- ## Your Name and Batch

  Archishman Saha, DD 2023 (Microelectronics)

- ## Course Offered In

  Autumn 2021-22

- ## Instructors

  Apurba Laha

- ## Prerequisites

  EE207: Electronic Devices and Circuits or EE733: Solid State Devices

- ## Difficulty

  Moderate to difficult

- ## Course Content

  The course involved going into the step-by-step process of fabricating a silicon-based device. An overview was given of the process flow for fabricating a CMOS device in the beginning of the course, following which the remaining course material comprised of delving deep into each step in the process flow and analyzing various techniques and methodologies used. Concepts associated with each step were also discussed in the lectures.

  Overall, this course involved significant amount of memorization and remembering facts especially once one gets deep into the process flow.

  The topics broadly covered in this course included:

  1. Basic properties of different types of Silicon wafers and defects associated
  2. CMOS technology process
  3. Crystal growth techniques and wafer fabrication process in Si
  4. Wafer cleaning practices and gettering
  5. Oxidation techniques and kinetics, and interface engineering in Si
  6. Doping of substrates using ion implantation techniques
  7. Epitaxial growth and thin-film deposition through Physical and Chemical Vapour Deposition
  8. Masking and developing patterns through lithography and etching
  9. Band gap engineering and HEMT devices

- ## Feedback on Lectures

  Lectures would be conducted regularly wherein the instructor would discuss the topics mentioned earlier. Not always would he go into the depth of things, and we were expected to

go through the reference material thoroughly, for examinations. For some people, the lectures would get a bit monotonous, occasionally. Nevertheless, most broad topics were touched upon in the lectures.

- ## Feedback on Evaluations

This course involved multiple quizzes, along with a regular midsem and endsem. For all examinations, one required thorough knowledge of the topics given in the reference material as lecture slides would sometimes be sketchy.

As mentioned before, the content covered in the course involved significant amount of remembering facts, and this would be an understatement to say that some effort had to be put in order to score marks. Questions asked often involved facts given between the lines of reference material, and thus compelled us to go through it thoroughly.

- ## Study Material and References

1. Silicon VLSI Technology – James D. Plummer, Michael D. Deal, Peter B. Griffin
2. Gallium Nitride Electronics – Rudiger Quay

- ## Follow-up Courses

Having done this course, one can take up EE672: Microelectronics Lab, that could give a practical demonstration of the process flow discussed throughout this course.

In addition, EE728: Growth & Characterization of Nanoelectronic Materials deals with the process of growth of heterostructures through epitaxial and vapour deposition techniques, and can enhance knowledge acquired in this course.

- ## Final Takeaways

This course gives an introduction to the process of fabricating a Si-based device and is crucial for those who are willing to go into studying Solid State Devices for the future.