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# Course Plan

**Cégep de la Gaspésie et des Îles**  
Montreal Campus  
Continuing Education Service

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**Mobile Application Development**  
LEA.C8

**ALGORITHMS, PSEUDOCODE AND DESIGN**  
**420-ENM-MT**

**WEIGHTING: 3-3-3**

**DURATION: 90 hours**

**UNITS: 3**

**PROFESSOR: Zied Zaier**

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**Winter 2018**

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## 1. GENERAL COURSE DESCRIPTION

The student learns to translate conceptual information into a concrete application. He or she represents knowledge by using schemas and diagrams. In addition, the student studies conceptual models, designs and implements algorithms, applies software design techniques and methods that allow him or her to develop computer applications in an efficient manner.

## 2. PLACE OF THE COURSE WITHIN THE PROGRAM

This course is offered in the second semester.

## 3. COMPETENCY AND ELEMENTS OF THE COMPETENCY

Code	Competency	Elements
ENF6	Develop plans for object-oriented software.	1. Become familiar with the request's analysis results.
		2. Choose design-pattern.
		3. Choose the algorithms.
		4. Write the pseudocode.
		5. Draw a logic diagram.
		6. Produce the technical design documents.
		7. Validate the plan.

## 4. CONTENT

Elements	Performance criteria	Content
1. Become familiar with the request's analysis results.	1.1 Taking into consideration the context and inherent constraints of the request. 1.2 Correct interpretation of the request. 1.3 Realistic anticipation of potential problems. 1.4 Capacity for synthesizing.	<ul style="list-style-type: none"> <li>• Problem-solving and design</li> <li>• Pseudocode</li> <li>• Programming concepts</li> <li>• Data structures</li> </ul>
2. Choose design-pattern.	2.1 Judicious choice of the design pattern, based on: <ul style="list-style-type: none"> <li>• The type of request;</li> <li>• The task to be accomplished.</li> </ul>	<ul style="list-style-type: none"> <li>• Structured System Design</li> <li>• UML Extension Mechanisms</li> <li>• Design Patterns</li> <li>• Introduction to SW Architectures</li> <li>• Design Diagrams: Component and Deployment Diagrams</li> </ul>
3. Choose the algorithms.	3.1 Choice of an algorithm adapted to the problem.	<ul style="list-style-type: none"> <li>• A range of basic numerical algorithms</li> <li>• The areas of sorting, searching and geometric algorithms</li> <li>• Algorithm complexity</li> <li>• The practical implications of polynomial and exponential complexity</li> </ul>
4. Write the pseudocode.	4.1 Taking into consideration the program's operating environment. 4.2 Clarity and precision of the pseudocode. 4.3 Correct identification of the process. 4.4 Respect for the time constraints and deadlines. 4.5 Correct translation of the algorithm.	<ul style="list-style-type: none"> <li>• Read and write simple algorithms using pseudo-code and flowcharts</li> <li>• A variety of algorithm design techniques</li> <li>• The practical implementation of the algorithm</li> </ul>
5. Draw a logic diagram.	5.1 Good sketch of the diagram. 5.2 Correct translation of the pseudocode. 5.3 Respect for the time constraints and deadlines.	<ul style="list-style-type: none"> <li>• Read and write simple algorithms using logic diagram</li> <li>• A variety of logic diagram design techniques</li> <li>• The practical implementation of the logic diagram</li> </ul>
6. Produce the technical design documents.	6.1 Clear and precise technical design plan. 6.2 Complete inclusion in the encoding specifications of the pseudocode and the other data needed for product development	<ul style="list-style-type: none"> <li>• Read and write simple technical design documents</li> <li>• A variety of technical design documents writing techniques</li> <li>• The practical implementation of the technical design documents</li> </ul>
7. Validate the plan.	7.1 Identification of potential problems. 7.2 Take into consideration the run-time context. 7.3 Appropriate execution of test sheets.	<ul style="list-style-type: none"> <li>• Read and write simple test plan</li> <li>• A variety of test plan writing techniques</li> <li>• The practical implementation of the test plan</li> </ul>

## 5. TEACHING METHODS

**Lecture:** The lecture portion of this course will provide an understanding of course fundamentals, specifically by exploring the course theoretical content. It will help give you a head start understanding of the basic knowledge prior to the labs. The lecture is also designed to give you a broader view of the course. All overhead documents used during each lecture will be posted on the overall course website. The assigned reading should be done before the class in which the material is discussed.

**Lab:** Labs will be used to explore course content through the use of manipulative examples, software, and other activities. These are designed to explore the course materials, teaching activities, additional examples, and additional information.

**Homework:** Homework is a very important part of the course and in order to fully master the topics it is essential that you work carefully on every assignment and try your best to complete every problem. There will be two homework assignments. Homework is due at the start of class. Late homework will not be accepted (no exceptions). It must be stapled and your name neatly written at the top right.

**Tests, quizzes and in class activities:** Tests, quizzes and in class activities are a very important part of the course and in order to fully master the topics it is essential that you work carefully on every assignment and try your best to complete every problem.

## 6. LEARNING ACTIVITIES

- Write pseudocode.
- Draw a logic diagram.
- Schematize an application.
- Develop and design an algorithm.
- Produce a technical design document.
- Implement a design.

## 7. EVALUATION

### **Formative evaluation**

Formative evaluation is an ongoing diagnostic type of assessment which provides feedback to students and teachers over the course of instruction. Students do not receive a mark for any type of formative evaluation as opposed to summative evaluation.

The lecture will involve different tests, quizzes, and in class activities which will be given in the form of labs but count as part of the lecture component.

### **Summative evaluation**

The **term-end evaluation** will consist of one final project (report), and one final exam. All exam questions will be inspired from the in class activities. Information about these will be posted on the course site. The final exam will be held in class instead of a lecture. There will be 5 in class activities and the best results of 3 out of 5 activities will count.

<b>Instrument</b>	<b>Elements evaluated</b>	<b>Weighting</b>	<b>When</b>
Three (5) in class activities	<ol style="list-style-type: none"> <li>1. Become familiar with the request's analysis results.</li> <li>2. Choose design-pattern.</li> <li>3. Choose the algorithms.</li> <li>4. Write the pseudocode.</li> <li>5. Draw a logic diagram.</li> <li>6. Produce the technical design documents.</li> <li>7. Validate the plan.</li> </ol>	30%	To be determined
Project Presentation	<ol style="list-style-type: none"> <li>1. Become familiar with the request's analysis results.</li> <li>2. Choose design-pattern.</li> <li>3. Choose the algorithms.</li> <li>4. Write the pseudocode.</li> <li>5. Draw a logic diagram.</li> <li>6. Produce the technical design documents.</li> <li>7. Validate the plan.</li> </ol>	15%	To be determined
<b>Term-end evaluation :</b> Report	<ol style="list-style-type: none"> <li>1. Become familiar with the request's analysis results.</li> <li>2. Choose design-pattern.</li> <li>3. Choose the algorithms.</li> <li>4. Write the pseudocode.</li> <li>5. Draw a logic diagram.</li> <li>6. Produce the technical design documents.</li> <li>7. Validate the plan.</li> </ol>	25%	To be determined
<b>Term-end evaluation :</b> Final Exam	<ol style="list-style-type: none"> <li>1. Become familiar with the request's analysis results.</li> <li>2. Choose design-pattern.</li> <li>3. Choose the algorithms.</li> <li>4. Write the pseudocode.</li> <li>5. Draw a logic diagram.</li> <li>6. Produce the technical design documents.</li> <li>7. Validate the plan.</li> </ol>	30%	To be determined

## 8. LATENESS POLICY

If a student arrives late for class, the student could be allowed to enter the class. However the teacher will register the absence for minimum cumulative periods of 30 minutes. For example, if a student arrives 10 minutes late he or she will be marked absent for 30 minutes. If a student arrives after 40 minutes, he or she will be marked absent for 1 hour.

However, the teacher reserves the right to have the student wait until a more appropriate time for the student to enter the classroom.

Nonetheless, if a student arrives late when an important part of the subject matter has already been introduced, the teacher reserves the right to decide if the student can or cannot enter the classroom.

## 9. REQUIRED INSTRUCTIONAL MATERIAL

**Textbooks:** None required. Various documents, articles, and book references will be supplied throughout the semester.

**Resource materials:** No required specific textbook for this course. Important course information will be posted on the course website, which is the main method of communicating information. It is the student's responsibility to check the website regularly for important course information.

**Software and tools:** A bundle of software and tools will be introduced during the course in different workshop activities

## 10. BIBLIOGRAPHY

Cormen, Thomas, Charles Leiserson, Ronald Rivest, and Clifford Stein. Introduction to Algorithms. 3rd ed. MIT Press, 2009. ISBN: 9780262033848.

Miller, Bradley, and David Ranum. Problem Solving with Algorithms and Data Structures Using Python. 2nd ed. Franklin, Beedle & Associates, 2011. ISBN: 9781590282571.

Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Education; International ed of 3rd revised ed edition (2011)

## ADDITIONAL INFORMATION

### **1. Attendance in class and for practical training**

- 1.1. Regular participation in the course (activities inside and outside the classroom) is considered essential for skills mastery.
- 1.2. Attendance will be taken at the beginning of each class.
- 1.3. Any student who arrives late for class may be refused access to the classroom by the teacher and be counted as absent.
- 1.4. It is the student's responsibility to provide the teacher or academic advisor with a reason for an absence. During a practical activity, the student must give a reason for an absence to the activity sponsor and to the supervisor
- 1.5. After unjustified absences amounting to 10% of the classes, the student is at risk being expelled from the course. The teacher will inform the academic advisor, who will decide what action to take.
- 1.6. For continuing education purposes, the following reasons can be given to justify an absence: legal situations (supported by a document), death of a family member, health care (with a professional's note) and parental obligation.
- 1.7. However, even in the case of justified absences, the student is at risk of being expelled from the course after a maximum of 20%. The teacher will inform the academic advisor, who will decide what action to take.
- 1.8. A student who must be absent for an undetermined period because of exceptional circumstances must inform the academic advisor, who will decide what action to take.
- 1.9. Presence at practical activities is compulsory. An absent student may be expelled from his or her practical activity for an unjustified absence. The activity's supervisor will inform the academic advisor, who will decide what action to take.
- 1.10. A student absent without a reason deemed valid by the teacher must not expect the teacher to provide special attention aimed at making up missed learning.

### **2. Language quality**

- 2.1. In accordance with the Institutional Language Policy, the Continuing Education Service must strive to ensure students' language quality.
- 2.2. For assignments and exams, the summative assessment of language quality counts for 10% of the mark.
- 2.3. In programs and courses where mastery of the written language is a learning objective, the Continuing Education Service reserves the possibility of setting the summative assessment of language quality at more than 10%. The decision will be made by the program team.
- 2.4. The Continuing Education Service reserves the right to use the clauses concerning language quality that are found in the Departmental Learning Policy of the departments in which continuing education courses and programs originate. Thus, the maximum credit given for language may, in some cases, exceed 10%.

#### Clause 2.9.3 of the Institutional Learning Policy

- 2.9.3** *For allophone clients and immersion students, 10% of marks will be given for language quality in the first year, but a student will be allowed to make up entirely the 10% if he or she makes corrections to an assignment within 5 days. In the second year, a total of 10% will also be given for language quality. A student can make up half (5%) if he or*

*she makes corrections to an assignment. In the third year, the same rules apply for all students.*

*For exams taken in class, there is no penalty for language quality for allophone students.*

### **3. Presentation of assigned work**

- 3.1 The manner in which assigned work must be handed in will be in accordance with the usual methodological standards. Students should consult the student guide delivered to them during the orientation activity.
- 3.2 The deadlines set for handing in written work and presenting activities must be met.
- 3.3 The student is responsible for handing in his or her work before the deadline, which must be respected even if the student is absent.
- 3.4 A penalty of 10% will be applied for each late day up to a maximum of 50% (5 days) to work handed in late. The student must give the teacher **prior notice** that work will be handed in late; if not, the work can be refused. After 5 days, unless there are extenuating circumstances, a mark of zero will be given for work handed in late.

### **4. Cheating and plagiarism**

#### Clause 2.12 of the Institutional Learning Policy

- 2.12.1 *All cheating, attempt to cheat or collaboration in cheating will result in a mark of zero for the test or work involved. In such cases, the teacher must seize the documents and make a report, which must be sent to the centre's office by the department coordinator or academic advisor for continuing education. The use of MP3 players, cell phones and laptop computers (unless authorized) is prohibited.*
- 2.12.2 *A student who plagiarises, that is, who steals or passes off as his or her own any work whatsoever, regardless of the source, of any author without giving a proper credit to the author will be given a mark of zero for the work handed in.*
- 2.12.3 *Any subsequent cheating or plagiarism by that student will result in a mark of zero for the entire course involved.*

### **5. Review of marks**

#### Clause 2.15 of the Institutional Learning Policy

- 2.15.1 *Any student who wants a review of the mark given for assigned work or for a summative assessment test during a session must ask the teacher within 5 working days following receipt of the mark.*

#### **Review of the mark for a final assessment test**

- 2.15.2 *Any student who wants a review of the mark given for a final assessment test, must address his or her request to the academic office or the academic advisor for continuing education **within 10 working days following the entry of the final mark in Omnivox.***
- 2.15.3 *The department must form a review committee made up of three teaching staff members (including the teacher concerned). The committee will send the final mark after review to the Studies Department. For continuing education, the review committee must be made up of three teaching staff members and include the teacher concerned as well as the academic advisor.*