NATIONAL UNIVERSITY OF ENGINEERING
COLLEGE OF SCIENCES
COMPUTER SCIENCE PROGRAM

BIC01 – INTRODUCTION TO COMPUTING

I. GENERAL INFORMATION

CODE	**:**	BIC01 Introduction to Computing
SEMESTER	**:**	1
CREDITS	**:**	2
HOURS PER WEEK	**:**	3 (Theory – Practice)
CONDITION	**:**	Mandatory
PREREQUISTES	**:**	None

II. COURSE DESCRIPTION

The course prepares students in the understanding and application of the basic principles of computer sciences. Students achieve a global vision of computing and computers including representatives themes such as: computer architecture, algorithms, programming languages, data structure, operating systems, data bases, and so on.

III. COURSE OUTCOMES

1. Understand and apply the concepts of propositional logic.
2. Recognize and represent data at machine level.
3. Organize the memory system in a processing unit.
4. Model and use data.
5. Write simple computer programs.

IV. COURSE CONTENTS

1. FUNDAMENTAL LOGIC

Propositional logic / Logical operators and connections / True tables.

2. FUNDAMENTALS OF COMPUTER PROGRAMMING

Basic syntax and semantics of a high-level programming language / Variables, types / Expressions and assignments / Conditional and iterative control structures / Data types / Data structures / Arrays /

3. ALGORITHMS

Algorithm for solving problems / Concept and properties / Analysis of basic algorithms / Search of the maximum and minimum value of a list of data / Algorithm strategies: brute force, divide and conquer.

4. DIGITAL LOGIC AND DIGITAL SYSTEMS

Digital systems / Digital computer / Computer architecture / Bits, bytes and words / Representation of numeric data and numeric bases / Floating ad fixed point systems / Two-complement representation / Non-numeric data representation / Registers and arrays representations.

5. COMPUTER ARCHITECTURE

Basic organization of Von Neumann machine / Control unit / Search instructions / Decoding and execution / Machine and assembly programming languages / Organization of memory systems.

6. COMMUNICATION AND INTERFACE

Interruption structures: vector type and priorities / Identification of interruptions / Buses, protocols / Direct memory access DMA / Networks.

7. FUNDAMENTALS OF OPERATING SYSTEMS

Definition of operating systems / Objectives / History of operating systems / Functionality of operating systems.

8. PROGRAMMING LANGUAGES

History of programming languages / Programming paradigms / Procedural languages / Object oriented languages / Functional languages / Non-algorithmic languages / Scripts / Virtual machines / Data bases / Data modeling.

V. METHODOLOGY

The course takes place in theory and practice sessions. In theory sessions, the instructor presents the concepts, theorems and applications. In practice sessions, different kinds of problems are solved and the solutions are analyzed. Active participation of students is encouraged in all sessions.

VI. GRADING SYSTEM

The Final Grade (PF) is calculated with the following formula:

PF = (EP + EF) / 2

ME: Mid-term exam EF: Final Exam

VII. BIBLIOGRAPHY

1. **J.G. BROOKSHEAR**
   Computer Science: Overview
   Addison Wesley, 2010