CPET-343: Hardware Description Languages [Fall Semester 2023]

Instructor:

Dr. Kaputa
Office: GOL-1341, Phone: 5-2073, Email: dskiee@rit.edu
Office hours: Mon and Wed from 9-10 in person, Thurs 3:30– 4:30 via zoom

Prerequisites: Digital Systems Design and Lab (CPET-241, CPET-242)

Text: Effective Coding with VHDL by Ricardo Jasinski.

Recommended Course Materials:

Binder for class notes and Altera DE0-SoC Development Board

Course Description:

This course is an in-depth coverage of current logic design and verification methodologies using a modern hardware description language (HDL). Topics include: coding for different levels of abstraction, implementation of arithmetic circuits and finite state machines, hierarchical designs, reusable component design, data and control path, best coding practices, design constraints and verification. Students, upon completion of this course, will have the necessary skills to analyze and design advanced hardware descriptions of combinational and sequential logic circuits using design and verification best practices and methodologies.

Intended Learning Outcomes:

1. Advanced Description of combinatorial and sequential logic hardware systems using an HDL.
2. Advanced use of a digital event driven simulator to verify HDL design correctness.
3. Advanced uses of a synthesis and Place&Route tool to map HDL designs into a programmable device.
4. Understand how a finite state machine can be represented in an HDL.
5. Design advanced arithmetic components in an HDL
6. Advanced HDL design concepts.
7. How to constrain a design to represent real circuit implementations.
8. Learn how to write testbench code to exercise and verify design.
9. Apply a verification methodology to the design

Homework: Assigned roughly every three weeks. Late homework will not be accepted.

Quizzes: Announced and unannounced quizzes will be given throughout the semester. Quizzes will be closed book and closed notes. There will be no makeup quizzes.

Tests: Two tests will be given during the semester. **You may bring one 8.5"x11" sheet** with hand written notes for use during these tests.

Final: This date is set by the university and can potentially be different that the date currently posted. Best practice is to stay in town the entire duration of final exam week. The final will be a closed book exam but you may bring two 8.5"x11" sheets with hand written notes.

CPET-343: Hardware Description Languages [Fall Semester 2023]

Evaluation:		**Letter Grades:**			
Quizzes and homework	25%	93.00 – 100.00	A	77.00 – 79.99	C+
Test 1 and 2	30%	90.00 – 92.99	A-	73.00 – 76.99	C
Final exam	20%	87.00 – 89.99	B+	70.00 – 72.99	C-
Lab Grade	25%	83.00 - 86.99	B	60.00 – 69.99	D
		80.00 – 82.99	B-	0.00 – 59.99	F

You must pass the lab in order to pass the class.

Attendance:

Attendance is not part of your grade, but it will be considered in when a student is close to a letter grade.

Grade Dispute:

If you feel that you have been unfairly graded on any test or assignment, you will have 2 weeks from the time the work is returned to your mail folder to meet with me about it.

Special Needs: RIT is committed to providing reasonable accommodations to students with disabilities. If you would like to request accommodations such as special seating or testing modifications due to a disability, please contact the Disability Services Office. It is located in the Student Alumni Union, Room1150; the Web site is www.rit.edu/dso. After you receive accommodation approval, it is imperative that you see me during office hours so that we can work out whatever arrangement is necessary.

Academic Dishonesty:

Students are encouraged to study together, but must do their own work. **All students are required to submit original work. It is Plagiarism in any form will not be tolerated.** All work is to be performed individually. At a minimum, plagiarism will result in a grade of 0% for that assignment as well as documentation of such being entered into the student's permanent records. If you are unclear as to what is considered plagiarism, please refer to the handbook: "*Writing with Sources*" by Gordon Harvey. This is on reserve in the library.

Rochester Institute of Technology does not condone any form of academic dishonesty.
Depending on the severity of the misconduct, a student judged to be guilty may receive a failing grade for the individual piece of work, or for the entire course. If the student believes the action is incorrect or severe, the student may appeal to the Academic Conduct Committee.

RIT is committed to providing a safe learning environment, free of harassment and discrimination as articulated in our university policies located on our governance website. RIT's policies require faculty to share information about incidents of gender based discrimination and harassment with RIT's Title IX coordinator or deputy coordinators, regardless whether the incidents are stated to them in person or shared by students as part of their coursework.

If you have a concern related to gender-based discrimination and/or harassment and prefer to have a confidential discussion, assistance is available from one of RIT's confidential resources on campus (listed below).

1. The Center for Women & Gender: Campus Center Room 1760; 585-475-7464; CARES **(available 24 hours/7 days a week)** Call or text 585-295-3533.
2. RIT Student Health Center – August Health Center/1st floor; 585-475-2255.
3. RIT Counseling Center - August Health Center /2nd floor - 2100; 585-475-2261.
4. The Ombuds Office – Student Auxiliary Union/Room 1114; 585-475-7200 or 585-475-2876.
5. The Center for Religious Life – Schmitt Interfaith Center/Rm1400; 585-475-2137.
6. NTID Counseling & Academic Advising Services – 2nd Floor Lynden B. Johnson; 585-475-6468 (v), 585-286-4070 (vp).