COURSE CHANGE REQUEST
Undergraduate Programs

Department Electrical Engineering and Comp Science

College Engineering and Computer Science

UUPC Approval 10-11-21
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner Posted _____
Catalog _____

Current Course Prefix and Number	CDA 4630	*Current* Course Title Introduction to Embedded System Design

*Syllabus must be attached for **ANY** changes to current course details. See Checklist. Please consult and list departments that may be affected by the changes; attach documentation.*

Change title to:

Change prefix

    From: **To:**

Change course number

    From: **To:**

Change credits*

    From: **To:**

Change grading

    From: **To:**

Change WAC/Gordon Rule status**

    Add ☐   **Remove** ☐

Change General Education Requirements***

    Add ☐   **Remove** ☐

  *Review Provost Memorandum

  **WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to this form. See WAC Guidelines.

***General Education criteria must be indicated in syllabus and approval attached to this form. See GE Guidelines.

Change description to:

  See attached syllabus for new course description.

Change prerequisites/minimum grades to:

  Prerequisite: CDA 3203 and EEE 3300 with "C" or better

Change corequisites to:

Change registration controls to:

Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade (default is D-).

Effective Term/Year for Changes:	Spring 2022	**Terminate course? Effective Term/Year for Termination:**

Faculty Contact/Email/Phone Hanqi Zhuang, zhuang@fau.edu, 561-297-3413

Approved by		*Date*
Department Chair	_signature_	9/23/2021
College Curriculum Chair	Dan Meeroff	10-4-21
College Dean	Fred Bloetscher	10-4-21
UUPC Chair	Dan Meeroff	10-11-21
Undergraduate Studies Dean	Edward Pratt	10-11-21
UFS President		
Provost		

Email this form and syllabus to mjenning@fau.edu seven business days before the UUPC meeting.

1. Course title/number, number of credit hours

Introduction to Embedded System Design - CDA4630	3 credit hours

2. Course prerequisites, co-requisites, and where the course fits in the program of study

Prerequisite: CDA 3203 and EEE 3300

3. Course logistics

Term: TBD
Class location and time:

4. Instructor contact information

Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	TBD

5. TA contact information

TA's name *Office address* *Office Hours* *Contact telephone number* *Email address*	TBD

6. Course description

This is a practical, hands-on course that teaches the design and analysis of embedded computing systems that interact with physical processes. Topics covered include embedded architectures, interaction with devices (I/O), concurrency, real-time principles, and embedded software. Students will learn concepts through a series of laboratory exercises with state-of-the-art embedded processors and industry-standard development tools. Students will design and build an embedded system with a custom PCB.

7. Course objectives/student learning outcomes/program outcomes

Course objectives	1. To learn embedded design. 2. To learn advanced hardware and software co-design issues. 3. To learn advanced concepts of computer automation systems. 4. To develop basic and advanced skills of interfacing between computing systems and real-world signals, devices and systems. 5. To acquire hands-on experience with working electronic and electromechanical sensors and actuators. 6. To demonstrate knowledge through class exercises and a main course project.

Student learning outcomes & relationship to ABET 1-7 outcomes	(1) An ability to identify, formulate, and solve complex computing/engineering problems by applying principles of computing, engineering, science, and mathematics. (Problem Solving) (2) An ability to apply the commuting/engineering design process to produce solutions that meet a given set of computing/engineering requirements with consideration for public health and safety, and global cultural, social, environmental, economics, and other factors as appropriate to the discipline. (Design) (6) An ability to apply the engineering/computer science theory and hardware/software development fundamentals to develop and conduct appropriate experimentation, analyze and interpret data, and use computing/engineering judgment to produce engineering/computing-based solutions. (Experimentation and/or simulation)

8. Course evaluation method

Midterm project -	20%	*Note*: The minimum grade required to pass the course is C.
Progress Reports 1, 2, and 3	20%	
Demo and PPP -	20%	
Source code and Executive Summary	20%	
Final Report -	20%	

9. Course grading scale

Grading Scale:
90-100 for "A" and "A-";
80-89 for "B+", "B", or "B-";
70-79 for "C+", "C", or "C-";
60-69 for "D+", "D" ,or "D-";
59 and below: "F"

10. Policy on makeup tests, late work, and incompletes

Makeup tests are given only if there is solid evidence of a medical or otherwise serious emergency that prevented the student from participating in the exam.

Late work is not acceptable unless the instructor previously agreed.

Incomplete grades are against the policy of the department. Unless there is solid evidence of a medical or otherwise serious emergency situation incomplete grades will not be given.

11. Special course requirements

TBD

12. Classroom etiquette policy

University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled or allowed in class sessions as needed. High level well behavior and class discipline are expected.

13. Attendance policy statement

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance.

Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

14. Disability policy statement

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

15. Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

16. Code of Academic Integrity policy statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001. If your college has particular policies relating to cheating and plagiarism, state so here or provide a link to the full policy—but be sure the college policy does not conflict with the University Regulation.

17. Required texts/reading
To reduce costs for our students, we strongly encourage you to explore the adoption of open educational resources (OER), textbooks and other materials that are freely accessible. We also encourage you to clearly state in the syllabus if course materials are available on reserve in the Library.

Textbook: Introduction to Embedded Systems, A Cyber-Physical Systems Approach, Second Edition By Edward Ashford Lee and Sanjit Arunkumar Seshia (Open Source Textbook)

18. Supplementary/recommended readings
TBD

19. Course topical outline, including dates for exams/quizzes, papers, completion of reading

- Intro to Embedded Systems CPUs, MPUs, Embedded Systems
- PCB Design
- Embedded architecture, ARM Cortex-M families (also intro to Cortex-A families time permitting)
- Device I/O, busses
- Serial protocols
- Sampling, ADCs, DACs
- Sensors and actuators
- Embedded Systems programming and debugging using C and Assembly in ARM chips
- Embedded Operating systems and real-time scheduling
- Power management, low energy design concepts and measurements
- Embedded Systems connectivity and IoT devices and networks
- Embedded Systems security