Object-Oriented Programming for Scientists and Engineers
MEC 510, Fall 2016

Instructor: Xiaolei Yang
Office: 103 Light Engineering
Office Hours: 2:00pm-5:00pm Friday
Phone: 2-3588
Email: xiaolei.yang@stonybrook.edu

Abstract
Object-oriented programming (OOP) has been widely employed for software design in the industry and academia. C++, one of the most widely used programming languages for object-oriented programming, is employed in this course to introduce the basic ideas of OOP and demonstrate the important concepts of OOP, such as abstraction, encapsulation, inheritance, composition, polymorphism, and operator and function overloading. At the beginning of the course, the traditional topics coming from C, such as data types, control structures, functions, arrays, strings, data structures, pointers, dynamic memory allocation and preprocessor will be covered briefly. As one of its key advantages, C++ has an extensive set of standard libraries readily available with any installation, thus providing support for Stream I/O, String and STL that will be covered in this course too. Software usually comes with a Graphical User Interface (GUI). Qt, a contemporary third party C++ library for GUI development, will be introduced in the end of this course.

By the end of this course, you should be able to write C++ programs using object oriented methodology to solve simple scientific and engineering problems.

Lecture: 4:00pm-6:50pm Tuesday (Chemistry 126, West Campus)

Text Books:

Required
1. Object-Oriented Programming in C++ (4th Edition). Author: Lafore, Robert. Publisher: Sams Publishing.

Recommended
2. C++: How to Program (9th Edition). Author: Harvey Deitel & Paul Deitel. Publisher: Pearson.
3. C++ and Object-Oriented Numeric Computing for Scientists and Engineers. Author: Daoqi Yang. Publisher: Springer,
4. C++ GUI Programming with Qt 4 (2nd Edition). Author: Jasmin Blanchette & Mark Summerfield. Publisher: Pearson.

Website: https://blackboard.stonybrook.edu/

Grading: Homework 60%, Final Project 40%.

Homework:

Homework will be either assigned in the class or posted at blackboard. All submissions will be due at the beginning of the class. Deadlines for the programming assignments will be posted as they are

assigned. You would submit assignments and projects electronically at the university provided Blackboard services.

MS Visual Studio should be used as IDE (integrated development environment) for programming. The Visual Studio 2015 can be downloaded from https://go.microsoft.com/fwlink/?LinkId=6919 78&clcid=0x409.

Gnuplot, VisIt and ParaView can be employed for visualization of your computational data.

OpenGL and GLUT can be used for 3D graphics programming. A beginning tutorial on using OpenGL and FreeGlut in Visual Studio 2015 can be found at https://mycodelog.com/2015/10/08/opengl-freeglut-in-visual-studio-2015/.

Qt 5.7.0 can be downloaded from http://download.qt.io/official_releases/qt/5.7/5.7.0/qt-opensource-windows-x86-msvc2015-5.7.0.exe for Windows 64-Bit and http://download.qt.io/official_releases/qt/5.7/5.7.0/qt-opensource-windows-x86-msvc2015_64-5.7.0.exe for Windows 32-Bit. Visual Studio Add-in can be downloaded from http://download.qt.io/official_releases/vsaddin/qt-vs-addin-1.2.5.exe. A short video for installing Qt in Visual Studio 2015 can be found at https://www.youtube.com/watch?v=P6Mg8FpFPS8.

Americans with Disabilities Act: If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, Room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. http://studentaffairs.stonybrook.edu/dss/index.shtml.

Academic Integrity: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.