CPE 144: DSP ARCHITECTURE DESIGN

In Workflow

1. EEE Committee Chair (mahyar.zarghami@csus.edu)
2. EEE Chair (milica@csus.edu)
3. ECS College Committee Chair (tongren.zhu@csus.edu)
4. ECS Dean (arad@csus.edu)
5. Academic Services (catalog@csus.edu)
6. Senate Curriculum Subcommittee Chair (curriculum@csus.edu)
7. Dean of Undergraduate (gardner@csus.edu)
8. Catalog Editor (catalog@csus.edu)
9. Registrar's Office (k.mcfarland@csus.edu)
10. PeopleSoft (PeopleSoft@csus.edu)

Approval Path

1. 2026-09-25T21:26:55Z
   Mahyar Zarghami (mahyar.zarghami): Approved for EEE Committee Chair
2. 2026-10-03T00:50:21Z
   Milica Markovic (milica): Approved for EEE Chair
3. 2026-10-23T16:10:13Z
   Tongren Zhu (tongren.zhu): Approved for ECS College Committee Chair
4. 2026-10-23T16:20:37Z
   Behnam Arad (arad): Approved for ECS Dean

Date Submitted: 2025-10-07T06:12:17Z

Viewing: CPE 144 : DSP Architecture Design

Last edit: 2026-10-23T16:09:19Z

Changes proposed by: Zahra Najafi (220235757)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
Zahra Najafi	zahra.najafi@csus.edu	916-278-4878

Catalog Title:
DSP Architecture Design

Class Schedule Title:
DSP Architecture 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:
Fall 2027 (2027/2028 Catalog)

Subject Area: (prefix)
CPE - Computer Engineering

Catalog Number: (course number)
144

Course ID: (For administrative use only.)
110596

Units:
3

Is the ONLY purpose of this change to update the term typically offered or the enforcement of existing requisites at registration?
No

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

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

This course complies with the credit hour policy:
Yes

Justification for course proposal:
CPE 144 focuses on DSP principles and their hardware implementation, including filters, transforms, pipelining, and specialized DSP architectures. To better align with the analytical demands of Digital Signal Processing design, EEE 180 (Signals and Systems) is the ideal prerequisite. It equips students with the necessary prerequisite concepts like transforms and frequency response, than the current prerequisite. Replacing CPE 142 with EEE 180 ensures proper preparation, creates a logical curriculum sequence (EEE 180 # CPE 144), and better supports success in both the analytical and architectural aspects of DSP design.

Course Description: (Not to exceed 90 words and language should conform to catalog copy.)
Fundamental principles of Digital Signal Processing (DSP): sampling theory, aliasing effects, frequency response, Finite Impulse Response filters, Infinite Impulse Response filters, spectrum analysis, Z transforms, Discrete Fourier Transform, and Fast Fourier Transform. Emphasis on hardware design to achieve high-speed real and complex multiplications and additions. Pipelining, Harvard, and modified Harvard architectures are included. Concludes with architectural overviews of modern DSP applications: modems, speech processing, audio and video compression and expansion, and cellular.

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

Fee Course?
No

Is this course designated as Service Learning?
No

Is this course designated as Curricular Community Engaged Learning?
No

Does this course require safety training?
No

Does this course require personal protective equipment (PPE)?
No

Does this course have prerequisites?
Yes

Prerequisite:
EEE 180

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):

Lecture

Lecture Classification

CS#02 - Lecture/Discussion (K-factor=1WTU per unit)

Lecture Units

3

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 and Assessment Strategies:

List the Expected Learning Outcomes and their accompanying Assessment Strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers). Click the plus sign to add a new row.

	Expected Learning Outcome	Assessment Strategies
1	Demonstrate understanding of the fundamental principles of digital signal processing, including sampling, transforms, and filters.	Exams, quizzes, and written assignments
2	Apply DSP techniques to analyze and solve problems in both time and frequency domains.	Homework assignments and problem sets
3	Analyze the performance and trade-offs of FIR, IIR, and other DSP structures.	Exams and short written reports
4	Design and implement DSP architectures using concepts such as pipelining and Harvard architectures.	Design projects
5	Evaluate the effectiveness of DSP architectures in real-world applications (e.g., speech, audio, video, communications).	Final project, presentation, or case study
6	Communicate technical concepts and results effectively in oral and written formats.	Reports and presentations

Attach a list of the required/recommended course readings and activities:

CPE_144_Syllabus.pdf

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?

No

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

Knowledge of human cultures and the physical and natural world
Integrative learning

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

Is this a General Education (GE) or Graduation Requirement (GR) course or is it being considered for GE/GR?

Is this a General Education (GE) course or is it being considered for GE?

No

Key: 859