SYLLABUS

COURSE: FUNDAMENTALS OF PROGRAMMING

1. General information

- Course name: Fundamentals of to Programming.
- Website: Moodle Online, course Cơ sở lập trình, teacher Nguyễn Minh Huy.
- Lecturer information:
    - M.S. Nguyễn Minh Huy, Software Engineering Department, Faculty of Information Technology, University of Science, HCMC.
    - Email: nmhuy@fit.hcmus.edu.vn, subject: [Student Id]-[Course name]-[Title].
    - Office hour: room I82, Software Engineering Dept, 227 Nguyễn Văn Cừ (email).

2. Course description

This course provides students with basic and advanced concepts of programming in C/C+ syntax. Students will learn how to construct a complete C/C++ program by using basic programming structures (variables, conditions, and loops), and compound structures (structs, arrays, and functions) across multiple project files. Students will also learn how to use different types of pointers for dynamic memory management, string manipulations, and binary files. Moreover, students will also learn to implement basic data structures such as linked list, stack, and queue.

3. Course objectives

At the end of this course, students are able to do the followings:

- **Describe** basic and advanced programming concepts in C/C++: programming languages, algorithm, pointer, and binary file.
- **Use** basic and complex programming structures to construct C/C++ program: variable, constant, condition, loop, function, struct, array, and string.
- **Implement** basic data structures: linked list, stack, and queue.
- **Organize** multiple-file projects to solve popular problems.

4. Course grades

		Theory	65%	Practice	35%
Progression	**20%**	Theory assignments	10%	Lab assignments	10%
Midterm	**25%**	Quiz and Exercises	15%	Lab midterm	10%
Final	**55%**	Final exam	40%	Lab final exam	15%
Bonus	**10%**	1% each (for student who is active in class, discussions, assignments ...)			

5. Course policies

- Students walk-through slides and read textbook before each theory session.
- Students do individual assignments after each theory session.
- Any kinds of cheating and plagiarism in this course receives ZERO grade.
- Violation of submission rules (deadline, naming convention, ...) receives PENALTY grade.
- In emergency situations, course syllabus is subject to change without notice.

6. Textbook and references

No.	Book	Information
1		K.N. King, C Programming: A Modern Approach, 2th Edition, W. W. Norton & Company, 2008.
2		C Programming, Wikibooks, http://en.wikibooks.org/wiki/C_Programming
3		Nhập môn lập trình và Kỹ thuật lập trình, Trần Đan Thư, Nguyễn Thanh Phương, Đinh Bá Tiến, Trần Minh Triết, Đặng Bình Phương, NXB Khoa Học Kỹ thuật, 2011.

7. Teaching plan (11 weeks)

Weeks	Contents	Notes
1. Programming overview	- Programming: concepts, languages, environments. - Algorithm: concepts, representations, efficiency.	
2. Input and output	- C/C++ overview: origin, program structure, standard library. - C/C++ basic: variable/constant, data-types, expressions. - IO stream: concept, read/write, formatting.	Quiz: 2, 3
3. Control flow statements	- Branches: if-else, switch-case. - Loops: while, do-while, for. - Exercises.	Quiz: 5, 6 Group exercise
4. Function and struct	- Function: concept, usage, passing arguments. - Multiple-file project: header file, divide-conquered technique. - Struct: concept, usage.	Quiz: 9, 16
5. Array 1-D	- 1-D array: concept, manipulations. - 2-D array: concept, manipulations.	Quiz: Ch.8
6. String and text file	- String: C-string vs. std::string. - Text file: file stream, read/write.	Group exercise (TA)
7. Pointer	- Concept, declaration, operators. - Pointer vs. array. - Memory management: allocate/de-allocate, dynamic 1-D array.	Quiz: 11
8. Advanced pointers	- Dynamic C-string manipulations. - Pointer of pointer: concept, dynamic matrix.	Quiz: 17
9. Binary file	- Binary file vs. text file. - Operations: open/close, read/write/seek.	Quiz: 22 Group exercise

	- Exercises.	
10. Linked list	- Singly linked list vs. array. - Operations: init, empty, find, add, remove. - Improvements: doubly.	
11. Stack and queue	- Stack: concept, operations. - Queue: concept, operations.	Group exercise (TA)