



Semiconductor Process Technology

ECE 5031

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Discrete and integrated circuit device design, silicon VLSI processing technologies, III-V compound semiconductor device fabrication technologies; epitaxy, doping, bandgap engineering; and device measurements and failure mechanisms.

Prerequisites and Co-requisites:

Prereq: 3030, or Grad standing in Engineering, Biological Sciences, or Math and Physical Sciences.

Course Goals / Objectives:

- Learn about the processing technologies used for fabrication of silicon VLSI integrated circuits
 - Develop an understanding of process integration for NMOS, CMOS and MOS memory IC technology
 - Exposed to silicon process information pertinent to the interface between process engineers and integrated circuit design engineers
 - Learn about processing technology of compound semiconductors
 - Learn about methods and techniques used for fabricating compound semiconductor devices used in communications, optoelectronics, high speed wireless applications
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Course Topics:

- Overview of CMOS process
 - Lithography – contact, projection, e-beam
 - Vacuum and ultra-high vacuum physics and technology
 - CVD and silicon epitaxy
 - Wet chemical processing
 - Plasma processing (etching, sputtering, PECVD)
 - Atomic layer deposition
 - Ion implantation and diffusion
 - Back end processing – interconnects and CMP
 - CMOS and MOS memory process integration
 - III-V semiconductor bulk crystal growth techniques
 - Semiconductor epitaxial growth methods - molecular beam epitaxy and metal organic CVD
 - Ohmic contact formation for III_V and III-nitride semiconductors
 - Compound semiconductor device process integration
 - Schottky contact formation for III-V and III-nitride semiconductors
 - Fabrication of III-V and III-nitride semiconductor diodes and transistors
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Designation:

Elective