

Computer Science Technology  
John Abbott College

**201-803-AB**  
**COURSE OUTLINE**

**GENERAL INFORMATION**

Program	Computer Science Technology (Programmer/Analyst)
Course Title	<b>Mathematics I</b>
Course Number	<b>201-803-AB</b>
Pondération	3 hours lecture and exercises + 2 hours homework (2-1-2)
Number of Credits	1.66
Competencies	Solve computer-related mathematical and statistical problems. 016P.2, 016P.3, 016P.4
Prerequisites	Same as program entry requirements
Semester	<b>Fall 2017</b>
Days and Time	
<b><u>Teacher Information</u></b>	
Name	
Office	
Phone	
Email	
Website	
Office Hours	

## **INTRODUCTION**

Designed for students of Computer Science Technology, this course covers Boolean algebra, set theory and linear algebra. Topics include Boolean valued expressions, truth tables, induction, set relationships, set operations, matrix operations, and solving systems of linear equations.

## **COURSE OBJECTIVES**

**Competency 016P. Solve computer-related mathematical and statistical problems.**

### **Achievement Context**

- **Based on situations specific to the computer science field**

<b>Elements of competency</b>	<b>Performance criteria</b>
016P.2 Perform logic operations.	<ul style="list-style-type: none"><li>2.1 Formulation of propositions appropriate for different situations.</li><li>2.2 Construction of a truth table for a proposition.</li><li>2.3 Correct simplification of a proposition.</li><li>2.4 Proper use of the proof-by-induction method.</li></ul>
016P.3 Organize and process data.	<ul style="list-style-type: none"><li>3.1 Construction of sets and subsets for different situations.</li><li>3.2 Proper performance of all set operations.</li><li>3.3 Establishment of the proper relations between sets.</li><li>3.4 Formulation of appropriate set expressions reduced to their simplest forms in order to process the data in a given situation.</li><li>3.5 Translation of propositions into set-theory language.</li></ul>
016P.4 Solve linear algebra problems.	<ul style="list-style-type: none"><li>4.1 Appropriate representation of a situation as a system of linear equations.</li><li>4.2 Correct performance of matrix operations.</li><li>4.3 Accurate representation of a system of linear equations in a matrix.</li><li>4.4 Application of the correct methods for solving a system of linear equations.</li></ul>

## **REQUIRED TEXT**

Mathematics for Computer Technology (3<sup>rd</sup> ed.), Robert N. McCullough, Morton Publishing Co.  
Cost: Approximately \$150

## **COURSE CONTENT WITH SELECTED EXERCISES**

### **Text: Mathematics for Computer Technology: 3<sup>rd</sup> edition**

The exercises listed below should help you practice and learn the material taught in this course; they form a good basis for homework. Your teacher may supplement this list during the semester. Regular work done as the course progresses should make it easier for you to master the course .

#### **COURSE CONTENT**

#### **SELECTED EXERCISES**

##### **Counting Principles (14.1 only of Chapter 14)**

Introduction to Permutations and Combinations

14.1 1-28 even, 29-38

##### **Sets (Chap. 8)**

Set notation

Operations on sets

Venn diagrams

Basic properties of sets

8.1 1-6, 17, 21, 23, 25

8.2 5-9, 13-15, 19, 23-26, 27-33 odd

8.3 2, 3, 6, 7, 9, 10, 12, 20, 21-30, 47, 48

8.4 5, 6, 7, 8, 9, 13, 14, 21, 23, 24, 38, 40

8.5 1-25 odd, 26-40

##### **Logic and Boolean Algebra (Chaps. 9 &10)**

Propositions

Logical connectives and truth tables

Properties of logic and inference

9.1 1-13 odd, 16-42 even

9.2 2-18 even, 23, 26, 31, 34-48

9.3 4, 6, 10, 12, 16, 18, 28, 32, 34, 39, 40

9.4 2, 4, 6, 8, 12, 14, 16, 18, 21-25, 31, 33, 35-40

9.5 1-6, 9-11, 13-15, 18, 22, 24-40

9.6 1, 2, 4, 5, 8, 12, 14, 19, 21-26, 27, 28, 33, 34

Boolean algebra and networks

Simplification of networks

10.1 1-5, 8, 10, 12-20 even, 21-24, 26, 28, 30

10.2 1-10, 12, 16, 18, 20-30 even

10.3 2, 3, 5, 6, 9, 12, 14, 15, 22-30 even, 39, 41, 42

10.4 1-16, 17- 20, 22, 30, 31, 43-46

10.5 1-12, 17, 18, 21, 22, 29, 30, 34, 35

##### **Matrices and systems of linear equations (Chaps. 3 &12)**

Examples of systems of linear equations

Gaussian elimination

Matrix operations: scalar multiplication, addition, multiplication, transposition, inverse matrices

3.1 2, 4, 7, 9, 10, 11, 13, 27, 29, 31

3.2 5, 7, 11, 16

3.3 4, 9, 10, 17

3.4 2-10 even, 19, 24, 26, 28

12.1 2-18 even, 19, 20, 22, 30

12.2 2-30 even, 31-36

12.3 2-32 even, 35, 37

12.4 3, 4, 5, 7, 13, 16, 17, 21-30, 33

12.5 13, 16, 21, 22, 24, 25, 27

##### **Mathematical Induction (Teacher's notes)**

supplementary exercises will be provided

In addition, formal class assignments will be given at regular intervals. These will be graded and will make up part of the class mark.

## TENTATIVE SCHEDULE

Week 1	Introduction to Permutations and combinations
Week 2	Set notation, Operations on sets, Venn diagrams
Week 3	Basic properties of sets, Propositions
Week 4	Logical connectives, Truth Tables
Week 5	Properties of logic and inference, <b>Test 1.</b>
Week 6	Boolean Algebra, Networks
Week 7	Simplification of networks
Week 8	Systems of linear equations
Week 9	Matrices and Matrix operations, <b>Test 2.</b>
Week 10	Matrix Operations, Inverse matrices
Week 11	Inverse matrices, Gaussian elimination
Week 12	Gaussian Elimination
Week 13	Proofs, Mathematical Induction.
Week 14	Mathematical Induction, <b>Test 3.</b>
Week 15	Review

### TEACHING METHODS

This course consists of 45 hours of scheduled lectures, with some problem solving in class at least once a week. In addition, each student will be required to do about 30 hours of personal study and homework.

### DEPARTMENTAL ATTENDANCE POLICY

Six missed classes (without suitable justification) may result in automatic failure. If you must miss a class, let your teacher know as soon as possible. If you are sick, please bring a medical note. In any case, you are responsible for covering missed classes, and doing missed assignments, yourself, regardless of the reasons for missing the classes.

### EVALUATION PLAN

The student's **Final Grade** is a combination of the **Class Mark** and the **Final Exam Mark**. The breakdown of the **Class Mark** is:

Quizzes and Assignments	25%
Tests (3)	3 (25%)=75%

The **Final Grade** will be whichever is **the better of**:

50% **Class Mark** and 50% **Final Exam Mark**  
**OR**  
25% **Class Mark** and 75% **Final Exam Mark**

A student with a **Class Mark** of less than 50% **MAY CHOOSE NOT TO WRITE** the **Final Exam**, in which case the **Class Mark** (< 50%) will be assigned as the **Final Grade**.

Students must be available until the end of the final examination period to write exams.

## **MATH DEPARTMENT WEBSITE**

<http://departments.johnabbott.qc.ca/departments/mathematics>

## **COURSE COSTS**

In addition to the cost of the text listed above (approx. \$150), a scientific, non-graphing, non-programmable calculator (approx. \$15 - \$25) may be useful. The recommended model used in math classes: **SHARP EL-531 XG**.

## **COLLEGE POLICIES**

Article numbers refer to the IPESA (Institutional Policy on the Evaluation of Student Achievement, available at <http://johnabbott.qc.ca/ipesa>). Students are encouraged to consult the IPESA to learn more about their rights and responsibilities.

### **Changes to Evaluation Plan in Course Outline (Article 4.3)**

Changes to the evaluation plan, during the semester, require unanimous consent.

### **Mid-Semester Assessment (Article 3.3)**

Students will receive an MSA in accordance with College procedures.

### **Religious Holidays (Article 3.2)**

Students who wish to observe religious holidays must inform their teacher in writing within the first two weeks of the semester of their intent.

### **Grade Reviews (Article 3.2, item 19)**

It is the responsibility of students to keep all assessed material returned to them in the event of a grade review. (The deadline for a Grade Review is 4 weeks after the start of the next regular semester.)

### **Results of Evaluations (Article 3.3, item 7)**

Students have the right to receive the results of evaluation, for regular day division courses, within two weeks. For evaluations at the end of the semester/course, the results must be given to the student by the grade submission deadline.

### **Cheating and Plagiarism (Articles 8.1 & 8.2)**

Cheating and plagiarism are serious infractions against academic integrity, which is highly valued at the College; they are unacceptable at John Abbott College. Students are expected to conduct themselves accordingly and must be responsible for all of their actions.