

Engineering Faculty Document No. EFD 43-22
January 18, 2022

Memorandum

To: The College of Engineering Faculty**From:** The Elmore Family School of Electrical and Computer Engineering**Re:** new Computer Systems Concentration

The faculty of the Elmore Family School of Electrical and Computer Engineering has approved the following new concentration from the College of Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Description: The Computer Systems Concentration gives students an opportunity to specialize in classes that cover the foundations of computer systems: how do the hardware and software systems that applications run on work. These courses cover topics such as networking, computer hardware, compilers, and operating systems.

Reasons: Computer systems are the foundation of how computing works, the software systems that sit under applications, and the computer hardware that software runs on. Many students that want to specialize in software or computer hardware development, whether at companies like Apple, Intel, Qualcomm, Cisco, Microsoft, Google, or in graduate school, will benefit from this concentration. This concentration is based on the historical core set of electives for Computer Engineering, so as the curriculum has gotten broader (more software, AI, ML classes), it is good to have a concentration that sits at the heart of CmpE.



Milind Kulkarni
Associate Head of Teaching and Learning
Professor of Electrical and Computer Engineering

Concentration in Computer Systems for the Bachelor of Science in Computer Engineering

Rationale

With the proliferation of electives in the CmpE degree over the last ten years, it is possible to satisfy elective requirements while taking one or even none of these courses. This isn't a bad thing—it means there are more options in our degree for students who want to focus on AI or software engineering. But it does mean that there is a need for a systems “track” to recognize students who want to pursue that course of study.

In a CS program, this track would be called “systems.” Most CS programs that have tracks/concentrations have some equivalent (including here at Purdue). Since we're in the College of Engineering, the ECE Undergraduate Committee thought it would be good to call it “computer systems” to avoid confusion, especially with systems engineering.

Proposing [Sub]area

This is proposed by Milind Kulkarni, after discussions with faculty in the research areas of Computer Engineering (broadly construed)

Target Degree

It will apply to the BSCmpE degree.

Concentration Requirements

Choose at least 9 credit hours from the following courses:

- ECE 40862 Software for Embedded Systems (3 credits) or ECE 56800 Embedded systems Embedded Systems (3 credits)
- ECE 46800 Introduction to Compilers and Translation Engineering (4 credits) or ECE 57300 Compilers and Translator Writing Systems (3 credits)
- ECE 46300 Introduction to Computer Communication Networks (3 credits) or ECE 50863 Computer Network Systems (3 credits)
- ECE 33700 ASIC Design Laboratory (2 credits) and ECE 43700 Computer Design and Prototyping (4 credits)
- ECE 46900 Operating Systems Engineering (4 credits)
- ECE 40400 Introduction to Computer Security (3 credits)
- With approval of the Associate Head of Undergraduate Programs or Associate Head of Teaching and Learning, can include up to 3 hours of:
 - VIP 37920 (2 credits)
 - VIP 47920 (2 credits)
 - ECE 49600 (1-3 credits)