

## ENEE 302 - Fall 2000 Course Description

1. Course: ENEE 302 Digital Electronics
2. Time: Tu Th 15:30 - 16:45
3. Place: Room CHM 0119
4. Instructor: R. W. Newcomb
  - Office: AVWII-1347; MSLab: AVWII-1362
  - Phones: Office: (301) 405-3662
  - Home: (301) 622-0177 (before 9:30pm)
  - Office Hours: Tu Th 2:00-3:00
  - email address: newcomb@eng.umd.edu; URL: <http://www.ee.umd.edu/newcomb/mslab.html>
5. Teaching Assistant: Mr. Olcay Korol korololc@eng.umd.edu
  - Section 0201 = M 12:00 in EGR 0110; Section 0202 M11::00 in EGL 1202
6. Prerequisite: ENEE 204 or consent of instructor
7. Textbook: A. S. Sedra and K. C. Smith, "Microelectronic Circuits," 4th Edition, Oxford University Press, NY, 1998, ISBN 0-19-511663-1. Recommended: G. W. Roberts and A. S. Sedra, "Spice," 2<sup>nd</sup> Edition, Oxford University Press, New York, 1997, ISBN 0-19-510842-6. Recommended Programs: Spice (on the SUNS); evaluation versions to 9.0 of PSpice for PCs; Student Version of MATH CAD and/or MATLAB
8. References: Journal Articles from: IEEE Journal of Solid-State Circuits, Electronics Letters, IEEE Transactions on Circuits and Systems, IEE Transactions, Solid State Electronics, International Journal of Electronics.
9. Course files: (when installed) Useful information and files can be seen and downloaded from the course section web address: <http://www.eng.umd.edu/newcomb/ENEE302.html> and <http://www.eng.umd.edu/class/enee/302>.
10. Course Description: This course covers Part III, Digital Circuits, along with selected parts of the remainder of the textbook and includes the design of microelectronic circuits at the transistor level with an emphasis upon computer aided design of digital and some analog circuits. Treatment is intended to emphasize design including design for test. Students are expected to get a good working knowledge of the important phases of microelectronic circuit design as well as how to present their designs to the electrical engineering community.
11. Course Operation: Lectures and discussions will occur at the lecture and discussion class periods, including some computer demonstrations. Working as a group of the whole, each student will design a similar form of a circuit fitting the themes chosen. Early in the course each student will choose a theme related circuit from a journal article (see References above) and proceed to design that circuit. In the end this will involve possibly two oral presentations, a first one on the theory of the circuit's operation and a second one on its simulation, with the latter followed by a written report on all aspects of the design (including a test protocol). Every student will be a commentator on another student's paper. Exercises from the textbook should be worked on an individual basis and collected in a notebook. The student will participate in discussion sessions led weekly by the TA where various problems will be assigned.

For those interested, VLSI layout is possible with fabrication via MOSIS (actual fabrication will require a commitment to make measurements on the chip, for which the Microelectronics Design Laboratory annex, Rm AVW 1364, can be made available).

Use of Spice (and/or PSpice or a similar circuit analysis program) is required. Copies of various evaluation versions of PSpice are available for student download (ftp of 6.2 disks from [http://www.ee.umd.edu/newcomb/spice\\_dl.htm](http://www.ee.umd.edu/newcomb/spice_dl.htm); latest [version 9.0] on CD from OrCad on www via [http://www.orcad.com/products/pspice/eval\\_f.htm](http://www.orcad.com/products/pspice/eval_f.htm)); some are on the PCs of Room EGR 0123 and Spice is on the UNIX workstations of the EE Department Computer Laboratories (Rms AVW 1442, 1454).
12. Design Paper Theme: possibly: improved logic gates and ring or other oscillator circuits.
13. Grading: Roughly:
  - 20% = homework and designs [collected in a dated indexed notebook]
  - 15% = class participation including commentator and discussion section activities
  - 20% = midterm exam
  - 25% = formal written individual design report [ $<01$  pages, 1.5 spacing]
  - 20% = final [W 12/20/00 08:00-10:00]