

Digital Circuit Design With VHDL

INSTRUCTOR	Daniel Llamocca
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WEBPAGE	dllamocca.org/Fall2013_WorkshopVHDL.htm
REFERENCE	Stephen Brown and Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL Design", Third Edition, McGraw Hill, 2009
SESSIONS	Fridays 2:00 pm - 4:00 pm @ ECE Room 216
MATERIALS	Digilent Nexys 3 Development Board ISE Design Suite 14 - Webpack Edition * Students must bring their own computer with the installed software

DESCRIPTION

Digital Logic design with VHDL. VHDL description of logic gates, combinational circuits, synchronous sequential circuits, and finite state machines. VHDL testbench generation. Design Flow for CAD software. Introduction to Digital System Design with VHDL.

OUTLINE OF TOPICS

Introduction	<ul style="list-style-type: none"> Introduction to VHDL Digital signal representation in VHDL: Data Types. VHDL Description: Logic Gates VHDL Testbench Generation
Concurrent Description	<ul style="list-style-type: none"> VHDL Description of Combinational circuits: Concurrent statements. 'with-select', 'when-else' for: (priority) encoder, decoder, comparator, mux, de-mux.
Behavioral Description	<ul style="list-style-type: none"> Behavioral description of Combinatorial circuits: Asynchronous Processes. 'if-else', 'case', 'for-loop'
Structural Description	<ul style="list-style-type: none"> Hierarchical design: port-map, package, for-generate, if-generate. Examples: Adders, comparators, multipliers, Look-up Tables, Barrel Shifter
Sequential Circuits	<ul style="list-style-type: none"> Asynchronous processes: Latches Synchronous processes: flip-flops, counters, registers
Finite State Machines	<ul style="list-style-type: none"> Algorithmic State Machine (ASM) charts VHDL Description examples
Introduction to Digital System Design	<ul style="list-style-type: none"> Components of a digital system: datapath circuit, control circuits Examples: shift-and-add multiplier, bit-counting circuit, small processor, multiply and accumulate (MAC) circuit.
Fixed-point arithmetic	<ul style="list-style-type: none"> Introduction to Fixed-point arithmetic Case example: Square root <ul style="list-style-type: none"> Algorithmic description Hardware implementation: iterative, pipelined

Schedule

	Su	Mo	Tu	We	Th	Fr	Sa
August					1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
September	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
October	29	30	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
November	27	28	29	30	31	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30