EEE 598 ST: MOCVD for III-Nitride Devices

Introduction: This course is designed to teach graduate students fundamentals on the operation of metalorganic chemical vapor deposition (MOCVD), and how it can be used for the growth of III-nitride semiconductors and structures, and the application of III-nitride materials for specific devices, including light-emitting diodes (LEDs), laser diodes (LDs), solar cells, and power transistors. The topic of the course includes: overview of MOCVD process, metalorganic precursors, thermo chemical kinetics, transport phenomena, mass transport & growth, design of MOCVD reactors, III-nitride materials, and III-nitride devices (LEDs, LDs, Solar Cells, and Power Transistors).

Grading: There will be one midterm examination during the semester and one project seminar/presentation, and one final technical report. Homework will be assigned approximately every two to three weeks.

Prerequisites: EEE 434; and 436 or 531 or equivalent basic understanding of quantum mechanics, electronic properties of semiconductors, and semiconductor device concepts. EEE 537 is suggested as a prerequisite but not required.

Text books:

1. Required: Organometallic Vapor-Phase Epitaxy — Theory and Practice, by Gerald B. Stringfellow, Academic Press, 2nd Edition (December 23, 1998).
2. Optional: Light-Emitting Diodes, by E. Fred Schubert, Cambridge University Press, 2nd Edition (June 19, 2006).

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