

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ON

COURSE OUTLINE

COURSE TITLE: Mathematics

CODE NO: MTH 122-4

SEMESTER: Three

PROGRAM: Computer Programmer

AUTHOR: R. Hamel

DATE: July 1997

PREVIOUS OUTLINE DATED: July 1996

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TOTAL CREDITS:

PREREQUISITES: MTH 111

SUBSTITUTE(S): None

LENGTH OF COURSE:

TOTAL CREDIT HOURS : 48

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. STUDENT PERFORMANCE OBJECTIVES:

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.

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.

Topic 3: Computer Considerations

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

Topic 4: Sets

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

II. STUDENT PERFORMANCE OBJECTIVES (Continued):

Topic 5: Logic

1. Simple and compound statements.
2. Truth tables: AND, OR, NOT, NAND, NOR, EOR.
3. Conditional and biconditional statements.
4. Properties of logic.
5. Logical implication.
6. Arguments.

Topic 6: Boolean Algebra

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

Topic 7: Computer Logic and Programming Structures

1. Algorithms.
2. Pseudocode.
3. Flow charts.
4. Decision Structures.
5. Repetition Structures.

TOPICS TO BE COVERED:

Approximate Time Frame

1. Basic Algebra	3 hours
2. Number Systems	9 hours
3. Computer Considerations	6 hours
4. Sets	6 hours
5. Logic	7 hours
6. Boolean Algebra	9 hours
7. Computer Logic and Programming Structure	5 hours

IV. LEARNING ACTIVITIES:

UNIT NUMBER	NO. OF HOURS	TOPIC DESCRIPTION	REFERENCE CHAPTER ASSIGNMENTS
1	3	Number Sets Properties of Integers and Real Numbers Exponents and Radicals Order of Operations	Pages 5-6 Pages 9-10 Pages 14-15 Page 30 Page 20
2	9	Number Systems Review Decimal Number Systems Binary Number System Octal Number System Hexadecimal Number System Conversion Between Number Systems Binary Addition Complementation Binary Subtraction	Page 121 Page 124 Page 126 Page 128 Page 130 Pages 136-137 Pages 139-140 Page 142 Pages 148-150 Pages 157-158 Pages 160-161
3	6	Significant Digits Precision, Rounding Scientific Notation Normalized Notation, Integer Representation, Floating Point Representation	Page 176 Pages 177-178 Page 179 Pages 183-184
4	6	Sets and Elements Subsets Operations on Sets Venn Diagram Basic Properties of Sets	Pages 202-203 Pages 205-206 Pages 208-209 Pages 212-213 Pages 216-217
5	7	Simple and Compound Statements Truth Tables: AND, OR, NOT, NAND, NOR, EOR Conditional and Biconditional Statements Properties of Logic Logical Implication, Arguments	Pages 222-223 Pages 226-227 Page 229 Page 233 Page 236 Pages 240-241

IV. LEARNING ACTIVITIES (Continued):

UNIT NUMBER	NO. OF HOURS	TOPIC DESCRIPTION	REFERENCE CHAPTER ASSIGNMENTS
6	9	Circuits Combinations of Switches Properties of Networks Simplification of Networks Logic Circuits	Pages 248-249 Pages 251-252 Pages 256-257 Page 260 Pages 263-264 Pages 267-268
7	5	Algorithms Pseudocode Flow Charts Decision Repetition	Pages 276-277 Handout Pages 279-280 Pages 285-289 Pages 292-294

V. REQUIRED RESOURCES / TEXTS / MATERIALS:

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

VI. EVALUATION PROCESS/GRADING SYSTEM (Continued):

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 from your instructor 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)

A+	Consistently outstanding	(90%-100%)
A	Outstanding Achievement	(80% - 89%)
B	Consistently above average achievement	(70% - 79%)
C	Satisfactory or acceptable achievement in all areas subject to assessment	(55% - 69%)
X or R	A temporary grade, limited to situations with extenuating circumstances, giving a student additional time to complete course requirements (See below)	(45% - 54%)
R	Repeat - The student has not achieved the objectives of the course, and the course must be repeated	(0% - 44%)
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 45% and 54% 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

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 55% or greater, a "C" grade will be assigned. If the re-calculated average is 54% 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:**Special Needs**

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities), you are encouraged to discuss required accommodations with the instructor and/or contact the Special Needs Office, Room E1204, Ext. 493, 717, 491 so that support services can be arranged for you.

Advanced Standing

Students who have completed an equivalent post-secondary course must bring relevant documents to the Coordinator, Mathematics Department.

Retention of Course Outlines

It is the responsibility of the student to retain all course outlines for possible future use in gaining advanced standing at other post-secondary institutions.

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

The instructor reserves the right to alter the course as he/she deems necessary to meet the needs of the students.

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VIII. PRIOR LEARNING ASSESSMENT:

There is a MTH 122 Challenge exam in place.

Students who wish to apply for advanced credit in the course should consult the instructor or the Prior Learning Assessment Office (E2203).