1. CONTENTS

1. Introduction
- Levels of abstraction in the study of computers
- Historical evolution of computers
- Von Neumann Architecture and instruction execution
- Programming languages

2. Binary Numbering Systems
- Numbering bases
- Numerical representation: integer-fixed point
  - Binary
  - 2's complement
  - BCD
- Addition and subtraction
- Alphanumerical representations

3. Combinational Systems

3.1 Introduction to combinational systems. Boolean Algebra
- Logical operations: NOT, OR, AND, XOR
- Boolean Algebra: Postulates and Theorems
- Logical Functions. Canonical Forms
- Truth Tables
- Universality of NAND and NOR gates

3.2 Combinational circuits
- Definition, analysis, synthesis.
- Circuit simplification: Karnaugh maps
- Basic combinational circuits:
  - Adders, decoders, multiplexers, comparators

4. Sequential systems
- Latches and Flip-Flops. Definition and types
- Registers
- Counters
- Sequential systems design

5. Memory System
- Basic concepts and characteristic parameters
- Memory hierarchy
- Memory operation. Address, control and data buses
- Types and technologies
- Memory map

2. LECTURER and COURSE WEB

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Tutorships: Mondays and Wednesdays 15-17h

 Course Web: http://atc2.aut.uah.es/~alvaro/Fundamentals.htm

3. EVALUATION

Continuous evaluation

It is the normal procedure to evaluate. It consist of attendance, completion and delivery of learning and assessment activities distributed throughout the semester.

Final evaluation

To qualify for the final evaluation, the student must write to the Centre Director in the first two weeks of the course explaining the reasons he or she cannot follow the system of continuous assessment. The director must assess the circumstances cited by the student and make a reasoned decision.

The **final grades** for the course will consist of:
- 60% corresponding to the theory grades.
- 40% corresponding to laboratory grades.

It is necessary to **pass both parts separately** to pass the course.

4. LABORATORY PRACTICES

Practices are **mandatory and in person** in laboratory classroom 0-L24. Therefore there is no final laboratory exam. Each practice will be evaluated by the teacher in the laboratory session and the final laboratory grade will be the average.

Before attending each laboratory session, students must read the practice documentation available in the web and:
-Buy the required material (inserting board, chips, leds, etc).
-Answer the theoretical questions.

5. BIBLIOGRAPHY

Basic bibliography
- Digital Fundamentals. Thomas L. Floyd. Pearson International.
Supplementary Bibliography
- Logic and Computer Design Fundamentals. M. Morris Mano, Prentice-Hall.
- Digital Design. M. Morris Mano, Pearson/Prentice-Hall.