**EEE 537— Fundamentals of Optoelectronics**

**Description:** This course is designed to teach junior graduate students fundamental optical properties such as quantum theory of radiation, absorption processes, radiative processes, nonradiative processes, photoluminescence of bulk semiconductors, semiconductor heterojunctions, quantum wells, and superlattices. Applications of these materials and properties in optoelectronic devices such as lasers, photodetectors, and solar cells will also be discussed.

**Prerequisites:** EEE 434; and 436 or 531 or equivalent basic understanding of quantum

mechanics, electronic properties of semiconductors, and semiconductor device concepts.

**Topics:**

1. Light propagation in media

2. Light propagation in waveguide

3. Optoelectronic materials

4. Semiconductor heterostructures, quantum wells, and superlattices

5. Structural properties

6. Electronic properties

7. Optical properties

8. Application of the materials and structures in devices

 Light emitting diodes

 Laser diodes

 Photodetectors

 Photovoltaics and solar cells

9. Fundamentals of fabrication and processing of devices

10. Optical communication systems and devices needs