



**ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL**  
**Faculty of Electrical and Computer Engineering**  
**COURSE SYLLABUS**  
*Programming Fundamentals*

**1. CODE AND NUMBER OF CREDITS**

<b>CODE:</b>	FIEC04341	
<b>NUMBER OF CREDITS: 5</b>	<b>Theoretical: 4</b>	<b>Practical: 1</b>

**2. COURSE DESCRIPTION**

This course presents strategies for solving basic engineering problems through the application of a structured programming language; Also through the application of good programming practices and with exercises that help develop logical thinking. We study the paradigm "divide and conquer" to divide large problems into modules or procedures, properly using simple variables, functions, arrays, iteration, recursion, basic processing files and simple data structures.  
In this course students will work in groups to solve various engineering problems in high-level language through a programming tool.

**3. PRE-REQUISITES AND CO-REQUISITES**

<b>PRE-REQUISITES</b>	FIEC06460 Digital Collaboration Tools
<b>CO-REQUISITES</b>	

**4. CORE TEXT AND OTHER REQUIRED REFERENCES FOR THE TEACHING OF THE COURSE**

<b>CORE TEXT</b>	1. This course is self-contained.
<b>REFERENCES</b>	1. Como programar en C, Cuarta Edición. DEITEL. 2. A Step-by-Step Guide to C Programming, Jean Paul Corriveau, Prentice Hall; 1 edition (November 27, 1997) 3. The Art and Science of C: A Library-Based Introduction to Computer Science, ERIC S. ROBERTS.

**5. COURSE LEARNING OUTCOMES**

At the end of the course, the student will be able to:

1. Solve basic engineering problems by applying the knowledge and proper use of control structures.
2. Recognize the importance of the functions as a tool to simplify the structure of a program.
3. Implement functions that contain control structures learned in this course.
4. Use text files for storing information.
5. Implement projects that integrate the concepts learned, expressed in high-level language with the help of a programming tool.

**6. COURSE PROGRAM**

- |                                    |                          |
|------------------------------------|--------------------------|
| I. Course Politics and Methodology | (1 session - 2.5 hours)  |
| II. Introduction to Programming    | (3 sessions - 7.5 hours) |
| • Program Types                    |                          |
| • Programming Languages            |                          |
| • Interpreters and Compilers       |                          |
| • Algorithms                       |                          |
| • Data Handling                    |                          |
| • Operations                       |                          |
| • Input and Output                 |                          |
| III. Structured Programming        | (4 sessions - 10 hours)  |
| • Predicate Logic                  |                          |



- Control Structures
  - Conditional Structures
  - Nested Sentences
- IV. Arrays (4 sessions - 10 hours)
- Concept and N-Dimensional Arrays
  - Ordering Algorithms
  - Search Algorithms
- V. Functions (2 sessions - 5 hours)
- Structured Programming and Code Modularization
  - Functions: Definition, Implementation and Use
  - Recursion
- VI. General Purpose Languages (1 session - 2.5 hours)
- Introduction to General Purpose Languages
  - C Language
  - Development Environments
- VII. The C Language (4 sessions - 10 hours)
- Data Types
  - Control Structures
  - Functions
  - Variables' Scope
  - Header Files
- VIII. Pointers (3 sessions - 7.5 hours)
- Definition and Inicialization
  - Applications
- IX. Libraries and Interfaces (2 sessions - 5 hours)
- Introduction to Libraries
  - Designing an Interface
  - Building a Library
  - Global Variables
- X. Files and Strings (4 sessions - 10 hours)
- Basic Concepts
  - Chars and Strings
  - Reading and Writing Lines to a Text File

**7. WORKLOAD: THEORY/PRACTICE**

The subject is taught five hours per week: 4 theoretical hours and 1 practice hour. Depending on the availability of laboratories, you can have hours to 2.5 hours each session or 2 sessions of 2 hours and 1 session of 1 hour.

**8. CONTRIBUTION OF THE COURSE TO THE EDUCATION OF THE STUDENT**

Students develop solutions related to the computer science domain. Students review and apply algorithms, data structures and text file management. Students analyze and design software solutions for basic engineering problems. At the beginning as one program and later in the course in a modular way applying the paradigm "Divide and Conquer". In this course they learn a high-level language: C.

BASIC TRAINING	PROFESSIONAL TRAINING	SOCIAL SKILLS DEVELOPMENT
	X	



**9. THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES OF THE COURSE AND THE LEARNING OUTCOMES OF THE DEGREE PROGRAM**

<b>LEARNING OUTCOMES OF THE DEGREE PROGRAM*</b>	<b>CONTRIBUTION (High, Medium, Low)</b>	<b>LEARNING OUTCOMES OF THE COURSE**</b>	<b>THE STUDENT MUST:</b>
a) An ability to apply knowledge of computing and mathematics appropriate to the program's student outcomes and to the discipline;	High	1	Write algorithms for solving basic engineering problems posed by the teacher.
b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;	High	1	Contrast known control structures to apply the most appropriate to solve a problem.
c) An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs;	Medium	2,3,5	Decompose a large problem into smaller pieces, each of which will become a function or a procedure.
d) An ability to function effectively on teams to accomplish a common goal;	Low	5	Analyze, design and implement solutions as a member of a workgroup.
e) An understanding of professional, ethical, legal, security and social issues and responsibilities;	Low	5	Identify and understand the ethical, social, security and productivity aspects of the applications you develop.
f) An ability to communicate effectively with a range of audiences;	---		
g) An ability to analyze the local and global impact of computing on individuals, organizations, and society;	---		
h) Recognition of the need for an ability to engage in continuing professional development;	---		
i) An ability to use current techniques, skills, and tools necessary for computing practice.	High	4,5	Implement projects whose development are presented throughout the course through deliverables, partial project and final project. Partial and final projects are presented. Tests are performed in the computer laboratory.
j) Ability to lead, manage and undertake projects.	---		



**10. EVALUATION IN THE COURSE**

Evaluation activities	
Exams	X
Tests	X
Homework/tasks	X
Projects	X
Laboratory/Experiments	
Class participation	
Visits	
Other	

**11. PERSON RESPONSIBLE FOR THE CREATION OF THE SYLLABUS AND THE DATE OF ITS CREATION**

<b>Created by</b>	Vanessa Cedeño Miele
<b>Date</b>	03/05/2013

**12. APPROVAL**

ACADEMIC SECRETARY OF THE ACADEMIC DEPARTMENT	DIRECTOR OF TECHNICAL ACADEMIC SECRETARY
NAME: Sra. Leonor Caicedo G.	NAME: Ing. Marcos Mendoza V.
SIGNATURE:	SIGNATURE:
Date of approval by the Directive Council: 2013-334 2013-08-12	<p>ESCUELA SUPERIOR POLITÉCNICA DEL LITORAL</p> <p><b>Ing. Marcos Mendoza V.</b> DIRECTOR DE LA SECRETARÍA TÉCNICA ACADÉMICA</p>

**13. VALIDITY OF THE SYLLABUS**

RESOLUTION OF THE POLYTECHNIC BOARD:	13-10-269
DATE:	2013-10-17