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:	**TYCHO BLACK**		
DATE:	**AUGUST 2003**	**PREVIOUS OUTLINE DATED:**	**JUNE, 2002**
APPROVED:			
	DEAN		**DATE**
TOTAL CREDITS:	**5**		
PREREQUISITE(S):	**CSD101**		
HOURS/WEEK:	**4**		

For additional information, please contact Colin Kirkwood, Dean
School of Technology, Skilled Trades & Natural Resources
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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++ as the development environment. Previous courses, CSD100 and CSD101, have developed basic skills in C++ programming.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. **Compare Object-oriented programming (OOP) with procedural programming and compare various OOP languages.**

   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.
   - Compare various OOP development environments.
   - Compare C++ with Java.

   This learning outcome constitutes approximately 5% of the course.

2. **Identify the features of C++ that make it a "better C", and apply them to programming problems.**

   Potential Elements of the Performance:

   - Utilize basic stream I/O for input/output.
   - Organize program modules into projects and utilize the tools available in an Integrated Development Environment for program development.
   - Utilize available methods for passing arguments to functions, including passing by value, passing by reference, passing by pointers and the use of default arguments.
   - Utilize enumerator (enum) variables.
   - Demonstrate a knowledge of scope and storage classes.
   - Use function overloading to provide multiple behaviors for

functions.
- Utilize structures (struct) for organizing dissimilar data elements into new data types.
- Use pointers effectively.
- Use file-handling methods to be able to create, read, write and update files.
- Use C-type strings and string-handling functions effectively.

This learning outcome constitutes approximately 25% of the course.

3. **Demonstrate an understanding of classes, encapsulation and polymorphism by solving programming problems involving their use.**

Potential Elements of the Performance:

- Define classes and implement class members and member functions using appropriate encapsulation (data hiding) mechanisms.
- Declare and define constructors and destructors for classes.
- Use the *this* pointer to point to the invoking object.
- 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.
- Implement friend functions and friend classes appropriately.

This learning outcome constitutes approximately 45% of the course.

4. **Write programs that use overloading, inheritance and exception handling to demonstrate object-oriented design.**

Potential Elements of the Performance:

- Implement operator overloading using friend or member functions.
- Use class inheritance to implement *Is-a* relationships and understand the difference between *composition and inheritance*.
- Use virtual functions (late binding) to redefine class methods for derived classes.
- Implement *Has-a* relationships with member objects (composition) or with private inheritance.
- Use function and class templates to create related functions and

classes.

- Use C++ exception handling in programs.
- Create a Win32 program using the MFC and Visual C++ (time permitting).

This learning outcome constitutes approximately 25% of the course.

III. TOPICS:

1. New features of C++ and elements of C not previously covered.
2. Overview of the elements and objectives of OOP.
3. Classes, encapsulation, constructors, destructors, parameter passing.
4. Friend functions and operator overloading.
5. Inheritance, polymorphism and exception handling.
6. Templates

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Textbook: "Brief version of Starting Out With C++", 3rd Edition, by Tony Gaddis, Scott Jones Publishers, 2001 ISBN 1-57676-065-0

V. EVALUATION PROCESS/GRADING SYSTEM:

3 WRITTEN TESTS	@ 20% each	60%
ASSIGNMENTS /QUIZZES		40%

(The percentages shown above may vary slightly 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 three written tests but is passing the assignment portion, (or vice versa).*

TESTS and QUIZZES

Tests will be announced about one week in advance. A zero grade will be given for tests or quizzes missed without a valid reason given in advance. Generally the only valid reasons are medical ones. Quizzes may be unannounced but advanced warning will generally be given.

In some cases assignments will be evaluated with a quiz based on the assigned work, on the due date. Re-writes on these quizzes will not generally be possible so lab attendance is essential. All assigned work must be completed on time, quizzes and tests written at the required time.

ASSIGNMENTS

A grade of 60% must be achieved on the assignment portion of the course to pass the course. A late penalty will be applied when assignments are not submitted by the due date. A penalty of 10% per week may be applied to overdue assignments. After assignments have been handed back to the class (generally in one or two weeks), 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 postsecondary courses:

Grade	Definition	Grade Point Equivalent
A+	90 - 100%	4.00
A	80 - 89%	3.75
B	70 - 79%	3.00
C	60 - 69%	2.00
F (Fail)	59% and below	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 situations with 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.	

UPGRADING OF INCOMPLETES

When a student's course work is incomplete or final grade is below 60%, it is possible to upgrade to a pass when a student meets all of the following criteria:

1. The student's attendance has been satisfactory.
2. An overall average of at least 50% has been achieved.
3. The student has not failed all of the theory tests taken.
4. The student has made reasonable efforts to participate in class and complete assignments.

The nature of the upgrading requirements will be determined by the instructor and may involve one or more of the following: completion of existing labs and assignments, completion of additional assignments, re-testing on individual parts of the course or a comprehensive test on the entire course.

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 or re-write testing is forfeited. If a student is identified as being “at risk”, perfect attendance is expected as a prerequisite to upgrading or X-grade opportunities. In addition, attendance at special tutorial classes is considered mandatory for those identified as at risk, if eligibility for re-write testing is to be maintained.

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 493 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.