E C E 544, Processing of Electronic Materials

1. Credits : 3  Contact Hours : 2.5

2. Textbook and Materials :


   a. Other Supplemental Materials : None

   b. Specific Course Information :

      a. Brief description of the content of the course (Course Catalog Description) : Physics and chemistry principles underlying microelectronic materials processing. Effects of processing on materials and structures important in microelectronic and opto-electronic devices.

      b. Pre-requisites or Co-requisites : CBE 440 or MS&E 351 or ECE 335; or cons inst

      c. This is a Selected Elective course.

3. Specific Goals for the Course :

   a. Course Outcomes :

      1. This course addresses the basic chemical and physical techniques used in the modern processing of materials at the micro and nanoscales particularly in the microelectronics industry. Simple device concepts are developed and used to relate the influence of the process technology to the device fabrication and materials characteristics.

      2. The relation between the properties of a deposited thin film and the deposition process is developed.
3. The underlying physical and chemical features common to many of these processes is emphasized.
4. While focusing on techniques used for the development of both Si and compound semiconductor-based technologies, the use and extension of these processing techniques to other types of materials is developed.

- **ABET Student Learning Outcomes:**

  (a) Ability to apply mathematics, science and engineering principles.
  (c) Ability to design a system, component, or process to meet desired needs.
  (e) Ability to identify, formulate and solve engineering problems.
  (k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

- **Brief List of Topics to be Covered:**
  1. Introduction to materials
  2. Physical deposition
  3. Ion beam modification of materials
  4. Lithography
  5. Chemical vapor deposition
  6. Dielectric formation
  7. Reaction-diffusion based processing
  8. Etching processes
  9. Epitaxial growth
  10. Plasma processes