

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING

CODE NO. : CSD205 SEMESTER: 3

**PROGRAM: COMPUTER ENGINEERING TECHNICIAN/
COMPUTER PROGRAMMER**

AUTHOR: DENNIS OCHOSKI

DATE: AUGUST 2006 PREVIOUS OUTLINE DATED: AUGUST 2005

APPROVED:

DEAN

DATE

TOTAL CREDITS: 5

PREREQUISITE(S): CSD101

HOURS/WEEK: 4

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I. COURSE DESCRIPTION:

This course introduces students to the concepts of Object-Oriented Programming and applies them in practical problem-solving exercises. The course presently uses Microsoft Visual C++ 6.0 as the development environment. Previous courses, CSD100 and CSD101, have developed basic skills in C++ programming.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

1. **Demonstrate the use of structures and files as they relate to one another. (Johnston: chapter 7 and Appendix F)**

Potential Elements of the Performance:

- Apply abstract data types (ADT) by creating the concept of a structure.
- Develop and manipulate an array of structures.
- Use structures as parameters in function calls.
- Use hierarchical (nested) structures.
- Utilize enumerator (enum) variables.
- Understand and be able to read from, write to, and update random access files (binary files)
- Write and debug programs utilizing the components above.

*This learning outcome constitutes approximately **20%** of the course.*

2. **Define and implement the concepts of classes and class relationships (Johnston: chapters 9 and 10)**

Potential Elements of the Performance:

- Identify the most important features of Object-oriented programming languages.
- Assess the strengths and weaknesses of OOP and procedural programming.

Potential Elements of the Performance(cont'd):

- Define classes and implement class members and member functions using appropriate encapsulation (data hiding) mechanisms.
- Explain the relationship between the class declaration and objects.
- Declare and define constructors and destructors for classes.
- Implement operator overloading.
- Use pointers to point to a class object.
- Declare and use the C++ string class.
- Define and use **has-a**, **uses-a**, and **is-a** relationships.
- Show how classes can have other classes as data members.
- Write and debug programs utilizing the components above.

This learning outcome constitutes approximately 40% of the course.

3. **Define and implement the concepts of inheritance and virtual functions (Johnston: chapter 11)**

Potential Elements of the Performance:

- Explain the use of inheritance in C++ programs.
- Derive new classes from base/parent classes.
- Relate inheritance to constructor and destructor functions.
- Use virtual functions (late binding) to redefine class methods for derived classes.
- Use class inheritance to implement **is-a** and **has-a** relationships.
- Define and use virtual functions.
- Define polymorphism and understand how it relates to inheritance and virtual functions.

This learning outcome constitutes approximately 25% of the course.

4. **Define and implement advanced concepts of object-oriented programming. (Johnston: chapter 11)**
 - Use dynamic memory allocation and de-allocation with *new* and *delete*.
 - Implement various Abstract Data Types (ADT), including a linked list, a stack and a queue.
 - Declare and define instance and static members.
 - Implement friend functions and friend classes appropriately.
 - Use C++ exception handling in programs.
 - Create a Win32 program using the MFC and Visual C++ (time permitting).

*This learning outcome constitutes approximately **15%** of the course.*

III. TOPICS:

1. Advanced components of structures and files.
2. Classes and class relationships
3. Inheritance and virtual functions.
4. Friend functions, templates, and exception handling.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Text: C++ Programming Today
by Barbara Johnston
ISBN: 1-13-085375-5

Links:

http://www.intap.net/%7Edrw/cpp/cpp06_01.htm

http://www.intap.net/%7Edrw/cpp/cpp07_01.htm

<http://www.saskschools.ca/~ehs/HeiselIntra/C.html> Lessons 3, 50 – 60

http://www.intap.net/%7Edrw/cpp/cpp08_01.htm

V. EVALUATION PROCESS/GRADING SYSTEM:

The mark for this course will be arrived at as follows:

Outcome	Assignments	Quizzes	Total
outcome #1:	10%	10%	20%
outcome #2:	5%		
	10%	25%	40%
outcome #3:	10%		25%
outcome #4:	<u>5%</u>	<u>25%</u>	<u>15%</u>
	40%	60%	100%

(The percentages shown above may vary if circumstances warrant.)

NOTE: *It is required to pass both the theory and the assignment part of this course. It is not possible to pass the course if a student has a failing average in the four written quizzes but is passing the assignment portion, (or vice versa).*

QUIZZES

Quizzes will be announced about one week in advance. A zero grade will be given for quizzes missed without a valid reason given in advance.

Generally the only valid reasons are medical ones. Re-writes on these quizzes will not generally be possible so lab attendance is essential. All assigned work must be completed on time and quizzes must be written at the required time.

ASSIGNMENTS

An overall average grade of 60% must be achieved on the assignments to pass the course. A late penalty will be applied when assignments are not submitted by the due date. A penalty of 10% per day may be applied to overdue assignments. After assignments have been handed back to the class (generally within one week), a grade of zero may be applied to overdue assignments. If lateness is due to extenuating circumstances, it is the student's responsibility to discuss the reasons for being late with the professor before the assignment is due.

The following semester grades will be assigned to students in this course:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 - 100%	4.00
A	80 - 89%	4.00
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 - 59%	1.00
F (Fail)	below 50%	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 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.	

ATTENDANCE:

Absenteeism will affect a student's ability to succeed in this course. Absences due to medical or other unavoidable circumstances should be discussed with the instructor. If attendance is poor, eligibility for an X-grade is forfeited.

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 instructor and/or the Special Needs office. Visit Room E1204 or call Extension 2493 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.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. 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.

While it is expected that students discuss assignments with each other and share ideas, it is not acceptable that students hand in work done by someone else and claim it as their own. Plagiarism on assignments will result in a zero grade being assigned for that assignment for everyone involved.

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 advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.