Object-Oriented Programming (Java)

Information and Communications Technology

Course Number: CST8284
Contribution to Program: Vocational
Applicable Program(s):  
<table>
<thead>
<tr>
<th>AAL</th>
<th>Core/Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>0336X01FWO Computer Programmer</td>
<td>2</td>
</tr>
<tr>
<td>0336X03FWO Computer Programmer</td>
<td>2</td>
</tr>
</tbody>
</table>

Prepared by: Rex Woollard  
Professor

Pre-Requisites: CST8110

Pre-Requisites: N/A

Co-Requisites: N/A

Course Description: Students learn object-oriented programming methodology using the Java programming language. Object-oriented concepts, such as encapsulation, inheritance, abstraction and polymorphism are covered and reinforced with practical applications.

Relationship to Vocational Learning Outcomes: This course contributes to your program by helping you achieve the following Vocational Learning Outcomes:

**Computer Programmer 0336X01FWO**
1. Use documented solutions to troubleshoot problems associated with software installation and customization. (T,A)
2. Develop, test, document, deploy, and maintain secure program code based on specifications. (T,A)
6. Use relevant methodologies, policies, and standards to develop secure program code. (T,A)
8. Conform to workplace expectations found in information technology (IT) environments. (T,A)

**Computer Programmer 0336X03FWO**
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2. Develop, test, document, deploy, and maintain secure program code based on specifications. (T,A)
6. Use relevant methodologies, policies, and standards to develop secure program code. (T,A)
8. Conform to workplace expectations found in information technology (IT) environments. (T,A)

T: Teach  A: Assess  CP: Culminating Performance

Essential Employability Skills: The course contributes to your program by helping you achieve the following Essential Employability Skills:

3. Execute mathematical operations accurately. (A)
4. Apply a systematic approach to solve problems. (T,A)
5. Use a variety of thinking skills to anticipate and solve problems. (T,A)
6. Locate, select, organize and document information using appropriate technology and information systems. (T,A)
7. Analyze, evaluate and apply relevant information from a variety of sources. (T,A)
10. Manage the use of time and other resources to complete projects. (A)

T: Teach  A: Assess  CP: Culminating Performance

Course Learning Requirements/Embedded Knowledge and Skills:

**Course Learning Requirements**
When you have earned credit for this course, you will have demonstrated the ability to:

**Embedded Knowledge and Skills**

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1. Install and use the Java Development and Runtime Environment and documentation libraries. Install and use the Eclipse Integrated Development Environment.

2. Write Java program code to solve a problem, based on a description of the problem context, including UML diagrams, using object-oriented techniques.

3. Explain and use basic data structures.

4. Produce tested code that executes correctly and consistently. Testing procedures will involve the use of: valid data only, invalid data only, and a combination both valid and invalid data.

5. Prepare program documentation using prescribed program specifications.

6. Debug program problems using manual methods and computerized tools in an appropriate manner.

7. Modify an existing program according to program specifications.
to recover program in case of failure make required changes; test changes and revise if necessary; update documentation.

8. Identify appropriate strategies for solving a problem.

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<td></td>
<td>Define a problem; identify sources of help; identify various strategies for problem solving; use technical reference manuals and/or on-line help where applicable.</td>
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**LEARNING RESOURCES**

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<tr>
<th>Required Textbook (also used in pre-requisite course):</th>
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**Online resource - Java Platform API Specification:**
http://docs.oracle.com/javase/7/docs/api/

**Online resource - The Java Tutorials:**
http://docs.oracle.com/javase/tutorial/

**LEARNING ACTIVITIES**

During this course, you are likely to experience the following learning activities:

Samples of learning activities include:

- classroom lectures
- software demonstrations
- online lectures
- online software demonstrations
- individual and paired laboratory work
- practical and reading assignments
- research of course-related material

The course consists of 2 hours of lectures and 2 hours of in-class labs per week. You will probably need to spend an additional 5 hours per week, on average, of your own time for assignments and study.

**Lectures**

Theoretical course material will be presented through online lectures and in-class lectures. The online lectures consist of multimedia material, some of which can be downloaded in a batch process; some of which can be viewed as structured web pages. The in-class lectures will be aided by use of computer projections, videos, demonstrations and brief lecture notes.

- Students are expected to work through the online lecture material and attend all of the in-class lectures. Attendance will be recorded.
- Students will be expected to find and read applicable material on the internet to be prepared to answer oral or written questions in lectures.
- Students can seek additional help through the use of BlackBoard discussion groups and e-mail.
- Students are encouraged to ask questions during lectures and to consult with the professor on topics which they do not clearly understand.

**Labs**

You will apply the lecture material to a series of exercises and assignments which are closely integrated with the current lecture materials. They will be marked.

- Your ability to complete the exercises and assignments successfully will directly correlate with your level of success on tests and the final exam. If you do the work yourself, you should be able to pass tests and exams.
- Exercises and labs build on earlier work and are increasingly complex as the course progresses. If you fall behind in your work, you will face increasing difficulty catching up.
- Some lab work will be performed in pairs (pairings defined by the course professor). Some lab work will be individual.
- You should seek advice and help from the professor in the laboratory and through the use of BlackBoardTM discussion groups and e-mail.
- Attendance will be recorded and can directly affect your final course grade.

Students should perform initial analysis and design on the full assignments before their scheduled lab period in order to take advantage of the limited lab time. Some exercises will be expected to be completed during the two hour lab time; some will be longer than can be accomplished in the two hour lab time. The professor will clearly identify in the assignment/exercise description what is expected.

**EVALUATION/EARNING CREDIT**

<table>
<thead>
<tr>
<th>The following will provide evidence of your learning achievements:</th>
<th>This activity validates the following Course Learning Requirements and/or Essential Employability Skills:</th>
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<tbody>
<tr>
<td>Single Midterm Test 20%</td>
<td>Write Java program code to solve a problem, based on a description of the problem context, including UML diagrams, using object-oriented techniques. - [CLR 2]</td>
</tr>
<tr>
<td>Several Quizzes Totalling 10%</td>
<td>Produce tested code that executes correctly and consistently. Testing procedures will involve the use of: valid data only, invalid data, invalid data, additional exceptions, testing for performance, and testing for security.</td>
</tr>
<tr>
<td>Final Exam 30%</td>
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</tbody>
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data only, and a combination both valid and invalid data. - [CLR 4]

- Execute mathematical operations accurately. - [EES 3]
- Apply a systematic approach to solve problems. - [EES 4]
- Use a variety of thinking skills to anticipate and solve problems. - [EES 5]

Labs/Assignments 40%

- Produce tested code that executes correctly and consistently. Testing procedures will involve the use of: valid data only, invalid data only, and a combination both valid and invalid data. - [CLR 4]
- Write Java program code to solve a problem, based on a description of the problem context, including UML diagrams, using object-oriented techniques. - [CLR 2]
- Prepare program documentation using prescribed program specifications. - [CLR 5]
- Debug program problems using manual methods and computerized tools in an appropriate manner. - [CLR 6]
- Modify an existing program according to program specifications. - [CLR 7]
- Identify appropriate strategies for solving a problem. - [CLR 8]
- Install and use the Java Development and Runtime Environment and documentation libraries. Install and use the Eclipse Integrated Development Environment. - [CLR 1]
- Explain and use basic data structures. - [CLR 3]
- Execute mathematical operations accurately. - [EES 3]
- Apply a systematic approach to solve problems. - [EES 4]
- Use a variety of thinking skills to anticipate and solve problems. - [EES 5]
- Locate, select, organize and document information using appropriate technology and information systems. - [EES 6]
- Analyze, evaluate and apply relevant information from a variety of sources. - [EES 7]
- Manage the use of time and other resources to complete projects. - [EES 10]

### COLLEGE GRADING NUMERICAL EQUIVALENT TABLE

<table>
<thead>
<tr>
<th>Final Grade</th>
<th>Mark Equivalent</th>
<th>Numeric Value</th>
<th>Final Grade</th>
<th>Mark Equivalent</th>
<th>Numeric Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>90-100%</td>
<td>4.0</td>
<td>C+</td>
<td>67-69%</td>
<td>2.3</td>
</tr>
<tr>
<td>A</td>
<td>85-89%</td>
<td>3.8</td>
<td>C</td>
<td>63-66%</td>
<td>2.0</td>
</tr>
<tr>
<td>A-</td>
<td>80-84%</td>
<td>3.6</td>
<td>C-</td>
<td>60-62%</td>
<td>1.7</td>
</tr>
<tr>
<td>B+</td>
<td>77-79%</td>
<td>3.3</td>
<td>D+</td>
<td>57-59%</td>
<td>1.4</td>
</tr>
<tr>
<td>B</td>
<td>73-76%</td>
<td>3.0</td>
<td>D</td>
<td>53-56%</td>
<td>1.2</td>
</tr>
<tr>
<td>B-</td>
<td>70-72%</td>
<td>2.7</td>
<td>D-</td>
<td>50-52%</td>
<td>1.0</td>
</tr>
<tr>
<td>F</td>
<td>0-49%</td>
<td>0</td>
<td>FSP</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### PRIOR LEARNING ASSESSMENT AND RECOGNITION

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:

- Portfolio
- Other

A PLAR candidate will be required to demonstrate competence through an examination process, though the nature of the examination will depend on the prior experiences of the student. In some cases, this might involve an oral examination based on a detailed survey of a student's portfolio. Alternatively, it might involve completing a written exam, which would be similar to the course final exam.
The following information is course-specific:

This course is part of the mobile (laptop) program initiative at Algonquin College. Students are required to have a functioning laptop at all lecture and lab classes. The specifications for the required laptop and additional information about the mobile program initiative can be found at http://www.algonquincollege.com/mlearning.

Lab exercises and assignments will not be included in the final grade unless the student achieves at least a grade of 50% or “D-” on the combined tests and final exam. (In other words, students who have a failing grade on the combined tests and final exam will receive a grade of “F”.) In order to pass the course, the student must have a grade of at least 50% (or “D-”) on evaluated lab activities.

All students are required to write the final exam. There are no provisions for “making up” a missed final exam. If, as a result of being off-track in your program or some unforeseen circumstance, you note that there is a scheduling conflict in your final exam schedule, it is your responsibility to alert your course professor no later than one week before final exams start, to allow for any special arrangements.

Required Software:

- Java Platform (JDK) 7u7 (or later update to Version 7)
- Eclipse Indigo 3.7.2 (or later 3.7 release)
  -- http://www.eclipse.org/downloads/
- JUnit 4.x
  -- https://github.com/KentBeck/junit/downloads

The following information is school/department-specific:

STUDENT ACADEMIC RESPONSIBILITIES

Each student is responsible for:
• Knowing the due dates for marked out-of-class assignments.
• Attending all classes and knowing the dates of in-class marked assignments and exercises.
• Maintaining a folder of all work done in the course during the semester for validation claims in cases of disagreement with faculty.
• Keeping both paper and electronic copies of all assignments, marked and unmarked, in case papers are lost or go missing.
• Regularly checking both Blackboard announcements as well as one's Algonquin e-mail account for important messages from both professors and college administration.
• Participating in on-line and classroom exercises and activities as required.
• Retaining course outlines for possible future use to support applications for transfer of credit to other educational institutions.

Harassment/Discrimination/Violence will not be tolerated. Any form of harassment (sexual, racial, gender or disability-related), discrimination (direct or indirect), or violence, whether involving a professor and a student or amongst students, will not be tolerated on the college premises. Action taken will start with a formal warning and proceed to the full disciplinary actions as outlined in Algonquin College Policies - HR22 and SA07. Harassment means one or a series of vexatious comment(s) (whether done verbally or through electronic means), or conduct related to one or more of the prohibited grounds that is known or ought reasonably to be known to be unwelcome/unwanted, offensive, intimidating, derogatory or hostile. This may include, but is not limited to: gestures, remarks, jokes, taunting, innuendo, display of offensive materials, offensive graffiti, threats, verbal or physical assault, stalking, slurs, shunning or exclusion related to the prohibited grounds.

For further information, a copy of the official policy statement can be obtained from the Student Association.

Violation of the Copyright Act

General – The Copyright Act makes it an offence to reproduce or distribute, in whatever format, any part of a publication without the prior written permission of the publisher. For complete details, see the Government of Canada website at http://laws.justice.gc.ca/en/C-42. Make sure you give it due consideration, before deciding not to purchase a textbook or material required for your course.

Software Piracy - The Copyright Act has been updated to include software products. Be sure to carefully read the licensing agreement of any product you purchase or download, and understand the terms and conditions covering its use, installation and distribution (where applicable). Any infringement of licensing agreement makes you liable under the law.

Disruptive Behaviour is any conduct, or threatened conduct, that is disruptive to the learning process or that interferes with the well being of other members of the College community. It will not be tolerated. Members of the College community, both students and staff, have the right to learn and work in a secure and productive environment. The College will make every effort to protect that right. Incidents of disruptive behaviour must be reported in writing to the departmental Chair as quickly as possible. The Chair will hold a hearing to review available information and determine...
any sanctions that will be imposed. Disciplinary hearings can result in penalties ranging from a written warning to expulsion.

For further details, consult the Algonquin College Policies AA32, SA07 and IT01 in your Instaguide.

The following information is College-wide:

Email
Algonquin College provides all full-time students with an e-mail account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course events. It is your responsibility to ensure that you know how to send and receive e-mail using your Algonquin account and to check it regularly.

Centre for Students with Disabilities (CSD)
If you are a student with a disability, it is strongly recommended that you identify your needs to the professor and the Centre for Students with Disabilities (CSD) by the end of the first month of the semester in order that any necessary support services can be arranged for you.

Academic Integrity* & Plagiarism*
Adherence to acceptable standards of academic honesty is an important aspect of the learning process at Algonquin College. Academic work submitted by a student is evaluated on the assumption that the work presented by the student is his or her own, unless designated otherwise. For further details consult Algonquin College Policies AA18 [http://www2.algonquincollege.com/directives/files/2012/04/AA18.pdf](http://www2.algonquincollege.com/directives/files/2012/04/AA18.pdf) and AA20 [http://www2.algonquincollege.com/directives/files/2011/08/AA20.pdf](http://www2.algonquincollege.com/directives/files/2011/08/AA20.pdf)

Student Course Feedback*
It is Algonquin College’s policy to give students the opportunity to complete a course assessment survey in each course that they take which solicits their views regarding the curriculum, the professor and the facilities. For further details consult Algonquin College Policy AA25 [http://www2.algonquincollege.com/directives/files/2011/10/AA25.pdf](http://www2.algonquincollege.com/directives/files/2011/10/AA25.pdf)

Use of Electronic Devices in Class*
With the proliferation of small, personal electronic devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices is disruptive and disrespectful to others. During examinations, the use of such devices may facilitate cheating. For further details consult Algonquin College Policy AA32 [http://www2.algonquincollege.com/directives/files/2011/11/AA32.pdf](http://www2.algonquincollege.com/directives/files/2011/11/AA32.pdf)

Transfer of Credit
Students, it is your responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

* College policies (previously called directives) are under review and redesign. The term directives is being retired. As such, the policy classification nomenclature is in transition. Students, it is your responsibility to refer to the Algonquin College Directives/Policies website for the most current information available at:([http://www2.algonquincollege.com/directives/](http://www2.algonquincollege.com/directives/))