Syllabus

1 Class Information

Meeting Time:	Mon & Wed 12 : 00 – 2:10 pm
Location:	Microsoft Teams
Credit Hours:	3
Instructor	Lakshmi Kavya Kalyanam
Office	ENB 249A
Email	lakshmikavya@usf.edu
Phone	(813)609 9796
Office Hour	Tue. & Thu. 11 am- 1 pm

2 Course Description

Catalog Description Covers analysis and design of digital systems using VHDL simulation. Provides experience with field programmable logic gates and gate arrays. Introduces the requirements for field programmable systems; testing of circuitry, and analysis of system design.

Additional Description This course introduces digital system designs based on field programmable logic arrays (FPGAs). Basic concepts of modern FPGA architectures will be explained, and certain unique features of FPGAs and their applications in digital system designs will also be discussed. Key elements of a typical digital system design flow using VHDL (a hardware description language), and, additionally, alternative design methods for large complex systems will be introduced. This course provides extensive hands-on experience through various digital design lab assignments using a commercial FPGA design toolkit.

Outcomes At the end of this course, students will

- Understand architecture of modern FPGAs, and comparison between FPGAs and other computing technologies.
- Be able to design and verify digital systems in VHDL using a FPGA design tool,
- Be able to implement VHDL design models onto a FPGA platform,
- Understand high level synthesis, and be able to use it to produce VHDL designs from C programs,
- Understand the basic concepts of heterogeneous computing, and its support by FPGAs.

Prerequisites CDA 3201/CDA 3201L Logic Design/Logic Design Lab

Textbook No required textbook. However, many topics are based on the following two references, which you are encouraged to acquire.

- For VHDL related topics, the following book will be used extensively throughout the semester. It is available on-line from the USF Library.

FPGA Prototyping by VHDL Examples: Xilinx MicroBlaze MCS SoC, 2nd Edition, Pong Chu, Wiley-Interscience, 2017, ISBN 978-1119282747,

- For reference on Xilinx Zynq-7000 FPGAs, *The Zynq Book* and its companaion tutorials, are available for free at
  http://www.zynqbook.com.

Other relevant material will be posted online during the semester.

Attendance Required

Last Day to Drop with 'W': June 25th, 2021

3 Evaluation

Assignments/Exam	Grades	Date
Lab assignments	60%	TBA
Final Project	40%	TBA

Final grading scale

$< 60\%$	$60\% - 69.99\%$	$70\% - 79.99\%$	$80\% - 89.99\%$	$\geq 90\%$
F	**D**	**C**	**B**	**A**

- The instructor reserves the right to give +/- letter grades for the final grades.
- The above grading scale may be subject to minor change depending on the overall class performance statistics.
- No incomplete (I) grades will be given.

Lab Assignments

- There will be around 7 assignments.
- All assignments are individual unless specified otherwise.
- The solution submissions must be your own work. Copying others' work is prohibited.
- Late submissions will **NOT** be accepted unless approvals for extensions are obtained from the instructor beforehand.
- Requests for re-grading must be submitted via email or in writing **within one week after a graded assignment is returned**.
- Additional specific requirements may be imposed for individual assignments. Read carefully each assignment description when it is distributed.

4 Course Topics

The following list of topics to be introduced is tentative, and may be subject to change as the semester progresses.

- Basic concepts and key features of FPGA architectures
- Digital system design using VHDL
- Basic concepts of design verification and its support in VHDL
- Design methodologies
- High-level synthesis of C programs
- System design using IPs
- Basic concepts of heterogeneous computing

5 Course Communication

Canvas will be used for the course communications. The course *front page* on Canvas contains lecture material, assignment information, grades, announcements. It will be updated regularly throughout the semester, therefore you need to access it regularly as well.

In addition, your email inbox needs to be cleared because messages broadcast to the whole class will be sent out via announcements and/or emails. *You are responsible for not receiving emails due to the overflow of your email inbox.*

6 Academic Integrity/Academic Dishonesty

Students are expected to be honest and not cheat on their assignments/examinations/project. Collaborations by forming study groups and having discussions with fellow students are highly encouraged, but copying each other's work is forbidden. You must write *your own solutions* in *your own words*. If you are unable to find the solutions to problems without step-by-step help from your study partners, you do not understand the solutions.

Every student should read the University's policies on student conduct, academic integrity, etc. Please see the University's Undergraduate Catalog regarding these policies at http://regulationspolicies.usf.edu/regulations/pdfs/regulation-usf3.027.pdf. Students caught cheating in any form will receive an **FF** grade for the course.

7 Course General Policies As Applicable

- All announcements and assignments will be posted through Canvas. Students are required to check Canvas regularly for updated course material and related information.

- Class Attendance is required although not monitored. Students are responsible for all information communicated during class. This information will not be necessarily duplicated in the class webpages.
- Academic dishonesty will not be tolerated and the student, in question, will be dealt with in accordance with the University policies.
- Cell phones may not be used as calculators. Cell phones must be turned off at all times including exams and lectures.
- The communication functions including text messaging on all devices must be turned off during exams.
- Students are not allowed to sell or distribute notes provided for this class.
- Students in need of academic accommodations for a disability may consult with the office of Students with Disabilities Services to arrange appropriate accommodations. Students are required to give reasonable notice to the instructor prior to requesting an accommodation. If accommodations are needed, a letter from the Office of Student Disability Services (SVC 1133) is required.
- Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) in writing by the second class meeting.
- The instructor reserves the right to interpret the class policies if confusions may occur.

8 Standard University Policies

Policies about disability access, religious observances, academic grievances, academic integrity and misconduct, academic continuity, food insecurity, and sexual harassment are governed by a central set of policies that apply to all classes at USF. These may be accessed at: https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx

9 Covid-19 Procedures

All students must comply with university policies and posted signs regarding COVID-19 mitigation measures, including wearing face coverings and maintaining social distancing. Failure to do so may result in dismissal from class, referral to the Student Conduct Office, and possible removal from campus.

Additional details are available on the University's Core Syllabus Policy Statements page: https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx

10 Emergency Situations and Other Issues

In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Canvas, Elluminate, Skype, and email messaging and/or an alternate schedule. It's the responsibility of the student to monitor Canvas site for each class for course specific communication, and the main USF, College, and department web-sites, emails, and MoBull messages for important general information.

Policies about disability access, religious observances, academic grievances, academic misconduct, and several other topics are governed by a central set of policies that apply to all classes at USF. These may be accessed at: https://www.usf.edu/provost/faculty-info/core-syllabus-policy-statements.aspx.