Course Title: Electronic Materials Processing

Instructor: Dr. Robert G. Hunsperger, Electrical & Computer Engineering, University of Delaware, 
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Days course meets on campus: None

Text: Stephen A. Campbell, Fabrication Engineering at the Micro and Nanoscale, 

Course Objectives:

1) To describe the basic processes that are used to fabricate semiconductor devices and 
   integrated circuits in both silicon and in III-V materials.

2) To explain the economic considerations involved in the choice of a process.

3) To illustrate the current state-of-the-art by reference to journal articles and to examples of 
   actual devices and production processes in use today.

Course Description:

In this course the basic goals, principles and techniques of semiconductor materials processing are discussed. The 
emphasis is on physical explanations of how devices and processes work rather than on elaborate mathematical 
models. After taking this course, you will be able to understand the capabilities and the limitations of the various 
techniques that are used to fabricate semiconductor devices and integrated circuits (ICs), including 
photolithography, diffusion, epitaxial growth, ion implantation, oxidation and thin-film deposition. You will be 
able to design processes for making devices and ICs in both silicon and III-V semiconductors, such as GaAs and 
InP, taking into account both performance and economic factors. You will acquire a knowledge of what is the 
present state of the art in semiconductor processing in both the laboratory and the production line, and you will 
learn how to keep this knowledge up to date by using resources that are available in published journals and on the 
Internet.
Homework: Problems will be assigned on a bi-weekly basis.

Submit all homework to the course instructor by the due dates shown on the attached schedule. (FAX to 302-831-1468 can be used if you wish.) This will ensure rapid grading and recording of your work. Please include the University course number on all work. (Delays of up to one week are OK. Approval for longer delays should be requested from the instructor.)

Exams: Midterm and a Final exam.

Grading:

The homework will account for 15% of your grade and the exams will count equally into the other 85%. Each exam will cover roughly half of the course material. The Midterm exam will be 1.5 hours long, while the Final will be 2 hours long.

The exams will be 'closed-book" but a formula and data sheet will be provided, so it will not be necessary to memorize equations or constants. It will only be necessary for you to be able to select the right equations and data from a list of all those covered by the course. Graded midterm exams will be returned. Final exams are not usually returned unless you specifically request it.

A complete set of all homework assignments will be given to you at the beginning of the term, and/or will be posted on the course website (www.ece.udel.edu/~hunsperg/622/). Homework will be graded on a "logical approach" basis rather than on whether you obtain the right answer. Thus you should be able to obtain 100% on the homework by making a reasonable effort to solve all problems and submitting them. Note that solutions may be posted before the problems are due to be handed in, since I do not grade on the basis of correct answers and often students at different locations are taking the course on different schedules. Please try your best on the problems and then submit them before you look at the solutions. Be sure that you understand the homework solutions before taking the exams.