

CERTIFICATE IN INTEGRATED CIRCUIT DESIGN



SACRAMENTO STATE

In Workflow

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Approval Path

1. 2026-04-17T23:40:06Z
Milica Markovic (milica): Approved for EEE Committee Chair
2. 2026-08-29T01:32:30Z
Milica Markovic (milica): Approved for EEE Chair
3. 2026-09-11T16:50:57Z
Tongren Zhu (tongren.zhu): Approved for ECS College Committee Chair
4. 2026-09-11T23:26:20Z
Behnam Arad (arad): Approved for ECS Dean

History

1. May 2, 2018 by clmig-jwehrheim

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Viewing: Certificate in Integrated Circuit Design

Last approved: Wed, 02 May 2018 13:42:52 GMT

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Changes proposed by: Amir Javan (223025881)

Academic Group: (College)

Engineering & Computer Science

Academic Organization: (Department)

Electrical and Electronic Engineering

Catalog Year Effective:

2027-2028 Catalog

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

Name (First Last)	Email	Phone 999-999-9999
Amir Javan	javan@csus.edu	916-278-7346

Program Snapshot

Type of Program:

Certificate

Program Change Type:

Non-Substantive

Title of the Program:

Certificate in Integrated Circuit Design

Designation: (degree terminology)

Certificate - Graduate

Delivery Mode:

Fully Face to Face

Support Mode:

State Support

Please see the CSU/CIP Code Crosswalk: https://www.calstate.edu/csu-system/administration/academic-affairs/academic-programs-innovation-and-faculty-development/Documents/CSU_Codes_to_CIP_2020.pdf

Establishment of a master's degree program should be preceded by a national professional accreditation of the corresponding bachelor's degree major program.

Will this program require accreditation?

No

Provide a clear, concise overview of the program proposal (new or change) and provide a justification. For NEW programs describe the purpose and focus of the program, identify the target student population(s), and highlight key strengths and distinguishing features of the program.

The IC Design Certificate has been systematically revised to align with the foundational domains and emerging priorities of modern integrated circuit design, while improving curricular efficiency and accessibility. The total unit requirement has been reduced from 16 to 13, lowering barriers to participation and degree completion without compromising academic rigor or technical depth.

The curriculum is structured to provide comprehensive coverage of the four principal domains of integrated circuit design: analog, mixed-signal, digital, and radio-frequency systems. Required and elective coursework have been reconfigured to ensure clear alignment with these domains, eliminate redundancies, and establish a coherent progression of competencies across the certificate.

The program maintains its emphasis on project-based learning, ensuring that students engage in hands-on design experiences that integrate theoretical knowledge with practical implementation. This approach supports the development of critical skills in circuit design, simulation, and system-level integration, preparing students to address contemporary challenges in semiconductor technologies.

Collectively, these revisions strengthen the intellectual coherence of the certificate, broaden student access, and enhance workforce readiness by equipping graduates with interdisciplinary expertise aligned with current and future needs in the integrated circuit design ecosystem.

University Learning Goals

Graduate (Masters) Learning Goals:

Disciplinary knowledge
Communication
Critical thinking/analysis
Research (optional)

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

Curriculum Alignment and Assessment

Program Learning Outcomes

Provide measurable, program-specific learning outcomes that reflect the most important competencies students will demonstrate upon completion of the program. Programs are expected to assess and use PLOs for continuous improvement.

Program Learning Outcomes**Learning Outcome**

Design and analyze integrated circuits across multiple domains, including analog, digital, mixed-signal, and radio-frequency systems, by applying fundamental principles of semiconductor devices, circuit theory, and system-level design.

Develop and validate integrated circuit designs using industry-relevant tools and methodologies, including schematic capture, simulation, layout, and verification, while accounting for performance, power, noise, and variability constraints.

Integrate and optimize circuit components within complex systems, demonstrating the ability to evaluate trade-offs and meet design specifications in modern semiconductor applications.

Interpret and communicate technical design results effectively, through documentation, visualization, and presentation of circuit performance, design decisions, and implementation outcomes.

Learning Outcomes Display

Course Code	PLO 1	PLO 2	PLO 3	PLO 4
EEE 230				
EEE 232				
EEE 234				
EEE 235				
EEE 231				
EEE 296N				
EEE 236				

Catalog Description (catalog copy):**Program Description**

The Integrated Circuit Design Certificate provides students with foundational and applied expertise in analog, digital, mixed-signal, and radio-frequency integrated circuit design. The program covers semiconductor device physics, fundamental circuit blocks in analog and digital domains, architectures for key mixed-signal circuits and data converters, and transceivers and wireless subsystems. It supports the full integrated circuit development process, from schematic design and simulation to layout extraction and physical verification. Through hands-on, project-based experiences using industry-standard CAD tools, students gain practical skills in end-to-end chip development. Graduates are prepared to assume professional roles in designing, implementing, and optimizing integrated circuits across diverse semiconductor applications.

Admission and Continuation Requirements (catalog copy): minimum GPA and prerequisites (if applicable), required coursework or preparation, portfolio, test scores, and/or letters of recommendation. For graduate programs: expectations for a relevant bachelor's degree (required or preferred disciplines, prerequisite knowledge, or equivalent experience), include evidence that program requirements conform to the minimum requirements for the culminating experience, as specified in Title 5 Section 40510 The Master's Degree and Section 40511 The Doctoral Degree.

This certificate is available to current MS students in EEE and CpE. With departmental approval, it is also open to individuals holding a BS degree in EEE, CpE, or a related field.

Program Requirements (catalog copy):**Program Requirements**

Code	Title	Units
Required Lower Division Courses (10 Units)		
EEE 230	Analog and Mixed Signal Integrated Circuit Design	3
EEE 232	Key Mixed-Signal Integrated Circuit Building Blocks	3
EEE 234	Digital Integrated Circuit Design	3
EEE 235	Mixed-Signal IC Design Laboratory	1
Required Electives (3 Units)		
Select one of the following:		3
EEE 231	Advanced Analog and Mixed Signal Integrated Circuit Design	
EEE 296N	Radio Frequency Integrated Circuit Design	
EEE 236	Advanced Semiconductor Devices	

Total Units**13**

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:

The revised certificate and proposed changes do not impact the Electrical and Electronic Engineering (EEE), Computer Engineering (CpE) or any other programs

Provide a fiscal analysis of the proposed changes:

N/A

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

N/A

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?

N/A

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

N/A

Key: 167