

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



COURSE OUTLINE

Course Title: Mathematics

Code No.: Mth 612-4

Semester: One

Program: Aviation Technology

Author: The Mathematics Department

Date: August 2000

Previous Outline Dated: August 1999

Approved: _____
Dean

Date

Total Credits: 4

Prerequisite(s): None

Substitute(s): Mth 143

Length of Course: 4 hrs./week

Total Credit Hours: 64

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For additional information, please contact Judith Morris, School of Continuous Learning,
(705) 759-2554, Ext. 516*

Mathematics
Course Name

Mth 612-4
Code No.

I. COURSE DESCRIPTION:

Students will develop skills needed to solve problems in technical mathematics. Topics include a detailed review of algebra followed by a study of quadratic equations, exponential and logarithmic functions, and trigonometric functions.

II. STUDENT PERFORMANCE OBJECTIVES:

The basic objectives are that the student develop an understanding of the methods studied, demonstrate a knowledge of the facts presented and show an ability to use these in the solution of problems. To accomplish these objectives, exercises are assigned. Test questions will be of near equal difficulty to questions assigned in the exercises. The level of competency demanded is the level required to obtain an overall passing average on the tests. The material to be covered is listed below.

III. TOPICS TO BE COVERED:

Approximate Time Frame

| | |
|--|----------|
| 1. Basic Algebraic Operations | 9 hours |
| 2. Systems of Equations and Graphing | 6 hours |
| 3. Factoring and Fractions | 8 hours |
| 4. Exponents and Radicals | 6 hours |
| 5. Quadratic Equations | 8 hours |
| 6. Trigonometry | 18 hours |
| 7. Exponential and Logarithmic Functions | 9 hours |

IV. LEARNING ACTIVITIES:

| TOPIC NUMBER | TOPIC DESCRIPTION | REFERENCE CHAPTER ASSIGNMENTS |
|--------------|---|---|
| 1.0 | BASIC ALGEBRAIC OPERATIONS | Exercises: 1-1 to 1-11 pp. 1-40 Review Exercises - Page 45 |
| 1.1 | Numbers and Literal Symbols | |
| 1.2 | Fundamental Laws of Algebra and Order of Operations | |
| 1.3 | Calculators and Approximate Numbers | |
| 1.4 | Exponents | |
| 1.5 | Scientific Notation | |
| 1.6 | Roots and Radicals | |
| 1.7 | Addition and Subtraction of Algebraic Expressions | |
| 1.8 | Multiplication of Algebraic Expressions | |
| 1.9 | Division of Algebraic Expressions | |
| 1.10 | Equations | |
| 1.11 | Formulas and Literal Equations | |
| 1.12 | Chapter Review | |
| 2.0 | SYSTEMS OF EQUATIONS AND GRAPHING | Exercises: 3-3, 3-4, 5-1 to 5-4 pp. 86-92, 129-146 Review exercises – p. 162 |
| 2.1 | Rectangular Coordinates | |
| 2.2 | The Graph of a Function | |
| 2.3 | Linear Equation | |
| 2.4 | Graphs of Linear Equations | |
| 2.5 | Solving Systems of Two Linear Equations Graphically | |
| 2.6 | Solving Linear Systems Algebraically | |
| 3.0 | FACTORING AND FRACTIONS | Exercises: 6-1 to 6-8 pp. 166-198 |
| 3.1 | Special Products | |
| 3.2 | Factoring: Common Factor and Difference of Squares | |
| 3.3 | Factoring Trinomials | |
| 3.4 | Sum and Difference of Cubes | |
| 3.5 | Equivalent Fractions | |

IV. LEARNING ACTIVITIES (Continued):

| TOPIC NUMBER | TOPIC DESCRIPTION | REFERENCE CHAPTER ASSIGNMENTS |
|--------------|--|--|
| 3.6 | Multiplication and Division of Fractions | |
| 3.7 | Addition and Subtraction of Fractions | |
| 3.8 | Equations Involving Fractions | |
| 3.9 | Chapter Review | |
| 4.0 | EXPONENTS AND RADICALS | Review Exercises – p.199 Exercises: 11-1 to 11-5 pp. 300-318 |
| 4.1 | Integral Exponents | |
| 4.2 | Fractional Exponents | |
| 4.3 | Simplest Radical Form | |
| 4.4 | Addition and Subtraction of Radicals | |
| 4.5 | Multiplication and Division of Radicals | |
| 4.6 | Chapter Review | |
| 5.0 | QUADRATIC EQUATIONS | Review Exercises – p.319 Exercises: 7-1 to 7-4 pp. 202-217 |
| 5.1 | Quadratic Equations: Solutions by Factoring | |
| 5.2 | Completing the Square | |
| 5.3 | The Quadratic Formula | |
| 5.4 | The Graph of the Quadratic Function | |
| 5.5 | Chapter Review | Review Exercises – p. 218 |
| 6.0 | TRIGONOMETRY | Exercises 4-1 to 4-5 Review Exercises – p. 124 pp. 104-123 |
| 6.1 | Angles | |
| 6.2 | Defining the Trigonometric Functions | |
| 6.3 | Values of the Trigonometric Functions | |
| 6.4 | The Right Triangle | |
| 6.5 | Applications of Right Triangles | |
| 6.6 | Trigonometric Functions of Any Angle | Exercise 8-1 p. 223 Exercise 8-2 p. 229 |
| 6.7 | Radians | Exercise 8-3 p. 234 |
| 6.8 | Graphs of the Trig Functions | Exercises 10-1 to 10-3 pp. 276-286 |
| 6.9 | Vectors | Exercises 9-1 to 9-4 pp. 243-260 |
| 6.10 | Oblique Triangles: The Law of Sines The Law of Cosines | Exercises 9-5 & 9-6 pp. 261-271 |
| 6.11 | Fundamental Trigonometric Identities | Exercise 20-1 pp. 509-516 |

IV. LEARNING ACTIVITIES (Continued):

| TOPIC NUMBER | TOPIC DESCRIPTION | REFERENCE CHAPTER ASSIGNMENTS |
|--------------|--|--|
| 7.0 | EXPONENTIAL AND LOGARITHMIC FUNCTIONS | Exercises 13-1 to 13-6 |
| 7.1 | The Exponential and Logarithmic Functions | Review Exercises – p. 376 pp. 351-371 |
| 7.2 | Graphs | |
| 7.3 | Properties of Logarithms | |
| 7.4 | Logarithms to the Base 10 | |
| 7.5 | Natural Logarithms | |
| 7.6 | Exponential and Logarithmic Equations | |
| 7.7 | Chapter Review | |

V. REQUIRED RESOURCES / TEXTS / MATERIALS:

1. Text: “Basic Technical Mathematics With Calculus”, 7th Edition, Metric Version, Washington. Addison-Wesley, 2000
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 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.

VI. EVALUATION PROCESS/GRADING SYSTEM (Continued):

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 with extenuating circumstances, giving a student additional time to complete course requirements (See below) | |
| 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.

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 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 all quizzes and assignments were submitted
- all of the topic tests were written

VI. EVALUATION PROCESS/GRADING SYSTEM (Continued):

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.

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 (E2203).

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