

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Technical Mathematics

CODE NO. : MTH 613-4 **SEMESTER:** Two

PROGRAM: Aviation Technology and Pilot Training

AUTHOR: The Mathematics Department

DATE: January 2007 **PREVIOUS OUTLINE DATED:** January 2006

APPROVED:

| | | |
|--|-------------|-------------|
| | _____ | _____ |
| | DEAN | DATE |

TOTAL CREDITS: 4

PREREQUISITE(S): MTH 612

HOURS/WEEK: 4

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I. COURSE DESCRIPTION:

The course includes topics in Plane Analytic Geometry, Introduction to Calculus including derivatives and integration of algebraic functions, and applications of differentiation and simple integration.

II. TOPICS TO BE COVERED:

hours allotted

- | | |
|---|----------|
| 1. Plane Analytic Geometry of straight lines and conic sections including equations, properties, and graphing of each | 16 hours |
| 2. Derivative calculus including functions, notations, limits, slopes of secants/tangents, delta method, derivative rules, composite and implicit functions, and higher order differentiation | 16 hours |
| 3. Derivative applications including slopes of tangents, normals and curves, curvilinear motion, related rates, curve sketching, and maximum/minimum applications | 16 hours |
| 4. Integral calculus involving differentials, anti-derivatives, indefinite and definite integration, areas and volumes | 16 hours |

III. LEARNING ACTIVITIES:

| TOPIC NUMBER | TOPIC DESCRIPTION | REFERENCE CHAPTER ASSIGNMENTS |
|---------------------|---|--|
| 1.0 | Plane Analytic Geometry | Chapter 21 |
| 1.1 | Straight line, slope, graphs, length, and intersections | Exercise 21.1& Ex. 21.2 |
| 1.2 | Circle | Exercise 21.3 & Ex. 21.7 |
| 1.3 | Parabola | Exercise 21.4 Exercise 21.7 |
| 1.4 | Ellipse and Hyperbola | Exercise 21.5 to Ex. 21.8 Review Exercise and Handout |
| 2.0 | The Derivative | Chapter 23 |
| 2.1 | Functional notation | Exercise 3.1 |
| 2.2 | Limits | Exercise 23.1 |
| 2.3 | Derivative – delta method | Exercise 23.3 & Ex. 23.4 |
| 2.4 | Derivative of polynomial by rule | Exercise 23.5 |
| 2.5 | Product and quotient rule | Exercise 23.6 |
| 2.6 | Composite functions – chain rule | Exercise 23.7 |
| 2.7 | Implicit functions | Exercise 23.8 |
| 2.8 | Higher derivatives | Exercise 23.9 Review exercise as required |
| 3.0 | Applications of Derivatives | Chapter 24 |
| 3.1 | Tangents and normals | Exercise 24.1 |
| 3.2 | Curvilinear motion | Exercise 24.3 |
| 3.3 | Related rates | Exercise 24.4 and Handout |
| 3.4 | Curve sketching | Exercise 24.5 & Ex. 24.6 |
| 3.5 | Maximum/minimum applications | Exercise 24.7 Review Exercises |
| 4.0 | Integration | Chapters 25 & 26 |
| 4.1 | Differentials | Exercise 24.8 |
| 4.2 | Antiderivatives | Exercise 25.1 |
| 4.3 | Indefinite integral | Exercise 25.2 |
| 4.4 | Definite integrals | Exercise 25.4 |
| 4.5 | Applications of the indefinite integral | Exercise 26.1 |
| 4.5 | Area under a curve and area between two curves | Exercise 25.3 26.2 |
| 4.6 | Volumes by integration | Exercise 26.3 and Handout |

IV. REQUIRED RESOURCES / TEXTS / MATERIALS:

1. Basic Technical Mathematics with Calculus, Washington, Allyn J. 8th (metric) Edition. Addison-Wesley, 2005
2. Calculator: (*Recommended*) SHARP Scientific Calculator EL-531W. *Note: The use of some kinds of calculators may be restricted during tests.*

V. 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 a list of test dates. 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 | <u>Definition</u> | <i>Grade Point Equivalent</i> |
|--------------|--|--------------------------------------|
| A+ | 90 – 100% | 4.00 |
| A | 80 – 89% | 3.00 |
| B | 70 - 79% | 2.00 |
| C | 60 - 69% | 1.00 |
| D | 50 – 59% | 0.00 |
| F (Fail) | 49% and below | |
| 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 613 | | |
|--------------------------|--|----------------------------------|
| Evaluation Device | Topics Covered (reference topic numbers from the course outline) | % weight of Final Average |
| Test 1 | 1 | 25% |
| Test 2 | 2 | 25% |
| Test 3 | 3 | 25% |
| Test 4 | 4 | 25% |

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.

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
- 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.

VI. 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.

Plagiarism:

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.

Course outline amendments:

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.

Retention of course outlines:

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

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