

Application for a New Course v10.5

Course ID <i>Subject and Number</i>	ENGR 422
Date APPROVED	
Date DENIED	

I. Systems and Catalog Information Complete each item.

1	Course Developer	Kenneth Olree
2	Course Teacher	A member of the Engineering & Physics Department faculty
3	Course Title	Embedded Systems
4	Course Abbreviation (if title is over 30 characters)	Embedded Systems
5	College	College of Arts and Sciences
6	Department	Engineering and Physics
7	Number of Credit Hours	3
8	Is the course Fixed Credit or Variable Credit?	Fixed
9	Is the course repeatable?	No
10	Maximum number of times course may be repeated	0
11	Maximum number of hours credit	3
12	Explanation for variable credit	N/A
13a	Course contact hours - LEC	3
13b	Course contact hours - Lab	0
13c	Course contact hours - Practicum	0
13d	Course contact hours - Seminar	0
13e	Course contact hours - Studio	0
13f	Course contact hours - Online	0
13g	Course contact hours - Colloquium	0
13h	Course contact hours - Field Experience	0
13j	Course contact hours - Internship	0
13k	Course contact hours - Research	0
13m	Course contact hours - Workshop	0
13n	Course contact hours - Other (specify)	0
14	Instructor Workload	3
15	Grade Mode (check all appropriate):	☒ _X_ Standard ☐ Credit/No Credit (undergrad only)
16	Maximum Enrollment	40
17	Catalog Description (50 words or less)	This course introduces fundamental concepts of embedded systems including C and assembly language programming, debugging, power supply considerations, and interfacing sensors,

		displays, and motors to microcontrollers.
18	List any prerequisites (course/s, test scores, class standing, major, etc.)	ENGR 210/211
19	List any co-requisites	ENGR 423
20	If the course is cross listed, specify the Course ID(s) MUST have signature in Section V off all Department Chairs	No
21	Does this course have any special student costs? Yes/No <i>Attach a <u>completed</u> "Request to Add or Change Course Fees" form. Describe in section IV-F.</i>	No
22a	How often will it be offered? Fall	As needed
22b	How often will it be offered? Spring	Offered
22c	How often will it be offered? Summer	As needed
23	Frequency? All, odd, or even years?	All
24	First semester this course will be offered <i>New courses may not be taught under their approved course ID until they appear in the catalog, therefore, no earlier than the coming fall.</i>	Spring 2016
25	List course/s that should be deleted, include the last semester for course/s being deleted <i>A course cannot be deleted when it is a requirement in a degree plan in any department.</i>	None
26	Is this course required for a degree/s? Yes/No <i>If "Yes," attach a revised degree plan(s) reflecting the placement of the new course.</i>	This course is an elective option for students interested in electrical engineering topics. All engineering students must select 14 hours of engineering electives to complete their degree.
27	Should the addition of this course be retroactively applied to the degree plan it supports? Yes/no and explain	No
28	Has this course been offered as a Special Topics course? Yes/No <i>If "Yes," specify the Course ID and enrollment for each term it was taught.</i> <i>(Note: New courses are NOT required to be taught as Special Topics courses prior to being approved. However, courses may be taught once as Special Topics before it is proposed. See the Course Descriptions section of the Catalog for details.)</i>	Yes. ENGR 440 – Spring 2015, Enrollment 6
29	List any courses in which content overlaps the proposed course. (Course ID and Name) <i>Attach statement from instructor/dept</i>	None

	<i>chair of existing course justifying the new offering in Section IV-D.</i>	
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II. Curriculum

1	Degree Plan Explanation of how this course affects degree requirements.	This course is an elective option for students interested in electrical engineering topics. All engineering students must select 14 hours of engineering electives to complete their degree.
2	Justification State the justification for adding this course to the current curriculum. Represent the need.	The course provides instruction on programming embedded systems and interfacing electronic hardware to peripherals. These are important issues for engineering students desiring to work with computers and electronics.

III. Course Design

1. Audience and Course Goal

1	Describe the intended audience, including prerequisite skills.	This is an elective course for engineering majors and intended to be completed during their junior or senior year. Non-majors interested in developing technical skills in embedded systems, programming, and electronic hardware interfacing may also take the course. Competency in advanced mathematics and calculus based physics are required for all students.
2	State the overarching course goal(s) in performance terms.	In this course students will learn how to program microcontrollers for embedded systems. They will learn how to power them, debug, and interface them to electronic hardware.

2. Competencies and Measurements

ABET Learning Objectives	Course Competencies	Measurement
3(a) an ability to apply knowledge of mathematics, science, and engineering	Understand battery profiles and performance characteristics. Use battery characteristics to calculate runtime	Homework, Quizzes, and Exam I, II
	Convert between signed and unsigned binary representations, floating point numbers, and other variable formats.	Homework, Quizzes, Exam II, III, and Final Exam
3(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	Design algorithms and implement them in C or assembly language code.	Homework, Quizzes, Exam I, II
	Create power supply designs to meet requirements for runtime and low battery indicator status.	
3(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	Use an integrated development environment such as Eclipse, Keil, or Code Composer to program and debug microcontroller code.	Homework
	Model electrical circuits in software such as Multisim to validate performance characteristics.	Homework

3. Text and Resources

1. Give the full publication information of the textbook/s and other required resources and outside readings.

ARM Assembly Language: Fundamentals and Techniques, 2nd edition, by William Hohl and Christopher Hinds, CRC Press, 2015, ISBN 9781482229851

2. For **combined undergraduate/graduate** courses, make two lists:
 - a. full publication information; label **Undergraduate**.
 - b. full publication information; label **Graduate**. Indicate number of pages required.

IV. Supporting Documentation

Supporting documents must accompany proposal prior to preliminary approval by chair and dean.

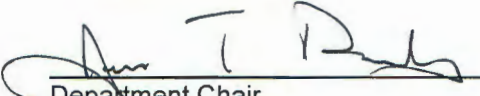
1	Library — Submit new course application and syllabus to the Dean of the Library. Consult with the director and establish a deadline for completion of the library report. Attach the signed copy of the Library report.
2	Instructional Design — The application and syllabus must be reviewed by the Adams Center. Attach a copy of the Adams Center Review Letter.
3	Content Overlap — Include one document for each course you listed in Section I-I. Attach statement from instructor/dept chair of existing course justifying the new offering.
4	Departmental Resources — List the resources that support the course and are available only through the department, if applicable. Attach the list of the holdings and the location/s.
5	Resources — List resources (other than library or departmental resources) that are needed to support this course (computers, lab equipment, other technology, etc.). Attach a complete list of all items and indicate possible sources or estimated cost of each. List the sources of any needed funds.
6	Expenses — List additional expenses needed to implement this course (full-time or part-time faculty, graduate or lab assistants, student employees, travel, special student costs, room renovation, storage facility, etc.). Attach a complete list of all items, the estimated cost of each and the source of the funds.
7	Justification — Attach all documents referred to in Section II-2
8	Syllabus — Attach the syllabus for the course based upon the anticipated first-semester offering.
9	Provide documentation for all additional attachments here

V. Preliminary Approvals

All supporting documentation has been assembled and attached to this application. I believe this course is ready to be presented to appropriate councils. We have a plan to fund this new course.

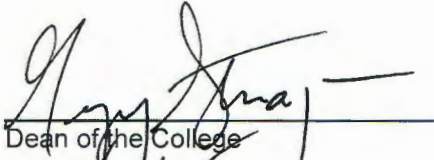
Course Number and Name ENGR 422 Embedded Systems

Primary Department



Department Chair
4/29/2015

Date



Dean of the College
4/23/15

Date

Cross-listing Department *Add more lines if multiple departments are cross-listing*

Department Chair

Date

Dean of the College

Date

Cross-listing Department *Add more lines if multiple departments are cross-listing*

Department Chair

Date

Dean of the College

Date

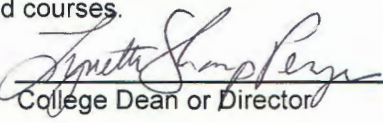
VI. Actions *Place all actions on one page.*

Course ID: ENGR 422

Course Title: Embedded Systems

1. College Academic Council: (for all courses)

Note: Insert additional lines for College Academic Council action for each college involved in cross-listed courses.

Approved ☒ Denied ☐  4-23-15
College Dean or Director Date

Approved ☐ Denied ☐ _____
College Dean or Director Date

2. Graduate Council: (for graduate level courses)

Approved ☐ Denied ☐ _____
Dean of Graduate School Date

3. Teacher Education Council: (when applicable)

Approved ☐ Denied ☐ _____
TEC Chair Date

4. University General Education Council: (when applicable)

Approved ☐ Denied ☐ _____
Provost's designee Date

5. University Undergraduate Academic Council: (*undergraduate level courses*)

Approved ☐ Denied ☐ _____
Vice Provost Date

6. Academic Provost: (for all courses)

Approved ☐ Denied ☐ _____
Provost Date

7. President of the University: (for all courses)

Approved ☐ Denied ☐ _____
President Date

Attach notes, comments, or conditions from appropriate councils: