# SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

## SAULT STE. MARIE, ONTARIO

Sault College

# COURSE OUTLINE

**COURSE TITLE:** Algebra

**CODE NO. :** MTH131-4        **SEMESTER:** One

**PROGRAM:** General Arts & Science

**AUTHOR:** The Mathematics Department

**DATE:** January 2004    **PREVIOUS OUTLINE DATED:** August 2003

**APPROVED:**

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                      **DEAN**                **DATE**

**TOTAL CREDITS:** 4

**PREREQUISITE(S):** None

**HOURS/WEEK:** 4 hrs./week

**I.      COURSE DESCRIPTION:** This course builds on the student's algebra skills and applies these skills in the context of business, life, and social sciences.  The topics of study include equations and inequalities, analysis of polynomial, rational, exponential, and logarithmic functions, systems of equations and inequalities, matrices, mathematics of finance, and introductory probability theory.


**II.     TOPICS:**

1.      Graphs, Equations, and Inequalities – 10 hours
2.      Polynomials and Rational Functions – 11 hours
3.      Exponential and Logarithmic Functions – 8 hours
4.      Mathematics of Finance – 8 hours
5.      Systems of Linear Equations and Matrices – 9 hours
6.      Sets and Probability – 14 hours

**III.    LEARNING ACTIVITIES:**

| **1.0** | **Graphs, Equations, and Inequalities** | Pages | Exercises |
|---|---|---|---|
| 1.1 | Graphs | pp. 66 – 73 | 2.1 pp. 73 - 76 |
| 1.2 | Equations of lines | pp. 76 – 85 | 2.2 pp. 86 – 89 |
| 1.3 | Linear models | pp. 89 – 96 | 2.3 pp. 96 – 100 |
| 1.4 | Quadratic equations | pp. 50 – 57 | 1.7 pp. 58 – 59 |
| 1.5 | Linear inequalities | pp. 100 - 105 | 2.4 pp. 106 – 107 |
| 1.6 | Polynomials and rational inequalities | pp.108 – 113 | 2.5 pp. 113 - 114 |
| **2.0** | **Polynomials and Rational Functions** | | |
| 2.1 | Functions | pp. 120-126 | 3.1 pp. 126 – 128 |
| 2.2 | Graphs of functions | pp. 128 – 137 | 3.2 pp. 137 – 141 |
| 2.3 | Applications of linear functions | pp. 141 – 148 | 3.3 148 – 151 |
| 2.4 | Quadratic functions | pp. 152 – 158 | 3.4  pp. 158 – 159 |
| 2.5 | Applications of quadratic functions | pp. 159 – 164 | 3.5 pp. 165 - 167 |
| 2.6 | Polynomial functions | pp. 168 – 174 | 3.6 pp. 175 – 177 |
| 2.7 | Rational functions | pp. 177 – 185 | 3.7 pp. 185 – 187 |
| **3.0** | **Exponential and Logarithmic Functions** | | |
| 3.1 | Exponential functions | pp. 192 – 196 | 4.1 pp. 197 – 199 |
| 3.2 | Applications of exponential functions | pp. 199 – 203 | 4.2 pp. 203 – 206 |
| 3.3 | Logarithmic functions | pp. 207 – 213 | 4.3 pp. 213 – 215 |
| 3.4 | Logarithmic and exponential functions | pp. 215 – 222 | 4.4 pp. 222 – 225 |
| **4.0** | **Mathematics of Finance** | | |
| 4.1 | Simple interest and discount | pp. 213 – 236 | 5.1 pp. 236 – 237 |
| 4.2 | Compound interest | pp. 238 – 246 | 5.2 p. 246  – 248 |
| 4.3 | Future value of an annuity and sinking funds | pp. 249 – 257 | 5.3 pp. 257 – 259 |
| 4.4 | Present value of an annuity and amortization | pp. 259 – 265 | 5.3 pp. 265 – 267 |

| **5.0** | **Systems of Linear Equations** | **Pages** | **Exercises** |
|---|---|---|---|
| 5.1 | Systems of linear equations | pp. 275 – 287 | 6.1 pp. 287 – 291 |
| 5.2 | The Gauss-Jordan Method | pp. 2291 – 298 | 6.2 pp. 299 – 301 |
| 5.3 | Basic matrix operations | pp. 302 – 308 | 6.3 pp. 208 – 310 |
| 5.4 | Matrix products and inverses | pp. 310 – 321 | 6.4 p. 321 – 324 |
| 5.5 | Applications of matrices | pp. 324 – 331 | 6.5 pp. 332 - 335 |
| **6.0** | **Sets and Probability** | | |
| 6.1 | Sets | pp. 415 – 422 | 8.1 pp. 422 – 424 |
| 6.2 | Applications of Venn diagrams | pp. 424 – 430 | 8.2 pp. 431 – 433 |
| 6.3 | Introduction to probabiltiy | pp. 433 – 439 | 8.4 pp. 439 – 441 |
| 6.4 | Basic concepts of probability | pp. 441 – 447 | 8.5 pp. 447 – 451 |
| 6.5 | Conditional probability and independent events | pp. 451 – 461 | 8.5 pp. 462 – 465 |
| 6.6 | Permutations and combinations | pp. 481 – 491 | 9.1 pp. 492 – 495 |
| 6.7 | Applications of counting | pp. 495 – 501 | 9.2 pp. 501 – 503 |
| 6.8 | Markov chains | pp. 522 – 530 | 9.5 pp. 531 - 534 |

**IV.    REQUIRED RESOURCES/TEXTS/MATERIALS:**
1. <u>Mathematics with Applications</u>, 8th Edition, Lial and Hungerford, Addison and Wesley Publishers
2. Calculator: SHARP Scientific Calculator EL-531G. *The use of some kinds of calculators may be restricted during tests.*


**V.    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.

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

## EVALUATION PROCESS/GRADING SYSTEM (cont'd)

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. | |

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.

**EVALUATION PROCESS/GRADING SYSTEM (cont'd):**

| Course:  MTH 654 | | |
|---|---|---|
| **Evaluation Device** | **Topics Covered** (reference topic numbers from the course outline) | **% weight of Final Average** |
| Test 1 | 1,2 | 35% |
| Test 2 | 3,4 | 30% |
| Test 3 | 5,6 | 35% |

**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 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.

## 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 E1204 or call Extension 493 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.

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