

Course Syllabus: Physics 476 Section 1, Spring Semester 2023

Instructor: Dr. Gary Varner

Lecture Hours: T Th 10:30- 11:30am, Lab T Th 13:00 - 15:00 Watanabe 214

week	date	Lecture topics	Laboratory topics
1	10-Jan 12-Jan	electronics packaging assembly techniques	soldering and hand wiring prototyping and wire-bonding
2	17-Jan	Intro to PCB technology	Ex. 0: CAD/CAM
	19-Jan	Schematic capture (I)	Ex.1: symbols and hierarchy
3	24-Jan	Schematic capture (II)	Ex. 2: wiring, busses, netlists
	26-Jan	Schematic capture (III)	Ex. 3: parts/footprints
4	31-Jan	Design management	Ex. 4: Libraries and part creation
	2-Feb	[Electronic standards]	Ex. 5: Placement
5	7-Feb	Layout (I)	Ex. 6: Routing
	9-Feb	Layout (II)	Ex. 7: Power and area fills
6	14-Feb	Layout (III)	Ex. 8: Artwork generation
	16-Feb	Design review/submission	Ex. 9: da BOM
7	21-Feb	Intro to Programmable Logic	Ex. 10: CAD tools
	23-Feb	FGPAs (I)	Ex. 11: design entry
8	28-Feb	FGPAs (II)	Ex. 12: user constraints
	2-Mar	VHDL language	Ex. 13: VHDL
9	7-Mar	Verilog language	Ex. 14: Verilog
	9-Mar	Logical simulation	Ex. 15: State table simulation
10	14-Mar 16-Mar	SPRING BREAK	SPRING BREAK
11	21-Mar	Intro to analog simulation	Ex. 16: models
	23-Mar	SPICE simulation	Ex. 17: accuracy, convergence
12	28-Mar	Conceptual Design Preparation	parts specification
	30-Mar	Intro to VLSI design	Conceptual Design Review
13	4-Apr	Bipolar vs. CMOS	Ex. 18: NAND and NOR
	6-Apr	Technical Design Preparation	Ex. 19: Amplifiers, parasitics
14	11-Apr	Large system design	Technical Design Review
	13-Apr	MOSIS and Fab. Processes	Ex. 20: DRC and submission
15	18-Apr	Project Theory (I)	Project work
	20-Apr	Critical Design Preparation	Project work
16	25-Apr	Project Theory (II)	Critical Design Review
	27-Apr	Deadline Management	Project work
17	2-May	Final Design Review Prep.	Final Design Review
	4-May	The Success of Failures	Project work
18	TBD	Tentative: Final Presentations -- 9:45 - 11:45 am	

Prerequisite: Physics 475, equivalent or premission from instructor

Texts: Horowitz & Hill: *The Art of Electronics*

Johnson & Graham: High-Speed Digital Design: *A Handbook of Black Magic*

Office hours: WAT333 M 10-11, any afternoon in WAT214 by appointment

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Exercises: **Mandatory** -- must be completed prior to next lab session

Grading: 20% Exercises

40% Final project

20% Final presenation

20% Final report