

Syllabus

EEE 598— Optoelectronic Material Growth and Device Processing

Goals: This course is designed to provide junior graduate students in engineering and other related disciplines systematic basic training in the area of optoelectronic material growth, device processing, technical writing and presentations. The topics to be covered include the basic experimental and communication skills needed for their graduate study and future careers.

Prerequisites: EEE 352, 435, or 436, or other equivalent courses for students from other disciplines such as physics, bioengineering, and materials engineering.

Text books:

Lecture notes and published literature

Coordinator: Professor Y.-H. Zhang, School of Electrical, Computer and Energy Engineering.

Prerequisites by topics:

1. Electromagnetic waves, quantum mechanics, and basics of solid state physics
2. Basic concepts of semiconductor materials and devices

Topics:

1. Thermodynamics of materials growth
2. Fundamentals of MBE, CVD, and MOCVD
3. In situ monitoring techniques (RHEED, ellipsometry)
4. Material characterization techniques (XRD, PL, FTIR, Hall, etc.)
5. Device processing techniques (photolithography, wet chemical etching, dry etching, thin film deposition, RTA, etc.)*
6. Basic device testing techniques (solar cell EQE measurements, photodetector characterization, laser diode characterization)
7. Weak signal detection techniques (lock-in, box car, sampling, etc.)
8. How to give technical presentations
9. How to write technical reports, proposals, and journal publications

Exams: Term projects and a final project. All the exams will be open book. Students are expected to give a few short presentations.

Lab tours: There will be lab tours to several research groups in the area of optoelectronics and photonics. Some experimental demonstrations will be held for the class.

*Can be optional. Access to CSSER cleanroom may require additional fees paid to CSSER.