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

COURSE OUTLINE

Course Title: Computer Mathematics

Code No.: MTH122-4 Semester: One

Program: Computer Programmer, Computer Engineering, Computer Network, Computer System Support

Author: The Mathematics Department

Date: August 2008 Previous Outline Dated: August 2007

"Brian Punch"

Approved: _____ _____
Chair Date

Total Credits: 4
Prerequisite(s): None
Hours/Week: 3

## I. COURSE DESCRIPTION:

This course presents mathematics needed in computer studies. Emphasis is placed on developing logical thinking skills and an algorithmic approach to problem-solving.

## II. LEARNING OUTCOMES:

After studying each of the indicated topics, the student should be able to perform the objectives that follow:

**Topic 1: Basic Algebra Review**

1. Number sets
2. Properties of integers and real numbers
3. Exponents and radicals
4. Order of operations
5. Inequalities and absolute values
6. Metric measurement

**Topic 2: Number Systems**

1. Number systems
2. Review decimal number system
3. Binary number system
4. Octal number system
5. Hexadecimal number system
6. Conversion between number systems
7. Binary addition
8. Complementation
9. Binary subtraction
10. Hexadecimal addition and subtraction

**Topic 3: Computer Considerations**

1. Scientific digits, accuracy, precision, rounding
2. Scientific notation
3. Normalized exponential form
4. Integer representation
5. Floating point representation

## II. LEARNING OUTCOMES (Continued):

**Topic 4: Sets**

1. Sets and elements
2. Subsets
3. Operations on sets
4. Venn diagrams
5. Basic properties of sets

**Topic 5: Logic**

1. Simple and compound statements
1. Truth tables: AND, OR, NOT, NAND, NOR, EOR
3. Conditional and bi-conditional statements
4. Properties of logic
5. Logical implication

**Topic 6: Boolean Algebra**

1. Circuits
2. Combination off switches
3. Properties of networks
4. Simplification of networks
5. Logic circuits

## III. TOPICS TO BE COVERED: Approximate Time Frame

| | |
|---|---|
| 1. Basic Algebra | 6 hours |
| 2. Number Systems | 9 hours |
| 3. Computer Considerations | 6 hours |
| 4. Sets | 9 hours |
| 5. Logic | 9 hours |
| 6. Boolean Algebra | 9 hours |

Total: 48 hours

| UNIT NUMBER | NO. OF HOURS | TOPIC DESCRIPTION | REFERENCE CHAPTER ASSIGNMENTS |
|---|---|---|---|
| 1 | 6 | Number Sets<br>Properties of Integers and Real Numbers<br>Exponents and Radicals<br>Order of Operations<br>Polynomials<br>Equations and Inequalities<br>Metric measurement | ***Problem Set 1.1, Odds***<br>***Problem Set 1.2, Odds***<br>***Problem Set 1.3,1.7,Odds***<br>***Problem Set 1.4, Odds***<br>***Problem Set 1.5, Odds***<br>***Problem Set 1.6, Odds***<br>***Instructor handout*** |
| 2 | 9 | Number Systems<br>Review Decimal Number Systems<br>Binary Number System<br>Octal Number System<br>Hexadecimal Number System<br>Conversion Between Number Systems<br>Binary Addition<br>Octal and Hexadecimal Addition and Subtraction<br>Binary Subtraction | ***Problem Set 5.1, Odds***<br>***Problem Set 5.2, Odds***<br>***Problem Set 5.3, Odds***<br>***Problem Set 5.4, Odds***<br>***Problem Set 5.5, Odds***<br>***Problem Set 5.6, Odds***<br>***Problem Set 5.7, Odds***<br>***Problem Set 5.8, Odds***<br>***Problem Set 6.1, Odds***<br>***Problem Set 6.2, Odds***<br>***Problem Set 6.3, Odds***<br>***Problem Set 6.4, Odds*** |
| 3 | 6 | Significant Digits<br>Precision, Rounding<br>Scientific Notation<br>Normalized Notation, Integer Representation, Floating Point Representation<br>Real Numbers | ***Problem Set 7.1, Odds***<br>***Problem Set 7.2, Odds***<br>***Problem Set 7.3, Odds***<br>***Problem Set 7.4, Odds*** |
| 4 | 9 | Sets and Elements<br>Subsets<br>Operations on Sets<br>Venn Diagram<br>Basic Properties of Sets | ***Problem Set 8.1, Odds***<br>***Problem Set 8.2, Odds***<br>***Problem Set 8.3, Odds***<br>***Problem Set 8.4, Odds***<br>***Problem Set 8.5, Odds*** |
| 5 | 9 | Simple and Compound Statements<br>Truth Tables: AND, OR, NOT, NAND, NOR, EOR<br>Conditional and Bi-conditional | ***Problem Set 9.1, Odds***<br>***Problem Set 9.2, Odds***<br>***Problem Set 9.3, Odds*** |

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|---|---|---|---|
| | | Statements<br>Properties of Logic<br>Logical Implication, Arguments | ***Problem Set 9.4, Odds***<br>***Problem Set 9.5, Odds***<br>***Problem Set 9.6, Odds*** |

| UNIT NUMBER | NO. OF HOURS | TOPIC DESCRIPTION | REFERENCE CHAPTER ASSIGNMENTS |
|---|---|---|---|
| 6 | 9 | Circuits<br><br>Combinations of Switches<br>Properties of Networks<br>Simplification of Networks<br>Logic Circuits | ***Problem Set 10.1, Odds***<br>***Problem Set 10.2, Odds***<br>***Problem Set 10.3, Odds***<br>***Problem Set 10.4, Odds***<br>***Problem Set 10.5, Odds***<br>***Problem Set 10.7, Odds*** |

## IV. REQUIRED RESOURCES / TEXTS / MATERIALS:

1. Textbook: "Mathematics for Data Processing", Robert N. McCullough, ***Third Edition,*** Prentice-Hall.

3. Calculator: (Recommended) SHARP Scientific Calculator EL-546V. 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.

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.

## V. 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)

| **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. |

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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 professor and/or the Special Needs office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

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.

Communication:
The College considers ***WebCT/LMS*** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the ***Learning Management System*** communication tool.

Plagiarism:
Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. 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.

## VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.