Fall 2017

ESE 218: Digital Systems Design

Instructor: Dmitri Donetski
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Office Hours: Wednesday, Thursday, 3-5 PM, room 247 Light Eng. bldg.

Prerequisites: Engineering Major: PHY 127 or 132 or 142, or ESE 124; Computer Science Major: CSE 220

Description: The course covers binary numbers, Boolean algebra, arithmetic circuits, flip-flops, analysis and design of sequential circuits, memory and programmable logic. The circuits are designed and simulated with CAD tools, assembled on breadboards and verified with the digital pattern generator and the logic analyzer.

Goal: Development of general background in theory and practical skills necessary for taking advanced Electrical and Computer Engineering courses.

Outcomes: students will develop 1) understanding fundamentals of analysis and design of digital circuits and standard building blocks; 2) skills in reading schematic of digital circuits and analysis of circuit behavior; 3) skills in design of combination and sequential circuits using conventional methods and CAD tools; 4) skills in verification and troubleshooting circuits with pattern generators and logic analyzers, determination of signal propagation delays.

Lectures: Lecture Hall 143, Eng. bldg., Monday, Friday, 1:00-2:20 PM

Labs: Room 235 Heavy Eng. bldg (new addition)
Section 1, Monday, 3:55-6:55 PM
Section 3, Tuesday, 7:00-10:00 PM
Section 4, Wednesday, 7:00-10:00 PM
Section 5, Tuesday, 12:55-3:55 PM

Textbook (required): M. Morris Mano, Michael D. Ciletti, "Digital Design", Pearson, either 6th or 5th edition. 6th ed: 2017, ISBN-13: 978-0470531082, ISBN-10: 0470531088, 5th ed.: 2013, ISBN-13: 978-0-13-277420-8, ISBN-10: 0-13-277420-8. All assignments including homeworks and instructions will be posted on the Blackboard

Lab kit (required): lab kit ordering instructions will be provided in class, lab experiments start from the 3rd week.

Grading: Lab reports (33 %, passing the course requires attendance of all labs and submission of all reports), Homeworks (11 %), Test 1 (10 %), Test 2 (15 %), Final exam (25 %), Portfolio (6 %)

Topical outline:
1. Binary numbers and codes: 5 %
2. Boolean algebra, logic transformation and minimization: 20 %
3. Arithmetic circuits, decoders, multiplexers, latches and flip-flops: 25 %
4. Analysis and design of sequential circuits: 30 %
5. Memory and programmable logic: 20 %

References:
1. F. Vahid, Digital Design with RTL Design, VHDL, and Verilog, 2nd ed, 2010, ISBN-13: 978-0470531082, ISBN-10: 0470531088
2. D.M. Harris, S.L. Harris, Digital Design and Computer Architecture, 2nd ed., 2012, ISBN-13: 978-0123944245, ISBN-10: 0123944244
3. J. Wakerly, Digital Design: principles and practices, with Verilog, 5th ed., 2017, ISBN-13: 978-0134460093, ISBN-10: 013446009X
4. W. Kleitz, Digital Electronics: A Practical Approach with VHDL, 9th ed, 2011, ISBN-13: 978-0132543033, ISBN-10: 0132543036

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room128, (631) 6326748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/

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