MEMORIAL UNIVERSITY

Faculty of Engineering and Applied Science

ENGINEERING 3891: ADVANCED PROGRAMMING

Instructor	**Lihong Zhang**	**Teaching Assistants**	**TBD**
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Office Hours	**TBD**		

Websites http://www.engr.mun.ca/~lihong/teaching/EN3891/HomePage.htm   and
http://online.mun.ca/d2l/

Communication *Office-hour visits or inquiries to lzhang@mun.ca*

CALENDAR ENTRY:

ENGI 3891 Advanced Programming includes advanced procedural language programming; data structures, user defined types, pointers; modularization techniques, scope and data hiding; object-oriented programming; classes, objects and attributes; data encapsulation, member and non-member functions; overloading, methods and friend functions; inheritance, sub- and super-classes; templates.

COURSE DESCRIPTION:

The topics will cover, but not be limited to: pointers, structures, classes, object creation, ad hoc polymorphism, inheritance, parametric polymorphism. Although not formally taught, examples and assignments will emphasize and explore such fundamental data structures as arrays, stacks, and queues.

PREREQUISITES: ENGI 1020

COREQUISITES: N/A

SCHEDULE: LECTURE: MWF 3:00-3:50 pm   Room: EN-1054
                   LAB: Wednesday 10:00-11:50   Room: EN-3000

CREDIT VALUE: 3 credits

RESOURCES:

    TEXT BOOK

- *Frank L. Friedman and Elliot B. Koffman, Problem Solving, Abstraction and Design Using C++ (5th Edition), Addison Wesley, 2006, ISBN: 0-321-45005-1. (Note: The textbook is not mandatory. It is specified only as a backup. The lecture notes are the primary resource and are available on the web in a form that may readily be printed.)*

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REFERENCE BOOKS
- *Brian Overland, C++ Without Fear, fourth edition, Prentice Hall, 2004. ISBN: 0321246950.*

MAJOR TOPICS:
- Review: commands and operators, control structures; functions and variables: scope, lifetime, storage class, pass-by-value, declaration versus definition, privacy; arrays & string; library objects.
- Pointers: notation, equivalence of pointer notation to array notation, passing by pointer, pass-by-reference.
- Structures: declaration, definition and usage, pointers to structures, structure assignment, abstract data types.
- Classes: data and function hiding, member functions, access control, objects, declaration versus instantiation, static members, inline functions.
- Object Creation: constructors and destructors, default constructors, overloading, default arguments, copy constructors, shallow versus deep copying.
- Ad Hoc Polymorphism: conversions, binary operator overloading, unary operator overloading, friend functions, assignment and subscript overloading.
- Inheritance: code reuse, derived and base classes, the protected access control, code reuse, virtual functions, abstract base classes, multiple inheritance.
- Parametric Polymorphism: function templates, signature matching, class templates, inheritance.

LEARNING OUTCOMES:
Upon successful completion of this course, the student will be able to:
- Understand the processes underlying programming in general.
- Demonstrate a fairly deep understanding of the processes underlying object-oriented programming in particular.
- Demonstrate knowledge of fundamental features of C & C++, such as functions, scope, pointers, classes, objects, data encapsulation, overloading, friend functions, inheritance, polymorphism, etc.
- Read and understand well-written programs in C & C++.
- Code in C++ at the class level.
- Have a working familiarity of Abstract Data Types, and basic data structures.

ASSESSMENT:

		Approximate Due Dates
Assignments	12% (1.5% each)	
Assignment 1		Sept. 27
Assignment 2		Oct. 4
Assignment 3		Oct. 11

Assignment 4	Oct. 25
Assignment 5	Nov. 01
Assignment 6	Nov. 08
Assignment 7	Nov. 15
Assignment 8	Nov. 22

Midterm   30%
    Midterm test is tentatively schedule at 15:00-15:50 on Oct. 16 (Wednesday) in EN-1054
Final exam   58%

Note:
1. *There are total 8 assignments (normally weekly), due Fridays at 8:55 am. Posted on the web, approximately a week before the due date. Submitted over the network using the WebSubmit procedure supported by ECS unless otherwise specified. The submit directory for each assignment will be closed at 8:55 am sharp. One programming problem each week. Unless otherwise informed, the assignments will be compiled and linked with a grading program that will test them automatically, as well as hand graded by a TA for style: 2 out of 10 points (TAs will be looking for mnemonic names, clean structure, and good commenting).*
2. *There is a laboratory on Wednesdays from 10:00-11:50 am in EN-3000/3029. There is no separate lab assignment as such. You will use this period to explore your weekly programming assignment. It is not anticipated that you will be able to complete your assignment during the lab period. Students are expected to do their own assignments. Group work is not permitted.*
3. *Any concerns about marking or special circumstances must be brought to the instructor's attention before the final exam. After the final exam has been written, only that mark might be re-considered.*
4. *Calculator policy: only simple scientific calculators are permitted in all quizzes, tests and examinations. Programmable calculators with text storage and graphics capabilities, as well as other aids (e.g., unauthorized books, notes, formula sheets, electronic translators and devices, etc.) are NOT allowed. Unauthorized use of the aids or devices above during quizzes, tests and examinations will be considered as an academic offence.*

ACADEMIC INTEGRITY AND PROFESSIONAL CONDUCT:
Students are expected to conduct themselves in all aspects of the course at the highest level of academic integrity. Any student found to commit academic misconduct will be dealt with according to the Faculty and University practices. More information is available at www.engr.mun.ca/undergrad/academicintegrity.

Students are encouraged to consult the Faculty of Engineering and Applied Science Student Code of Conduct at http://www.engr.mun.ca/policies/codeofconduct.php and Memorial University's Code of Student Conduct at http://www.mun.ca/student/conduct.

LAB SAFETY:

Students are expected to demonstrate awareness of, and personal accountability for, safe laboratory conduct. Appropriate personal protective equipment (PPE) must be worn (e.g. steel-toed shoes, safety glasses, etc.) and safe work practices must be followed as indicated for individual laboratories, materials and equipment. Students will immediately report any concerns regarding safety to the teaching assistant, staff technologist, and professor.

INCLUSION AND EQUITY:

Students who require physical or academic accommodations are encouraged to speak privately to the instructor so that appropriate arrangements can be made to ensure your full participation in the course. All conversations will remain confidential.

The university experience is enriched by the diversity of viewpoints, values, and backgrounds that each class participant possesses. In order for this course to encourage as much insightful and comprehensive discussion among class participants as possible, there is an expectation that dialogue will be collegial and respectful across disciplinary, cultural, and personal boundaries.

STUDENT ASSISTANCE:

Student Affairs and Services offers help and support in a variety of areas, both academic and personal. More information can be found at www.mun.ca/student.

ADDITIONAL INFORMATION:

Comments, suggestions and constructive criticisms are always welcome.