EEL 4740

Embedded Computing Systems

Section: U01

In Person

Spring Term 2026

Course Meeting Information

Class meeting times	
Day	Tuesday Thursday
Time	12:30 pm - 1:45 pm
Location	EC 2410

Professor Information

Atoussa Tehrani

Roles: Primary Instructor

Email: hosseini@fiu.edu

Response Time: 48 hours

Phone: (305)348-4943

Office Hours: Thursdays 2 pm - 4 pm or by appointment

Office Location: EC3113

Department or Academic Unit: ECE

Course Prerequisites

Course prerequisites, if any, are listed below.

Prerequisite: EEL4709C

Course Description

This is an undergraduate-level course which covers the principles of embedded computing systems. The course presents the main elements in the design of embedded systems and how FPGA technology is used for such a design. Since the course is intended to serve students with a background in Computer or Electrical Engineering, prior knowledge of computer design is expected. These include Computer Architecture, Processor, Combinational and Sequential Logic Design. Topics covered include embedded systems design metrics, FPGA, VHDL, designing custom single-purpose processors and implementing the corresponding VHDL model in FPGA, and programming an ARM general-purpose processors and peripherals for embedded system design.

Textbook and Course Materials

VHDL for Engineers

Required/Recommended: Recommended

Authors: Kenneth L. Short

Publisher: Pearson

Publication Date: 2009

Copyright Date: 2009

ISBN 10: 0131424785

ISBN 13: 9780131424784

Chapters/Pages: 1 through 10

Panther Book Pack

Get all required course materials for $20.50 per undergrad credit hour through Panther Book Pack. You'll be charged automatically unless you opt out within 3 days after the add/drop deadline.

For more details, to compare costs, and to learn how to access your course materials, visit the Panther Book Pack information page on FIU OneStop.

Readings, Materials, and Open Educational Resources (OER)

Frank Vahid and Tony Givargis***, Embedded System Design: A Unified Hardware/Software Introduction,*** second edition, John Wiley & Sons, ISBN: 9780471386780, 2002

Peter J. Ashenden***, Digital Design, An Embedded Systems Approach using VHDL,*** ELSEVIER, ISBN: 978-0-12-369528-4, 2008

Student Learning Outcomes/Objectives

- Identify different embedded systems related concepts and technologies.
- List integrated circuit (IC) technologies used for embedded systems.

- Explain the design of embedded processing system using the field programmable gate array (FPGA).
- Use VHDL hardware description language to implement FPGA designs.
- Examine VHDL models implemented in FPGA.
- Design custom single-purpose processors.
- Implement custom single-purpose processors in FPGA.
- Analyze the characteristics of a General-Purpose Processor.
- Assess the features of different Standard Single Purpose Processors or peripherals.
- Design an embedded system to implement the required functionality.

Expectations of the Course

Required FPGA Board:

> The assignments are developed based on "Zybo Z7 FPGA Development Board", students will borrow this board from the department, they will have to return it at the last class meeting.

Academic Misconduct:

For work submitted, it is expected that each student will submit their own original work. Any evidence of duplication, cheating or plagiarism will result at least a failing grade for the course.

Assignments & Assessments

Course Material:

- Course material is shared with students in Canvas.

Assignments:

- Students must submit their assignment on Canvas by the due date. Student can upload a file or enter the text in Canvas. The file formats that can be uploaded are .pdf, .doc, or .txt. **You will not be able to upload assignment past the due date. No other form of submission is accepted.**
- No credit is given to late assignments.

Quizzes:

- Students take the quizzes in Canvas, by the due date.

Exams:

- Students will take the midterm and the final exam in-person during class time.
- ***No makeup exams*** offered, both exams are closed book, one sheet of notes and a calculator are allowed to be used during the exam.
- **Midterm Exam** is scheduled on February 19th 2026 at 12:30 PM – 1:45 PM in EC2410
- **Final Exam** is scheduled on April 21st 2026 at 12 pm - 2:00 pm in EC2410

Grading

Grading Scheme:

Category	Weight
Assignments	34%
Quizzes	8%
Midterm Exam	15%
Final Exam	30%
Final Project	13%
Total	100%

Grading Scale:

<table>
<tr><td colspan="2">Grading Scale:</td><td>Points per Credit hour:</td><td>University's Code of Academic Integrity
http://academic.fiu.edu/academic_misconduct.html</td></tr>
<tr><td>A</td><td>94-100</td><td>4.00</td><td rowspan="9">"Florida International University is a community dedicated to generating and imparting knowledge through excellent teaching and research, the rigorous and respectful exchange of ideas, and community service. All students should respect the right of others to have an equitable opportunity to learn and honestly to demonstrate the quality of their learning. Therefore, all students are expected to adhere to a standard of academic conduct, which demonstrates respect for themselves, their fellow students, and the educational mission of the University. All students are deemed by the University to understand that if they are found responsible for academic misconduct, they will be subject to the Academic Misconduct procedures and sanctions, as outlined in the Student Handbook."</td></tr>
<tr><td>A-</td><td>90-93</td><td>3.67</td></tr>
<tr><td>B+</td><td>88-90</td><td>3.33</td></tr>
<tr><td>B</td><td>84-87</td><td>3.00</td></tr>
<tr><td>B-</td><td>80-83</td><td>2.67</td></tr>
<tr><td>C+</td><td>78-80</td><td>2.33</td></tr>
<tr><td>C</td><td>70-78</td><td>2.00</td></tr>
<tr><td>D</td><td>60-70</td><td>1.00</td></tr>
<tr><td>F</td><td><60</td><td>0.00</td></tr>
</table>

Schedule of Topics

Week	Date	EEL4740 Weekly Topic Spring 2026	Due Assignment
1	1/6/26	Introduction to Embedded Systems	
	1/8/26		
2	1/13/26	IC technologies	Assignment 1 Quiz 1
	1/15/26	VHDL	
3	1/20/26	VHDL models for combinational logic	Assignment 2
	1/22/26		
4	1/27/26	VHDL models for sequential logic	Assignment 3 Quiz 2
	1/29/26		
5	2/3/26	Controller Design and programming	
	2/5/26		
6	2/10/26	Controller Design and programming	
	2/12/26		
7	2/17/26	Review for midterm	Assignment 4 Quiz 3
	2/19/26	**Midterm Exam at 12:30 PM – 1:45 PM in EC2410**	
8	3/3/26	Single purpose processor	
	3/5/26		
9	3/10/26	General Purpose processor	Assignment 5
	3/12/26		
10	3/17/26	General Purpose processor	Quiz 4
	3/19/26		

11	3/24/26	Peripherals	Assignment 6
	3/26/26		
12	3/31/26	Custom peripherals	Assignment 7
	4/2/26		
13	4/7/26	Custom peripherals	Assignment 8 Assignment 9
	4/9/26	Review for final exam	
14	4/14/26	Final project presentation	Final project report
	4/16/26	Final project presentation	
	4/21/26	**Final Exam at 12 pm - 2:00 pm in EC2410**	

Canvas Schedule

Due Date	Assignment Name	Assignment Type	Points
	Academic Honesty Policy	Quiz	0
	Practice Quiz	Quiz	0
1/18/26	Assignment 0	Assignment	0
1/18/26	Assignment 1	Assignment	4
1/18/26	Quiz 1	Quiz	2
1/25/26	Assignment 2	Assignment	4
2/1/26	Assignment 3	Assignment	4
2/1/26	Quiz 2	Quiz	2
2/15/26	Assignment 4	Assignment	4

Due Date	Assignment Name	Assignment Type	Points
2/15/26	Quiz 3	Quiz	2
2/19/26	Midterm Exam	Assignment	15
3/15/26	Assignment 5	Assignment	4
3/15/26	Final Project Proposal	Assignment	1
3/22/26	Quiz 4	Quiz	2
4/5/26	Assignment 6	Assignment	4
4/12/26	Assignment 7	Assignment	4
4/19/26	Assignment 8	Assignment	6
4/19/26	Final Project Report	Assignment	12
4/21/26	Final Exam	Assignment	30

Policies & Resources

Before starting this course, please review the Policies & Resources Page in Canvas, which includes comprehensive information on various University and Course Level Policies such as:

- University Policies
- Accessibility and Accommodations
- Online Etiquette
- Technical Requirements and Skills
- Computer & Digital Literacy Skills
- Course Technology Accessibility Statements and Privacy Policies

- Academic Integrity
- Copyright Statement
- Nondiscrimination Statement
- Panthers Care & Counseling and Psychological Services (CAPS)
- Fair Use Policy

Nondiscrimination Statement

The **Office of Civil Rights Compliance and Accessibility** (CRCA) is responsible for ensuring that FIU maintains a workplace and learning environment free from discrimination, where current and prospective faculty, staff, and students are treated equitably. If any student, employee, or applicant has a sincere and reasonable belief that they have been discriminated against or harassed based on age, color, disability, marital status, ethnic or national origin, race, religion, retaliation, sex, or any other protected category, they can report their concerns to the CRCA team through report.fiu.edu.