A) COURSE

Course Id:	Course
5705	INTRODUCTION TO PROGRAMMING

Class Hours per Week	Lab hours per week	Complementary practices	Credits	Total hour course
3	2	3	8	80

B) GENERAL COURSE INFORMATION:

	EE (IEA)	ME (IM)	MME (IMA)	EME (IME)	MTE (IMT)
Level:	IV	IV	III	III	
Course Type (Required/Elective)	Required	Required	Required	Required	
Prerequisite Course:	None	None	None	None	
CACEI Classification:	OC	OC	OC	OC	

C) COURSE OBJECTIVE

At the end of the course, the student will be capable of:
Design and implement computer programs to solve basic engineering problems applying logical reasoning in structuring these solutions, using the paradigm of structured programming and using Programming Language C as a tool.

D) TOPICS (CONTENTS AND METHODOLOGY)

1. Introduction to the logic of programming		4 hrs
Specific Objective:	The student will know the basic tools needed to express a solution to a problem through computer	
1.1 Data types and operators 1.2 Introduction to the Boolean logic 1.3 Flow diagrams 1.4 Algorithms		
Readings and other resources	Corona, M; Ancona, M. "Diseño de algoritmos y su codificación en lenguaje C". McGraw-Hill. 2011	
Teaching Methodologies	Lectures Problem solving Demonstration in computer	
Learning Activities	Teamwork Homework and exercises. Laboratory practices	

2. Introduction to C Language		3 hrs
Specific Objective:	The student will know the basics of C programming language	
2.1 Structure of a C program 2.2 Data Types 2.3 Variables 2.4 Constants 2.5 Operators and Expressions		
Readings and other resources	Gottfried, Byron S. “Programación en C”. 2a Edición revisada. McGraw-Hill. 2005	
Teaching Methodologies	Lectures Problem solving Demonstration in computer	
Learning Activities	Teamwork Homework and exercises. Laboratory practices	

3. Functions		3 hrs
Specific Objective:	The student will be able to design and develop programs using functions, in order to facilitate maintenance and increase code reuse.	
3.1 Structure of a function 3.2 Structure of a program using functions 3.3 Definition and call 3.3.1 Scope of variables 3.3.2 Passing arguments by value 3.3.3 Functions that return values		
Readings and other resources	Gottfried, Byron S. “Programación en C”. 2a Edición revisada. McGraw-Hill. 2005	
Teaching Methodologies	Lectures Problem solving Demonstration in computer	
Learning Activities	Teamwork Homework and exercises. Laboratory practices	

4. Flow control structures		3 hrs
Specific Objective:	The student will be able to apply flow control structures in solving engineering problems and problems in general	
4.1 Selection structures 4.2 Rrepetition Structures 4.3 Break instruction		
Readings and other resources	Gottfried, Byron S. “Programación en C”. 2a Edición revisada. McGraw-Hill. 2005	
Teaching Methodologies	Lectures Problem solving Demonstration in computer	
Learning Activities	Teamwork Homework and exercises. Laboratory practices	

5. Arrays		**3 hrs**
Specific Objective:	The student will be able to apply arrays for data storage, in order to be used in solving problems	
5.1 Introduction to arrays 5.2 Arrays as parameters 5.3 Two-dimension arrays		
Readings and other resources	Gottfried, Byron S. “Programación en C”. 2a Edición revisada. McGraw-Hill. 2005	
Teaching Methodologies	Lectures Problem solving Demonstration in computer	
Learning Activities	Teamwork Homework and exercises. Laboratory practices	

6. Structures		**3 hrs**
Specific Objective:	The student will be able to build new types of data gathering basic data types	
6.1 Introduction to structures 6.2 Structures as parameters 6.3 Arrays of structures		
Readings and other resources	Gottfried, Byron S. “Programación en C”. 2a Edición revisada. McGraw-Hill. 2005	
Teaching Methodologies	Lectures Problem solving Demonstration in computer	
Learning Activities	Teamwork Homework and exercises. Laboratory practices	

7. Pointers		**3 hrs**
Specific Objective:	The student will know the concept of pointer and be able to apply it in passing arguments by reference	
7.1 Concepto de apuntador 7.2 Paso de argumentos por referencia		
Readings and other resources	Gottfried, Byron S. “Programación en C”. 2a Edición revisada. McGraw-Hill. 2005	
Teaching Methodologies	Lectures Problem solving Demonstration in computer	
Learning Activities	Teamwork Homework and exercises. Laboratory practices	

8. Files		**3 hrs**
Specific Objective:	The student should be able to apply the files for storing data permanently	

8.1 Introduction to files 8.2 Operations in files	
Readings and other resources	Gottfried, Byron S. "Programación en C". 2a Edición revisada. McGraw-Hill. 2005
Teaching Methodologies	Lectures Problem solving Demonstration in computer
Learning Activities	Teamwork Homework and exercises. Laboratory practices

E) TEACHING AND LEARNING METHODOLOGIES

Topics are presented with traditional and audiovisual presentations. In some sessions the teacher presents the problem, develops the solution in the form of algorithm, and implements the algorithm in C. In other sessions the teacher poses the problem, students develop a solution in the form of algorithm, and once the solution is feasible, the teacher presents a suggested solution. Finally, the student implements the algorithm in C language.

During some sessions of the course, students will work in the computer. In these sessions the teacher guides students in the implementation of previously developed algorithms. Computer sessions should not be more than 30% of all sessions.

The teacher should continually instruct the student to perform homeworks involving the solution of engineering problems based in computer. For these solutions, the student must pose the solution through an algorithm and then implement it. It is essential that the teacher provides the student feedback on the solutions developed.

F) EVALUATION CRITERIA:

Final grade is composed by the average of the two midterms and an ordinary final exam.

Evaluation:	Schedule	Suggested Form of Evaluation and weighing	Topics
1st Term	Session 17	Exam 80%, Homework 20%,	Units 1 to 3
2nd Term	Session 52	Exam 80%, Homework 20%,	Unit 4
3rd Term	Session 80	Exam 80%, Homework 20%,	Units 5 to 8
Final evaluation		100% (Average of the partial evaluations)	
Other activity:			
Extraordinary exam	According to schedule	100% Exam	100% of topics
Title exam	According to schedule	100% Exam	100% of topics
Regularization exam	According to schedule	100% Exam	100% of topics

G) BIBLIOGRAPHY AND ELECTRONIC RESOURCES

Main Books

Gottfried, Byron S.
Programación en C, 2a Edición revisada
McGraw-Hill. 2005
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Complementary Books

Deitel, Harvey; Deitel, Paul.
Cómo programar en C/C++ y Java
Pearson Educación, 2004

Corona, M; Ancona, M.
Diseño de algoritmos y su codificación en lenguaje C
McGraw-Hill. 2011

Kernighan, Brian; Ritchie, Dennis
El lenguaje de programación C. 2a Edición
Prentice Hall, 1991

Internet Links

ANSI C Compiler