Course Description

EEE 631-- Heterostructures and Superlattices -- Their Fundamentals and Applications

1997 Catalog Data: EEE 631: Heterostructures and Superlattices -- Their Fundamentals and Applications, Credit 3,

Prerequisites: EEE 436, 531 or 537

Text and Reference books:


Coordinator: Y.-H. Zhang, Professor, Department of Electrical Engineering

Goals: This course is designed to provide graduate students a broad foundation in semiconductor heterostructures and superlattices. It will include their fundamental physics, growths, characterization, and detailed device applications. 1D and 0D nano-structures and their physics and applications to optoelectronic devices will also be discussed.

Prerequisites by topics:

1. Fundamental knowledge of quantum mechanics and solid state physics
2. Basic semiconductor device theory

Topics:

1. Introduction (1 class)
2. Basics of Heterostructures (HSs) and Superlattices (SLs)
3. Band Structures of HSs and SLs
4. Optical Properties of HSs and SLs
5. Growth of HSs and SLs
6. Materials Characterization
7. Device Applications of HSs and SLs
8. One-dimensional (1-D) and Zero-dimensional (0-D) Nanostructures
9. Device Applications of 1-D and 0-D Semiconductor Nanostructures (quantum-dot lasers and IR detectors etc.)

ABET category content as estimated by faculty member who prepared this course description:

Engineering Science: 3 credits 100%.