Introduction to Digital Logic Design
The University of Kansas EECS 140 / 141
Spring 2007

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http://www.ittc.ku.edu/~jpgs/courses/digital-logic

Instructor Information

Office Hours

• Dr. James P.G. Sterbenz
  - Associate Professor of EECS, KU Lawrence, US
  - Visiting Professor of Computing, Lancaster University, UK

• 3036 Eaton Tue. Thu. 09:00 – 10:30
  - no office hours 10:30 – 11:00: class prep time

• Or by appointment
  - email or call to arrange in advance
  - call before dropping in unless already on campus
Instructor Information

Contact: Email

- **Contact information**
  - email: jpgs@eecs.ku.edu *only*
    - begin subject with "EECS140 - " or "EECS141 - 
    - email to other addresses will be ignored
    - non-conforming subject lines will likely be misfiltered and unread
  - email generally checked daily
  - email is unreliable; retry if no reply within 48 hours
  - email with *meaningful* subject lines
    - bad
      Subject: Hi!
      Subject: regarding class
    - good
      Subject: EECS140 - question about flip-flop metastability

Instructor Information

Contact: Phone and Web

- **Contact information**
  - phone
    - Lawrence Eaton office: +1 785 864 8846
    - Lawrence Nichols office: +1 785 864 7890
    - KC Edwards office (Thu aft.): +1 913 897 8538
    - do not skype or call my home or mobile phone unless emergency
  - Web
    - *http://www.ittc.ku.edu/~jpgs*
GTA Information
Contact

• Graduate teaching assistants
  - Fabrice Baijot  bricefab@ittc.ku.edu
  - Jorge Ortiz  ortizj@ittc.ku.edu
  - Zachary Parr  zparr@ittc.ku.edu

• Course web page will have office hours

Course Information
Correspondence

• Course information and notes
  - http://www.ittc.ku.edu/~jpgs/courses/digital-logic
    • notes for each lecture will be posted in PDF
  - http://people.eecs.ku.edu/~ortizj/EECS140
    • laboratory and homework information
  - check regularly for updates
    • readings and assignments in schedule table
    • “last updated on bottom of page”
Course Information

Correspondence

- You are required by EECS to have eecs.ku.edu address
- I’m willing to use other email addresses...
  ...but only if they are relatively reliable
  - many free email accounts are not!
    • and may get spam-blocked
  - if there are problems I’ll require a .ku.edu address

Course Information

Course Description

An introductory course in digital logic circuits covering number representation, digital codes, Boolean Algebra, combinatorial logic design, sequential logic design, and programmable logic devices, using VHDL.

3 hours

Corequisite: MATH 121 (Calculus I)
Course Information

High-Level Schedule

- Learned 2112 – Lawrence Campus
  - lecture: Wed. 11:00 – 12:15
  - lab: multiple sections; see class web page
- 23 Jan. – 10 May
  - two midterm exams
- 18 May
  - final exam

Textbooks

- Peter J. Ashenden
  Digital Logic Design: An Embedded Systems Approach using VHDL
  - first part available at KU bookstore
  - required for EECS 140 and 141
- Peter J. Ashenden
  The Student’s Guide to VHDL
  - optional for EECS 140; required for EECS 141
  - recommended for CoE majors: you will need it later
Textbooks

- Texas Instruments
  *Digital Logic Pocket Data Book*
  - required for EECS 140 and 141
- Enoch O. Hwang
  *Digital Logic and Microprocessor Design with VHDL*
  - used last semester; different perspective on the material
  - supplementary for EECS 140 and 141
  - will be on reserve at the library

Reading Assignments

- Reading to be done *before* corresponding class
  - check web page for reading schedule
- You will not do well if you slack on the reading
- You are responsible for *all* required reading
  - may be on exams even if not covered in lecture!
  - contributes to your class participation cluefulness
  - may be on pop quizzes
Course Information

Grades

- Grades based *only* on merit
  - *not* based on
    - current or potential probationary status
    - employer reimbursement or potential lack thereof
    - immigration status and potential visa revocation
    - family pressure or repercussions
    - quantitative meaning (may be curved more generously)
  - A: 90 – 100%
  - B: 80 – 89%
  - C: 70 – 79%
  - D: 60 – 69%
  - F: 00 – 59% *or academic misconduct regardless of score*

Course Information

Grade Contribution

- Grade relative contribution
  - 55% exams
    - two mid-term section exams at 15% each
    - comprehensive final exam at 25%
  - 25% laboratory participation and report
  - 20% homework and quizzes
    - weekly homework assignments
      - lowest grade will be dropped
      - late homework will not be accepted
    - occasional pop quizzes may be given as deemed necessary
Course Information

Class Participation

- Interactive class is better for all of us
- Ask questions if you don’t understand
  - you don’t want to wait until after the exam
  - you must have done the readings
- Come to office hours if you need help
  - GTA for laboratory questions
  - GTA or professor for help with homework
  - GTA for questions on homework or lab grading
  - professor for issues with class or the GTAs

Course Information

Etiquette

- Try to be on time: consistent late arrivals
  - are disruptive
  - will encourage pop quizzes at the beginning of class
- Do no begin packing up until I announce end of class
- No audible mobile phone or other electronic devices
  - if it doesn’t vibrate, turn it off!
  - repeated offenses will reduce your final grade
- University does not tolerate class disruption
  - if I notice and am annoyed, I’ll ask you to leave class, e.g.
    - text messaging
    - reading newspaper, eating
Course Information

Homework

- Weekly homework assignments
  - due at 11:00 before the start of class
    - bring to class or
    - bring to department office for time stamp

Assignment Legibility and Standards Compliance

- Half-size digital logic template required
  - required for both EECS 140 and 141
  - ANSI Y32.14, IEEE 91a, or MIL-STD-806C compliant
    - any electronically generated must be shape-compliant
    - recommended: Pickett 1222i at KU Bookstore
- Exams, quizzes, homework, and lab reports
  - must not be drawn freehand
  - straightedge and template must be used for diagrams
  - grade of zero will be given on noncompliant parts
  - any other illegible work will receive a grade of zero
Course Information

Exams

- Closed book and notes; no electronic devices
- Exams
  - midterm exams cover material corresponding third of course
  - final exam: ~1/2 last third of course; ~1/2 comprehensive
    - approximately half comprehensive for all course material
- Missing an exam
  - if you know in advance, you must notify me in advance
    - the further in advance the better: in person and by email
  - proof of reason will be required
  - notification after exam acceptable only in emergency
  - cases not meeting these criteria will receive an F on exam

Course Information

Quizzes

- Pop quizzes occasionally given at beginning of class
  - to gauge understanding between exams
  - to encourage reading before class
  - to encourage and reward on-time arrival
  - may not be made up under any circumstances
- Closed book and notes; no electronic devices
  - unless specifically permitted on selected quizzes
Academic Integrity and Plagiarism
Reading the Riot Act

• Apologies to those that already know this
• Opportunity to learn for those who:
  - haven’t learned it yet
  - come from an environment or culture of tolerance
• Warning of the consequences
  - ignorance will not be an excuse
  - ask me if you have any question about this
• Applies to
  - copying homework and lab reports
  - cheating on exams and quizzes
• http://www.ittc.ku.edu/~jggs/courses/academic-integrity.html

Academic Integrity and Plagiarism
Homework and Laboratory Assignments

• Cheating on homework and labs is prohibited
  - you may discuss solution strategies with others
  - you must not copy or receive answers from others
  - you must not falsify laboratory experiment results
• Guideline
  - discussing how to solve a problem with classmates is fine
  - don’t leave the discussion with anything written down
• Sanctions
  - grade of zero on entire assignment for all involved
  - possible additional reduction of class grade to F
  - referral to department and school for further sanctions
Academic Integrity and Plagiarism
Exams and Quizzes

• Cheating on exams and quizzes is prohibited
  - you must not copy or receive answers from others
  - you must not use any electronic devices
  - you must not use any printed or written materials
    • unless specifically authorised by the instructor

• Sanctions
  - grade of zero on exam for all involved
  - probable grade of F for the course
  - referral to department and school for further sanctions

Course Outline
Tentative

• Introduction and methodology
• Combinational / combinatorial logic and gates
• Number representation and arithmetic
• Sequential logic: flip-flops, counters, state machines
• Memories
• Implementation of digital logic
• Processors