ENEE 303 Spring 2019 Course Description

1. Course: ENEE 303 Analog and Digital Electronics (Honors)
2. Time: Tu Th 11:00 – 12:15
3. Place: Room CHM 2201
4. Instructor: R. W. Newcomb; Office: AVWII-1347; MicroSystems Lab: AVWII-1349
   Phones: Office: (301) 405-3662; Home: (301) 622-0177 (before 9:30pm)
   Office Hours: Tu 3:10– 4:50 but can meet whenever free
   email address: newcomb@eng.umd.edu; URL: http://www.ece.umd.edu/~newcomb/mslab.html
5. Teaching Assistant: Ms. Yidi Shen
   M 9-9:50 in EGR 2116 & M 10-10:50 in EGR 3114, email: yidishen@yeah.net
6. Prerequisite: ENEE 204 or consent of instructor.

7. Textbook: A. S. Sedra and K. C. Smith, "Microelectronic Circuits," 7th Edition, Oxford University Press, NY, 2014, ISBN 978-0-19-933913-6. Recommended: K. C. Smith, M. Amiri, S. Mirabbasi, "Problem Supplement," G. W. Roberts and A. S. Sedra, "Spice," 2nd Edition update, Oxford University Press, New York, 1997, ISBN 0-19-510842-6, J. O. Atia, PSPICE and Matlab for Electronics, CRC Press, Boca Raton, 2002. Recommended Programs on the UMD EIT VCL page: PSpice (on the EIT VCL under Cadence 17_2 Design Entry CIS); MathCad 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.ece.umd.edu/~newcomb/courses/fall2019/303/ENEE303_spring2019.html

10. Course Description: This course covers the key ideas of microelectronic circuit design at the transistor level with an emphasis upon circuit theory and simulation via computer aided design of some digital and analog circuits. Treatment is intended to emphasize design including testing. 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. The laboratory 307 uses the 303 course material.

11. Course Operation: Lectures and discussions will occur at the lecture and discussion class periods, including some computer demonstrations. Each student will design a circuit from a chosen journal paper. Early in the course each student will choose a journal article (see References above) and proceed to design and simulate that circuit. In the end this will involve one or two oral presentations (depending upon number of students), a first one would be 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. Every student will be a commentator on another student's paper. Exercises from the textbook should be worked on an individual basis. The student will participate in discussion sessions led weekly by a TA where various problems will be discussed/assigned. Use of PSpice (or a similar circuit analysis program) is required. The latest full version of Cadence PSpice is available via EIT.umd.edu/vcl. The path to the bicmos12.olb file is: VCLServer\cadence\SPB_17.2\tools\pspice\library\bicmos12 (you may also need bicmos12.lib; download from the course page if not found in PSpice libraries).

12. 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 a room in AVW should be able to be made available).

13. Grading: Grading will be based roughly on the following:
    20% = homework and designs
    15% = class participation including commentator and discussion section activities
    20% = midterm exam
    25% = formal written individual design report [<11 pages, 1.5 spacing]
    20% = final [05/16/19 in classroom 08:000-10:00am]