CPE 187: EMBEDDED SYSTEMS DESIGN

In Workflow

1. EEE Committee Chair (mahyar.zarghami@csus.edu)
2. EEE Chair (fbelkhou@csus.edu)
3. ECS College Committee Chair (troy.topping@csus.edu)
4. ECS Dean (kevan@csus.edu)
5. Academic Services (torsetj@csus.edu;%20212408496@csus.edu;%20cnewsome@skymail.csus.edu)
6. Senate Curriculum Subcommittee Chair (curriculum@csus.edu)
7. Dean of Undergraduate (james.german@csus.edu;%20celena.showers@csus.edu)
8. Dean of Graduate (cnewsome@skymail.csus.edu)
9. Catalog Editor (212408496@csus.edu;%20torsetj@csus.edu;%20cnewsome@skymail.csus.edu)
10. Registrar's Office (wwd22@csus.edu;%20wlindsey@csus.edu;%20sac19595@csus.edu;%20danielle.ambrose@csus.edu;%20h.skocilich@csus.edu;%20j.espera@csus.edu)
11. PeopleSoft (PeopleSoft@csus.edu)

Approval Path

1. Tue, 26 Mar 2019 23:25:13 GMT
   Perry Heedley (pheedley): Rollback to Initiator
2. Fri, 12 Apr 2019 21:11:40 GMT
   Perry Heedley (pheedley): Approved for EEE Committee Chair
3. Fri, 12 Apr 2019 21:38:18 GMT
   Fethi Belkhouche (fbelkhou): Approved for EEE Chair
4. Fri, 13 Sep 2019 16:37:09 GMT
   Troy Topping (troy.topping): Approved for ECS College Committee Chair
5. Fri, 13 Sep 2019 17:00:12 GMT
   Kevan Shafizadeh (kevan): Approved for ECS Dean

Date Submitted:Fri, 05 Apr 2019 17:56:16 GMT

Viewing:CPE 187 : Embedded Systems Design
Last edit:Fri, 03 May 2019 17:08:29 GMT

Changes proposed by: Praveen Meduri (219708594)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
Praveen Meduri	praveen.meduri@csus.edu	916-278-7308

Catalog Title:
Embedded Systems Design

Class Schedule Title:
Embedded Sys Design

Academic Group: (College)
ECS - Engineering & Computer Science

Academic Organization: (Department)
Electrical and Electronic Engineering

Will this course be offered through the College of Continuing Education (CCE)?
No

Catalog Year Effective:
Spring 2020 (2019/2020 Catalog)

Subject Area: (prefix)
CPE - Computer Engineering

Catalog Number: (course number)
187

Course ID: (For administrative use only.)
168823

Units:
3

Changes to a course's units impact any related programs. As a result, a corresponding change must also be submitted for those programs

In what term(s) will this course typically be offered?
Fall term only

Does this course require a room for its final exam?
Yes, final exam requires a room

Does this course replace an existing experimental course?
No

This course complies with the credit hour policy:
Yes

Justification for course proposal:
This course focuses on contemporary embedded systems design. This term refers to an electrical or electromechanical system with an embedded microcomputer (or microcontroller) that accepts inputs from the user and various sensors in order to control the system to obtain efficient and consistent performance under varying conditions. In addition, embedded systems facilitate communication between the system and the internet (the "Internet of Things"). Applications of embedded systems are seemingly endless, including but not limited to the areas of communications, robotics, signal processing, controls, automotive, etc. Hence, the ability to design embedded systems is a crucial skill for all EEE and CpE students. The existing CpE 187 course is being expanded to 3 units total and redesigned to provide a more complete and up-to-date coverage of the topic.

The expanded coursework now incorporates additional necessary topics that were hitherto covered only in a prerequisite course (CpE 166). Thus with the course expansion, CpE 166 is no longer a pre-requisite. EEE 102 is an obsolete course that is no longer taught, and hence, it is no longer a prerequisite. Also, the revised course does not have any writing assignments/reports that would require the English prerequisites listed in the original description.

Course Description: (Not to exceed 80 words and language should conform to catalog copy.)
Introduction to embedded systems with applied projects. The ISA, memory map, register architecture and configuration for one processor are studied in depth. Topics include: Overview of embedded systems; hardware, firmware, and software design; interrupt programming; application of contemporary interfacing protocols like USB and Bluetooth; use of an integrated development environment (IDE) for development; functional debugging; Real Time Operating Systems (RTOS) considerations and scheduling. One two hour lecture and one three hour lab per week.

Are one or more field trips required with this course?
No

Fee Course?
No

Does this course have prerequisites?
Yes

Prerequisite:
CPE 185 or EEE 174

Prerequisites Enforced at Registration?
Yes

Does this course have corequisites?
No

Graded:
Letter

Approval required for enrollment?
No Approval Required

Course Component(s) and Classification(s):
Laboratory
Lecture

Laboratory Classification
CS#16 - Science Laboratory (K-factor=2 WTU per unit)
Laboratory Units
1

Lecture Classification
CS#04 - Lecture /Recitation (K-factor=1 WTU per unit)
Lecture Units
2

Is this a paired course?
No

Is this course crosslisted?
No

Can this course be repeated for credit?
No

Can the course be taken for credit more than once during the same term?
No

Description of the Expected Learning Outcomes: Describe outcomes using the following format: "Students will be able to: 1), 2), etc."
Upon completion of this course the student will be able to:
1. Use industry standard Integrated Development Environment (IDE)
2. Apply key design concepts of embedded systems like interfacing and firmware development
3. Apply debugging techniques to embedded systems
4. Use contemporary professional engineering tools to design and document embedded systems.
5. Document the design process and testing process properly.

Assessment Strategies: A description of the assessment strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers) which will be used by the instructor to determine the extent to which students have achieved the learning outcomes noted above.
Homework assignments with problems incorporating practical design requirements and realistic constraints. (ELO2, ELO3)
Exams (ELO2, ELO3), lab demonstrations and presentations (ELO1, ELO4)
Quizzes (ELO 2)
Project reports (ELO5)

Is this course required in a degree program (major, minor, graduate degree, certificate?)
No

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?
No

Will there be any departments affected by this proposed course?
Yes

Indicate which department(s) will be affected by the proposed course:

Department(s)
Electrical and Electronic Engineering

I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.
I/we agree

University Learning Goals

Undergraduate Learning Goals:
Competence in the disciplines
Intellectual and practical skills

Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?
No

GE Course and GE Goal(s)

Is this a General Education (GE) course or is it being considered for GE?
No

Reviewer Comments:
Perry Heedley (pheedley) (Tue, 26 Mar 2019 23:25:13 GMT): Rollback: Please see email thread for a discussion of the changes needed for approval.

Key: 866