SYLLABUS

COURSE: OBJECT ORIENTED PROGRAMMING

1. General Information

- Course name: Object Oriented Programming.
- Website: Moodle, Phương pháp lập trình hướng đối tượng, giáo viên Nguyễn Minh Huy.
- Lecturer:
    - M.S. Nguyễn Minh Huy, SE Dept, Faculty of IT, University of Science.
    - Email: nmhuy@fit.hcmus.edu.vn, subject: [Student Id]-[Course Name]-[Subject].
    - Office hour: room I82, SE Dept, 227 Nguyễn Văn Cừ (email in advanced).

2. Course Description

This course is to introduce to students fundamental knowledge of object oriented programming through C/C++ programming language. Students will know the difference between procedural programming and object oriented programming. Students will learn various concepts of object oriented programming, from basics like object, class, constructors, destructor, operator, etc, to advances like encapsulation, inheritance, and polymorphism. Students will also learn how to use the Standard Template Library to solve problems. Through project-based learning, students will practice to apply object oriented design to a programming problem.

3. Course Objectives

After finishing this course successfully, students can do the followings:

- **Differentiate** between procedural programming and object oriented programming.
- **Define** basic concepts of object oriented programming: object, class, object life cycle, operators, etc.
- **Describe** advanced concepts: encapsulation, inheritance, and polymorphism.
- **Use** the C++ Standard Template Library to boost programming productivity.
- **Apply** object oriented design in solving programming problems by using C/C++.

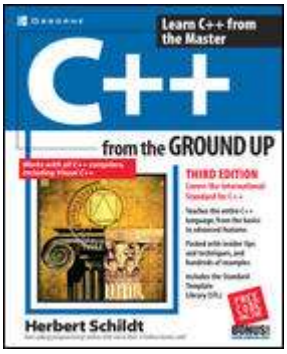
4. Course Grades

		Theory	**65%**	**Practice**	**35%**
In-progress	**20%**	Theory assignments	10%	Lab assignments	10%
Midterm	**25%**	Midterm Exam	15%	Lab midterm	10%
Final	**55%**	Final exam	40%	Lab final	15%
Bonus	**10%**	1% for each case (active in class, discussion).			

5. Course Policies

- Students walk-through slides and read textbook chapter before each theory session.
- Home work are done on individual basis.
- Any kinds of cheating and plagiarism receives FAILED grade.
- Violations of submission rules (deadline, conventions, …) receive PENALTY grade.
- In emergency situations, course syllabus is subject to change without notice.

6. Textbook and References

No.	Book	Description
1		C++ Primer Plus, 4th Edition, Stephen Prata, SAM, 2001.
2		C++ From the Ground Up, 3rd Edition, Herbert Schildt, McGraw-Hill/Osborne, 2003.
3		C++ FAQ Lite, Marshall Cline, http://parashift.com/c++-faq-lite/
4		Lập trình hướng đối tượng, Trần Đan Thư, Đinh Bá Tiến, Nguyễn Tấn Trần Minh Khang, NXB Khoa Học Kỹ Thuật, 2010.

7. Course Schedule (11 sessions)

Topics	Descriptions	Activities
1. Course Overview	- Coding convention. - Function overloading. - Error handling. - Abstract programming.	
2. Object and Class	- Basic concepts: procedural vs. object oriented, object, class. - Object usage. - Access control: public, private, protected.	
3. Object Life Cycle	- Constructors: concept, default, copy. - Destructor: concept. - Static members. - Class template.	
4. Operators	- Operator function. - Special operators. - Friend function.	
5. Encapsulation	- The Big Three. - Encapsulation.	
6. Midterm Exam		
7. Standard Template Library	- Overview: origin, iterators, functors. - Containers: basic containers, adaptors. - Algorithms: generate, compute, copy, find, remove, transform.	
8. Inheritance	- Basic concepts. - Access control in inheritance. - Method overriding.	

	- IS-A vs. HAS-A relationship.	
9. Object Life Cycle in Inheritance	- Constructors in inheritance. - Destructor in inheritance. - The Big Three in inheritance.	
10. Polymorphism	- Basic concepts: interface, object substitution. - Virtual function: dynamic binding, pure virtual function, virtual destructor. - Smart Pointers.	
11. Object Oriented Design	- Class diagram. - Design patterns.	