	Ex. 19-3
2.4	Infinite series	Ex. 29-1
2.5	Maclaurin Series	Ex. 29-2
2.6	Certain operations with series	Ex. 29-3
2.7	Computations by use of series expansions	Ex. 29-4,
2.8	Taylor series	Ex. 29-5
3.0	**Differential equations**	**Chapter 30**
3.1	Solutions of DEs	Ex. 30-1
3.2	Separation of variables	Ex. 30-2
3.3	Integrating combinations	Ex. 30-3
3.4	Linear DEs of first order	Ex. 30-4
3.5	Elementary applications	Ex. 30-5
3.6	Second order homogenous DEs	Ex. 30-6
3.7	Auxiliary equations with repeated roots	Ex. 30-7
3.8	Solutions of non-homogenous DE's	Ex. 30-8
3.9	Applications of second order DEs	Ex. 30-9
3.10	Laplace transforms	Ex. 30-10
3.11	Solving DE's by Laplace transforms	Ex. 30-11
3.12	Review exercise	

V.   REQUIRED RESOURCES / TEXTS / MATERIALS:

1. <u>Basic Technical Calculus with Analytic Geometry</u>, A. J. Washington, Sixth 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
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.

At the discretion of the instructor, there may be a mid-term exam and there may be a final exam, each of which can contribute up to **30%** of the overall mark.
The instructor will provide you with 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)

Grade	Definition	*Grade Point Equivalent*
A+	90 – 100%	4.00
A	80 – 89%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

Course: MTH 654		
Evaluation Device	**Topics Covered** (reference topic numbers from the course outline)	**% weight of Final Average**
Test 1	1.1-1.4 and 1.6	33%
Test 2	1.5 and 1.7-1.8 and 2	33%
Test 3	3	34%

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:

- an overall average between 40% and 49% 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 "D" 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 50% or greater, a "D" grade will be assigned. If the re-calculated average is 49% or less, an "F" grade will be assigned.

"F" and "X" Grades at the end of the Semester
If an "X" grade is not cleared by the specified date, it will become an "F" grade. Except for extenuating circumstances, an "X" grade in Math will not be carried into the next semester.

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

VII.   SPECIAL NOTES:

Special Needs:
If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your instructor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

<u>Plagiarism</u>:
Students should refer to the definition of "academic dishonesty" in *Student Rights and Responsibilities*. Students who engage in "academic dishonesty" will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

<u>Course outline amendments</u>:
The Professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

<u>Retention of course outlines</u>:
It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

VII.   PRIOR LEARNING ASSESSMENT:
Students who wish to apply for advanced credit in the course should consult the professor or the Coordinator, Mathematics Department. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII.   DIRECT CREDIT TRANSFERS:

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

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

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