Cover Sheet: Request 14113

EEL4XXXC- Microprocessor Applications 2

Info

Process	Course|New|Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Shannon Chillingworth schill@ece.ufl.edu
Created	8/8/2019 2:27:25 PM
Updated	11/18/2019 8:16:24 AM
Description of request	New course request.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Electrical and Computer Engineering 011905000	Robert Fox	New course	8/8/2019
No document changes					
College	Recycled	ENG - College of Engineering	Heidi Dublin	Tabled. # of credits/include info about labs.	9/5/2019
No document changes					
Department	Approved	ENG - Electrical and Computer Engineering 011905000	Robert Fox	Updated syllabus addresses College committee's concerns.	9/16/2019
No document changes					
College	Approved	ENG - College of Engineering	Heidi Dublin	Approved by the HWCOE Curriculum Committee and Faculty Council	11/18/2019
EEL4XXXC_MicroPII_UCC_1_Syll_Lab.docx					9/27/2019
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			11/18/2019
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 14113

Info

Request: EEL4XXXC- Microprocessor Applications 2
Description of request: New course request.
Submitter: Shannon Chillingworth schill@ece.ufl.edu
Created: 8/8/2019 2:21:58 PM
Form version: 1

Responses

Recommended Prefix EEL
Course Level 4
Course Number XXX
Category of Instruction Advanced
Lab Code C
Course Title Microprocessor Applications 2
Transcript Title Microprocessor Apps 2
Degree Type Baccalaureate

Delivery Method(s) On-Campus
Co-Listing No

Effective Term Earliest Available
Effective Year Earliest Available
Rotating Topic? No
Repeatable Credit? No

Amount of Credit 4

S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 4
Course Description Implementation of a Real-Time Operating System on an ARM Cortex M processor to create more robust and complex microprocessor applications. Introduction to IoT applications.
Prerequisites EEL3744C & proficiency in programming in C
Co-requisites N/A
Rationale and Placement in Curriculum This course is a follow up to EEL 3744C (Microprocessor Applications). This course builds on concepts taught in EEL 3744C.
Course Objectives To understand the benefits of using an RTOS (Real-Time Operating System) on a microcontroller. They will also learn about the architecture of ARM cortex M based processors. Students will learn the basic components of an RTOS including both background and event threads, thread scheduling algorithms, inter-process communication, thread priority, and synchronization/mutual exclusion via semaphores. Students will also learn how to design embedded C software driver libraries for peripherals such as I2C RGB LEDs drivers and a resistive, pixel-based touchscreen. Students will conclude the course by interfacing with a CC3100 Wi-Fi chip to create an IoT application.
Course Textbook(s) and/or Other Assigned Reading Required Textbooks and Software
- Hardware (included)

TI MSP432 Launch Pad
TI CC3100 Wi-Fi Booster Pack
TI SENSORPACK Booster Pack
HKN IoT Development Board

- Software:

TI Code Composer Studio 7
Some HKN IoT Source Code (provided in class)

Recommended Materials

- Title: Real-Time Operating Systems for ARM Cortex-M Microcontrollers
- Author: Jonathan W Valvano
- Publication date, edition, and publisher: 4th Edition
- ISBN number: ISBN-13: 978-1466468863, ISBN-10: 1466468866

- Title: TI MSP432 ARM Programming for Embedded Systems
- Author: M. Mazidi, S. Chen, S. Naimi, and M. Salmanzadeh
- Publication date, edition, and publisher:
- ISBN number: ISBN-13: 978-0997925913, ISBN-10: 0997925914

Weekly Schedule of Topics Course Schedule

Week 1: Introduction to ARM and CCS
Week 2: Introduction to BSP, ARM CMSIS
Week 3: NVIC, SysTick, PendSV, MPU
Week 4: C Data Structures, Real-Time Systems, Threads and Schedulers
Week 5: Integration of SysTick, PendSV to Scheduler, Basic Semaphores (Spin Lock)
Week 6: Periodic Events
Week 7: Improved Semaphores, Blocking, and Yielding / Deadlocks
Week 8: FIFO, Inter-process Communication, Sleeping, Midterm Exam
Week 9: Spring Break
Week 10: LCD Touchscreen, Thread Priority / Priority Inversion / Aperiodic Event Threads
Week 11: Thread Creation and Destruction, Networking Basics: IPv4 and IPv6
Week 12: Networking Basics: TCP, UDP and Bluetooth
Week 13: CC3100, Final Exam
Week 14: Networking Basics: Security
Week 15: Final Project Discussions and Presentations

Grading Scheme Assignment Percentage of Final Grade

Midterm Exam 10%
Final Exam 10%
Laboratory+Quizzes 70%
Final Project 10%
TOTAL 100%

Instructor(s) Yier Jin
Attendance & Make-up Yes
Accomodations Yes
UF Grading Policies for assigning Grade Points Yes
Course Evaluation Policy Yes