SISTEMAS DIGITAIS

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Contents

1. Introduction

Sistemas Digitais, or Digital Systems, is a one-semester course of the *cursos* ESC, IG and EI. The objective is a general introduction into digital logic and circuits and, in fact, a preparation for understanding the bits and bytes of computers that will be treated in the succeeding course, *Arquitectura de Computadores.* More explicitly, we will see

1. Number systems, conversions, arithmetic and codes
2. Boole algebra
3. Combinatorial circuits and simplifications
4. Flip-flops
5. Sequential circuits, synchronous and asynchronous
6. Registers and functional elements
7. A simple ALU design
8. Bus structure of a simple microprocessor
9. Mass memory, RAM and ROM, static and dynamic, address decoding
10. Logic families, in particular the *TEXAS INSTRUMENTS* SN74xx TTL series

At the end of this course, students must be able to understand and to work with logical functions like NAND and NOR, to read schemes of digital circuits, to design circuits and to have a basic notion of the anatomy of a simple computer.

In a one-semester course it is simply impossible to treat all subjects in depth. Hence, this course is only an *introduction* into the most common and fundamental techniques. This syllabus is meant to contain **all** examination material, tests and examination can be done without problems after studying this syllabus. For more detailed analysis of e.g. sequential circuits, I advice to read some basic text book: "Introduction to switching theory and logical design," F.J. Hill and G.R. Peterson, Wiley and Sons, 1974, or "Modern digital design," R.S. Sandige, McGraw-Hill, 1990.

Because students in computer science, including those from *Gestão* and *Ensino,* must be able to read original computer documentation, this course syllabus is completely written in English.

Hans du Buf and Paulo Oliveira, 12/2/2001

PS: This syllabus may still contain errors. For preparing a better and error-free version, please report your suggestions for improvements and errors that you detect using the next page. Doing this, you may gain extra points in your final result!

Sistemas Digitais, ano lectivo 2000/2001

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A enviar ao Prof. Hans du Buf, FCT, Campus de Gambelas.