



DIGITAL DESIGN

Enrollment year	2019/2020
Academic year	2020/2021
Regulations	DM270
Academic discipline	ING-INF/05 (DATA PROCESSING SYSTEMS)
Department	DEPARTMENT OF ELECTRICAL, COMPUTER AND BIOMEDICAL ENGINEERING
Course	ELECTRONIC AND COMPUTER ENGINEERING
Curriculum	PERCORSO COMUNE
Year of study	2°
Period	2nd semester (08/03/2021 - 14/06/2021)
ECTS	6
Lesson hours	50 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	TORTI EMANUELE - 6 ECTS
Prerequisites	Programming fundamentals.
Learning outcomes	<p>This course is meant to address the fundamentals of Boole's algebra, the methods and the techniques of Analysis and Design of the Logic Networks, both combinatorial and sequential, (asynchronous and synchronous) and a description of the functions of the Arithmetic/Logic Unit in the scenario of the architecture of a numeric processor. The practice lessons are about analysis and synthesis of Logical Networks and algorithms for math operations. They aim to the understanding the functions of the Arithmetic/Logic Unit and its performances.</p>
Course contents	<p>Logical Network Module Sito Web: vision.unipv.it/reti-logiche Introduction to Boole's Algebra Introduction to Logic and Set Theory; Boole's Algebra; boolean</p>

	<p>expressions and functions; consensus theorem; canonical forms; implicants and implicates; representation of boolean functions; simplification of boolean functions and minimum cost functions (method of Karnaugh maps, method of Tison, method of Quine-McCluskey; Petrick function).</p> <p>Combinatorial networks Combinatorial networks; logic variables and electrical signals; elementary electronic components; elementary functional blocks: And, Or, Not, Nor, Nand, Xor, Analysis of Combinatorial networks; Synthesis of Combinatorial networks. Elementary Combinatorial networks: adder, coder and decoder, multiplexer, ROM. Transients in Combinatorial networks: static hazards.</p> <p>Sequential networks Sequential networks: internal state; finite state machines, minimum machines; method of the triangular table, equivalent machines and compatible machines. Asynchronous machines, critical paths. Synchronous machines. Analysis of sequential machines, temporal analysis. Synthesis of sequential machines: states assignment. Remarkable Sequential networks: Latch and Flip-Flops, registers, counters, sequence detectors, serial and parallel adders.</p>
Teaching methods	<p>Logical Network Module: Lectures (hours/year in lecture theatre): 45 Practical class (hours/year in lecture theatre): 0 Practicals / Workshops (hours/year in lecture theatre): 0</p>
Reccomended or required readings	<p>M. Morris Mona, Charles R. Kime. Logic and Computer Design Fundamentals. Pearson -Prentice Hall, 2008, IV edition.</p>
Assessment methods	<p>The exam of the Logical Network module consists of a written test followed by the chance to sustain an oral examination to improve the final rank.</p>
Further information	
Sustainable development goals - Agenda 2030	<p>\$lbl legenda sviluppo sostenibile</p>