

CHIP DESIGN (BRIDGE GRADUATE CERTIFICATE)

Chip design is at the core of modern electronics, powering advancements in computing, artificial intelligence, automotive systems, medical devices, and consumer electronics. As integrated circuits become more complex, the semiconductor industry faces a growing demand for engineers with specialized expertise in chip design, layout, and manufacturing.

The Bridge Graduate Certificate in Chip Design prepares students and professionals with the theoretical foundation and practical skills necessary to design, simulate, and verify integrated circuits (ICs). The program focuses on analog, digital, and mixed-signal circuit design using industry-standard electronic design automation (EDA) tools, equipping graduates to meet the challenges of next-generation semiconductor systems.

This 12-credit hour certificate consists of 6 credit hours of core coursework and 6 credit hours of elective coursework, allowing students to build a strong foundation while tailoring their learning to specialized areas such as mixed-signal design, VLSI systems, or EDA-based design projects. The two core courses include:

- ECE 5550 – Solid State Electronics
- ECE 5560 – Analysis and Design of Analog Integrated Circuits

The certificate may be applied toward the Master of Science in Electrical Engineering: Semiconductor Engineering, making it an ideal pathway for graduate students and industry professionals seeking to advance their careers in semiconductor design.

Students completing the program will be able to:

- Explore semiconductor material properties, device physics, and integrated circuit manufacturing processes.
- Design and simulate analog and digital circuit building blocks, including amplifiers, current mirrors, and logic gates.
- Utilize industry-standard EDA tools for schematic capture, layout, and circuit verification.
- Design and evaluate mixed-signal circuits that integrate analog and digital components for real-world applications.
- Earn an industry-recognized certification or demonstrate advanced competency in chip design.

To earn the certificate, students must complete a total of 12 credit hours, consisting of two core courses and two elective courses. A minimum grade of B- is required in each course, and an overall GPA of 3.0 must be maintained. All courses in the certificate program must be completed within three years of first enrollment. Courses applied to the master's degree must be completed within six years of first enrollment.

Code	Title	Credits
Required Courses		6
ECE 5550	Solid State Electronics	
ECE 5560	Analysis and Design of Analog Integrated Circuits	
Elective Courses (Select two of the following)		6
ECE 5960	Introduction to VLSI Systems	
ECE 5995	Special Topics in Electrical and Computer Engineering I (Integrated Circuits Design using EDA Tools (Winter))	
ECE 7566	Advanced Mixed Signal Integrated Circuits	
Total Credits		12