BS IN COMPUTER ENGINEERING

In Workflow

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Approval Path

1. Fri, 23 Oct 2020 16:52:09 GMT
   Gareth Figgess (figgess): Approved for ECS College Committee Chair
2. Fri, 23 Oct 2020 17:21:06 GMT
   Kevan Shafizadeh (kevan): Approved for ECS Dean

History

1. May 1, 2018 by clmig-jwehrheim
2. Sep 17, 2018 by 212408496
3. Sep 17, 2018 by 212408496
4. Dec 12, 2018 by Behnam Arad (arad)
5. Jan 23, 2020 by Behnam Arad (arad)
6. Apr 28, 2020 by Celena Showers (celena.showers)

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Viewing: BS in Computer Engineering

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Changes proposed by: Behnam Arad (101010646)

Academic Group: (College)

Engineering & Computer Science

Academic Organization: (Department)

Engineering

Catalog Year Effective:

2021-2022 Catalog

Individual(s) primarily responsible for drafting the proposed degree major program:

Name (First Last)	Email	Phone 999-999-9999
Behnam Arad	arad@csus.edu	916-278-7160

Type of Program Proposal:

Major

Program Change Type:

Non-Substantive

Title of the Program:

BS in Computer Engineering

Designation: (degree terminology)

Bachelor of Science

Briefly describe the program proposal (new or change) and provide a justification:

To keep the BS degree program current and relevant, the Computer Engineering Committee proposes several changes based on the latest IEEE/ACM Computer Engineering Curricula (2016) and feedback from Industry Advisory Council. In particular, the changes listed below are intended to further expose Computer Engineering students to contemporary topics in Embedded Systems and Computer Security:

1. Change CpE 187 from a technical elective to a required course. The course adds necessary coverage of embedded systems into our curriculum as recommended by the latest IEEE/ACM Curricula guidelines for Computer Engineering.
2. Change CpE 186 from a required course to an elective. The change enables us to make CpE 187 a requirement without changing the total required units. The Computer Engineering Committee believes that topics in CpE 187 are more essential than those covered in CpE 186. Students interested in CpE 186 can still take it as an elective.
3. Rename 'Technical Electives' to "Technical Elective I".
4. Add 'Technical Elective II' which requires students to complete either CSc/CpE 159 or CSc 154. Currently CSc/CpE 159 is a required course, and CSc 154 is an elective. By adding CSc 154 as an alternative to CSc/CpE 159 requirement, students have the option of learning advanced topics in either computer security or operating systems.

Objectives of the degree program:

The Computer Engineering Program's specific educational objectives are to educate graduates that possess:

1. Core Knowledge: Our graduates will have careers in computer engineering, or be engaged in a related career path.
2. Application of Knowledge: Our graduates will apply their knowledge and skills to solve practical engineering problems.
3. Lifelong Learning: Our graduates will continue to develop their skills and seek knowledge after graduation in order to adapt to advancing technology and the needs of society. This may be indicated by the graduate's pursuit of an advanced degree or other formal instruction, and/or that the graduate has developed a professional specialty.
4. Professionalism: Our graduates will have the necessary professional skills, such as high ethical standards, effective oral and written communications, and teamwork, to be productive engineers and to advance in their careers.

University Learning Goals

Undergraduate Learning Goals:

Competence in the disciplines
Knowledge of human cultures and the physical and natural world
Integrative learning
Personal and social responsibility
Intellectual and practical skills

Will this program be 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

Do these changes impact the Smart Planner roadmap?

Yes

Please attach the Smart Planner roadmap:

2021_CPE_Computer Engineering BS.docx
2021_CPE_Computer Engineering BS.pdf

Briefly describe the change:

1. Changed CpE 187 from a technical elective to a required course.
2. Changed CpE 186 from a required course to a technical elective.
3. Changed 'CpE Technical Elective' to 'Technical Elective I'
4. Added 'Technical Elective II' that is satisfied by either CSc 154 or CSc/CpE 159.

Catalog Description:

Units required for Major: 97
Total units required for the BS: 124

Program Description

The Bachelor of Science degree in Computer Engineering is a four-year program that emphasizes engineering design of computer hardware and systems at all levels. Engineering design begins with logic design taught to entering students during their first semester. The thread of design continues through the study of architecture, CMOS and VLSI technology, ASIC design, operating

systems, computer hardware design, and networking hardware. To complete their degree, students take a two-semester senior design and project course.

As defined by policy http://www.csus.edu/umanual/acadaff/fsm00010.htm, a change in units constitutes a substantive change to the program. If your changes constitute a substantive change, please refer back to the 'Program Change Type' field above to ensure that 'Substantive' is selected.

Program Requirements: (If new courses are being created as part of a new program, it will be useful to propose courses first.)

Program Requirements

Code	Title	Units
Required Lower Division Courses (23 Units)		
CPE/EEE 64	Introduction to Logic Design [1]	4
CSC 15	Programming Concepts and Methodology I	3
CSC 20	Programming Concepts and Methodology II	3
CSC 28	Discrete Structures for Computer Science	3
CSC 35	Introduction to Computer Architecture	3
CSC 60	Introduction to Systems Programming in UNIX	3
ENGR 1	Introduction to Engineering [1]	1
ENGR 17	Introductory Circuit Analysis	3
Required Mathematics Courses (11 Units)		
MATH 30	Calculus I [1]	4
MATH 31	Calculus II [1]	4
MATH 45	Differential Equations for Science and Engineering	3
Additional Required Courses (13 Units)		
ENVS 10	Introduction to Environmental Science [1]	3
ENGR 140	Engineering Economics [1]	2
PHYS 11A	General Physics: Mechanics [1]	4
PHYS 11C	General Physics: Electricity and Magnetism	4
Required Upper Division Courses (44 Units)		
CPE/CSC 138	Computer Networks and Internets	3
CPE/CSC 142	Advanced Computer Organization	3
CPE 151	Cmos And Vlsi	3
CPE 166	Advanced Logic Design	4
CPE 185	Computer Interfacing	4
CPE 187	Embedded Systems Design	3
CPE 190	Senior Design Project I [1]	2
CPE 191	Senior Design Project II [1]	2
CSC 130	Data Structures and Algorithm Analysis	3
CSC 139	Operating System Principles	3
EEE 108	Electronics I	3
EEE 108L	Electronics I Laboratory	1
EEE 117	Network Analysis	3
EEE 117L	Networks Analysis Laboratory	1
EEE 180	Signals & Systems	3
ENGR 120	Probability and Random Signals	3
Technical Elective I (3 Units)		
Select one of the following:		3
CPE 144	Dsp Architecture Design	
CPE 153	Vlsi Design	
CPE 186	Computer Hardware System Design	
CSC 131	Computer Software Engineering	
CSC 133	Object-Oriented Computer Graphics Programming	
CSC 134	Database Management Systems	
CSC 151	Compiler Construction	
CSC 152	Cryptography	
CSC 153	Computer Forensics Principles and Practices	
CSC 154	Computer System Attacks and Countermeasures	

CSC 155	Advanced Computer Graphics	
EEE 120	Electronic Instrumentation	
EEE 122	Applied Digital Signal Processing	
EEE 181	Introduction to Digital Signal Processing	
EEE 187	Robotics	
Technical Elective II (3 Units)		
(select one of the following)		3
CSC 154	Computer System Attacks and Countermeasures	
CPE/CSC 159	Operating System Pragmatics	
Total Units		97

[1]   Course also satisfies General Education (GE)/Graduation Requirement.

Note:
- Students are expected to satisfy the general education requirements of the Accreditation Board for Engineering and Technology (ABET) as well as the University's General Education requirements. Students should consult the Program Coordinator for specific General Education requirements.
- A second-year foreign language course (2A or equivalent) may also satisfy 3 units of GE when the course is being taken to comply with the Sacramento State foreign language requirement. Students should consult with an advisor for exact GE eligibility of these courses.

General Education Requirements [1]

Code	Title	Units
Area A: Basic Subjects (9 Units)		
A1 - Oral Communication		3
A2 - Written Communication		3
A3 - Critical Thinking		3
Area B: Physical Universe and Its Life Forms		
B1 - Physical Science [2]		0
B2 - Life Forms [2]		0
B3 - Lab (Note: Lab experience to be taken with one of the following: B1, B2 or B5) [2]		0
B4 - Math Concepts [2]		0
B5 - Additional Course (Any B to reach 12 units) - Take upper-division course to complete Area & upper division requirements. [2]		0
Area C: Arts and Humanities (12 Units)		
C1 - Arts		3
C2 - Humanities		3
C1/C2 - Area Course C		3
C1/C2 - Area C Course - Take upper-division course to complete Area & upper division requirements.		3
Area D: The Individual and Society (9 Units)		
Area D Course		3
Area D Course		3
Area D Course		3
Area D Course - Take upper-division course to complete Area & upper division requirements. [2]		0
Area E: Understanding Personal Development		
Area E Course [2]		0
Total Units		30

[1]   To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (http://catalog.csus.edu/colleges/academic-affairs/general-education/).

Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).

[2]   Required in Major; also satisfies GE.

Graduation Requirements [1]

Code	Title	Units
Graduation Requirements (required by CSU) (9 Units)		
American Institutions: U.S. History		3
American Institutions: U.S. Constitution & CA Government		3
Writing Intensive (WI)		3
Graduation Requirements (required by Sacramento State) (6 Units)		
English Composition II		3

Race and Ethnicity in American Society (RE)	3
Foreign Language Proficiency Requirement [2]	0

[1] To help you complete your degree in a timely manner and not take more units than absolutely necessary, there are ways to use single courses to meet more than one requirement (overlap). For further information, please visit the General Education page (http://catalog.csus.edu/colleges/academic-affairs/general-education/).
Note: There is no way to list all possible overlaps so please consult with a professional advisor. The Academic Advising Center can be visited online (http://www.csus.edu/acad/), by phone (916) 278-1000, or email (advising@csus.edu).

[2] If not satisfied before entering Sacramento State, it may be satisfied in General Education Area C2 (Humanities). 'C- or better required.' The alternative methods for satisfying the Foreign Language Proficiency Requirement are described here: https://www.csus.edu/college/arts-letters/world-languages-literatures/foreign-language-requirement.html
Note: Students with a declared major of BS in Computer Engineering are exempt from the Foreign Language Graduation Requirement.

Fiscal Impact to Change an Existing Program

Indicate programmatic or fiscal impact which this change will have on other academic units' programs, and describe the consultation that has occurred with affected units:

Computer engineering Program is a jointly sponsored by Computer Science (CSC) and Electrical and Electronics Engineering (EEE) Departments. The proposed changes have been reviewed by faculty in both departments. EEE faculty considered the impact of changing CpE 186 and CpE 187 to an elective and a required course, respectively. CSC Department discussed the impact of offering CSc 154 as an alternative to CSC/CpE 159 requirement. Faculty in Both departments approved the changes impacting their departments.

Attach a copy of correspondence with these units:

CpE 186 187 .pdf
Form B - CSC EEE Ack.pdf

Provide a fiscal analysis of the proposed changes:

No significant impact.

How will the above changes be accommodated within the department/College existing fiscal resources?

No significant impact. The courses are already being offered on regular basis by each department.

Will the proposed changes require additional resources?

No

What additional space, equipment, operating expenses, library, computer, or media resources, clerical/technical support, or other resources will be needed?

None.

Estimate the cost and indicate how these resource needs will be accommodated:

N/A

Key: 321