Syllabus

Instructor: Dr. Herman Lam
- Office Benton Hall, Room 313
- Office hours: Mon P5, Tues P8, Wed P8, Fri P6
- Telephone: (352) 392-2689
- Email: hlam@ufl.edu

TAs: TA Lab schedule and office hours (All office hours are in NEB 213B, unless specified otherwise, indicated in red below), see in table form here.
- Nirali Patel: niralipatel@ufl.edu
  - Lab: Tues P9-P10
  - Office hour: Mon E1, Tues P8
- Cristo Silva: cristosilva@ufl.edu
  - Labs: Wed P9-P10
  - Office hour: Thurs P7
- Shreyas Sreedhara: shreyasgaadikere@ufl.edu
  - Labs: Thurs E2-E3, shares Mon E2-E3
  - Office hour: Thurs P9 (NEB 222)
- Bhavana Subramanian: bsubramanian@ufl.edu
  - Labs: Fri P6-P7; Fri P8-P9
  - Office hour: Fri P5
- Akash Vasishta: akashvasishta@ufl.edu
  - Labs: Thurs P11-E1, shares Mon E2-E3
  - Office hour: Wed P5

Class lectures:
- MWF 4th period (10:40 – 11:30 pm), Larsen Hall 310

Textbook:

Lab board and instrument:
- **DE10-Lite 0 Board**: Information on terasIC website (including user manual under "Resources" tab). The DE-10 Board will be provided to you (included in your lab fee)
- **Digilent Analog Discovery** multi-function instrument
- **Digilent Analog Discovery Getting Started**

**Design software:** *Quartus Prime Lite Edition 18.0*

**VHDL resources:**
- Some examples and notes:
  - [Introduction to VHDL](#)
  - [Some VHDL examples](#)
  - [Some example testbenches](#)
  - [VHDL sequential statements Part A](#)
  - [VHDL sequential statements Part B](#)
  - [VHDL for state machines](#)
  - [Another state machine example](#)
  - [GenericVHDLExamples](#)
- [VHDL Quick Reference Card](#)
- [VHDL Tutorial: Learn by Example](#)
- [VHDL Math Tricks of the Trade](#)
- [VHDL Online](#)
- VHDL book, can be downloaded (pdf): [Free Range VHDL](#)

**Grading:**
- Test 1 (20%)
- Test 2 (25%)
- Labs and Mini-Project (25%)
- Final Exam (30%)

There are no scheduled makeup tests. Makeup tests are handled case-by-case, only for documented illness and emergencies.

**Course Objective:**

The objective of this course is to study the fundamentals, methods, and techniques for the structured design of digital systems, using the state of the art technologies and design environments and tools.

**Course Contents:**

**I. Digital design building blocks and technologies**
- Review of commonly-used digital components: MUXes, deMUXes, decoders, encoders, adders, flip-flops, counters, registers, etc. In addition, we will learn to specify these components in VHDL.
- Carry-look-ahead adders, ALUs, multipliers
- Programmable logic devices: PLA’s, PROM’s, CPLD’s, and FPGA’s
- Memories - RAM, SRAM, DRAM, ROM, Flash, HMC

**II. Digital design methodology and techniques for finite state machines (FSM) and FPGA’s**
• Top-down, modular design
• Controller/controlled-component architecture
• ASM fundamentals and design methods
• Implementation methods - traditional, MUX, ROM, "one-hot"
• Design and Implementation techniques using FPGA's
• Testing and design for testing
• Digital design examples (labs)

III. Design languages, tools, and environments (lab-intensive)
• Design life cycle using model digital development environments
• Design specification: graphical, VHDL
• Logic synthesis
• Simulation: functional and timing using VHDL testbenches
• Timing analysis
• Device program
• Testing

Honesty Policy:
All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

Accommodation for Students with Disabilities:
Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services:
Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

• UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
• Career Resource Center, Reitz Union, 392-1601, career and job search services.

Software Use:
All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.