

ELEG 855
Microwave and Millimeter-Wave Technology
SYLLABUS

Course Title: Microwave and Millimeter-Wave Technology

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Days course meets on campus: None this semester.

Texts:

Required: Microwave Devices and Circuits, Third Edition, S.Y. Liao, Prentice Hall, 1990,
ISBN 0-13-583204-7 (Special order printing available through
University of Delaware Bookstore.)

Recommended: Physics of Semiconductor Devices, Second Edition, S.M. Sze, Wiley Interscience,
1981, ISBN 0471-05661-8

Prerequisites: Basic undergraduate courses in semiconductor devices and electromagnetic waves.

Course Objectives:

1. To explain how the various devices of a microwave/millimeter-wave circuit operate and how they are assembled into a system
2. To explain how microwave/millimeter-wave devices and circuits are characterized in terms of their “S”-parameters.
3. To describe the new devices that are extending this technology to sub-millimeter wavelengths (terahertz frequencies).
4. To illustrate the current state-of-the-art by reference to journal articles and to examples of actual devices and systems in use today. The emphasis is on devices used mostly in military, homeland security and medical-imaging applications.

Course Description:

Describes the principles of device operation and circuit characteristics for the microwave/millimeter-wave FET, IMPATT, TRAPATT, Gunn diode, varactor diode, p-i-n diode and tunnel diode. Sub-millimeter-wave and terahertz-wave devices are also considered. The emphasis is on physical explanations of how devices and systems work rather than on elaborate mathematical models.

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Course Requirements

Homework	Problems assigned on a weekly basis.
Exams:	Midterm and a Final exam.
Class Attendance:	Students are responsible for all material covered in the video lectures and reading assignments.

Submit all homework and exams to the course instructor at the above address by the due dates shown on the attached schedule. (FAX to 302-831-1468 is preferred.) 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.)

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 sent to you at the beginning of the term, and/or will be posted on the course website (www.ece.udel.edu/~hunsperg/855). 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. Graded homework submitted by FAX will not be returned to you, but solutions will be posted on the website and you will be notified by Sakai that we have received your homework. If you do not have web and/or FAX access, mail in your homework and it will be returned with a copy of the solutions. 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.