

Texas State University
Department of Computer Science

CS 2420.002 Digital Logic
Syllabus, Fall 2016

Instructor: Husain Ghooloom
Comal 301F
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Course Webpage: <http://www.husainghooloom.com/classes.html>

Meeting Time/Place: MW 12:30 p.m. - 1:50 p.m. DERR 235

Office Hours: MW 2:00 pm - 3:15 pm and 5:00 pm – 6:15 pm

Other times by appointment.
(Appointments need not be made during regularly scheduled office hours.)

TEXTBOOK: Required
Randy H. Katz, Gaetano Borriello, *Contemporary Logic Design*, second edition, Pearson Prentice Hall, 2005

References
M. Morris Mano and Michael D. Ciletti, *Digital Design*, 4th edition, Pearson Prentice Hall, 2007

Tarnoff, D., *Computer Organization and Design Fundamentals*
- Free Book.

Course Catalog Description:

This course covers the fundamentals of computer design by studying the algebraic methods to design digital circuits and how they can be used to design the basic blocks that are used to design a computer. An introduction to computer hardware and the technologies used to create, capture, and communicate digital information. A laboratory provides hands-on experience with the subject matter, e.g., electricity, combinational and sequential digital circuits, VLSI, etc.

Prerequisites: C or higher in CS 1428 : Foundations of Computer Science III

Course Goals and Objectives :

The goals of the course are to teach the methods of logic analysis and design and the fundamental technologies of computer hardware. Specific objectives include the following:

- Describe how Boolean 1 and 0 are represented in digital circuits.
- Convert numbers in different number systems.
- Encode nonnumeric data.
- Process negative integers in sign-magnitude and 2's-complement representation.
- Describe functions of basic logic gates.
- Use logic functions and diagrams to describe functions of combinational and sequential circuits.
- Optimize logic functions with K-maps.
- Design logic circuits using existing logic function/circuit blocks.
- Describe the difference of Mealy and Moore state machines.
- Describe how data is read from and written to a memory chip.
- Understand how memory chip arrays are built.
- Describe the main types of memory technology.
- Understand how the basic arithmetic and logic units in an ALU are built.
- Explain how instructions are composed and processed.
- Describe a complete cycle of executing an instruction in ALU.
- Explain the different addressing modes.
- Explain the basic concepts of interrupts and I/O operations.

MY GOALS FOR YOU

- To understand Boolean logic and gates
- To understand combinational logic design
- To understand sequential logic and state design
- To understand basic computer components and for what they are used.
- To understand basic computer architecture

How will these goals be achieved ?

- Course lectures and homework
- Implementation labs and projects
- Demonstrations and examples .

FINAL EXAM SCHEDULE:

C.S. 2420.002 Will be on: Wednesday December 14th, 2016
Exam Time: 11:00 a.m. - 1:30 p.m.

GRADING POLICY: Homework – 20%
One Midterm – 25% (October 19th , 2016)
Lab – 25%
Final – 30%

Lab: You have to attend a **designated lab** (Counts 25% of your grade). Lab includes course projects.

No cell phones, recording/storage retrieval devices, or calculators are allowed during exams. A grade of zero will be recorded when any such device is determined to be in a student's possession during an exam.

Makeup examinations are not given

ASSIGNMENT LATE POLICY: Assignments should be placed on the central desk **AT THE BEGINNING** of class on the day they are due. This does not mean fifteen minutes or ten minutes or even *five* minutes into the lecture. This means **at the beginning**. Regardless of the deadline set, there will always be people who want it extended.

Now that the deadline *for full credit* has been established, **please respect this deadline, and plan accordingly.**

Turning in work **early** is discouraged; however, if it is necessary to do so, bring the assignment, **with a note of explanation attached**, to the secretary of the Computer Science Department in the second floor of Comal Building (211).

Each time you turn in an early assignment to CS Department , *remember to have the secretary initial each assignment plus note the date and time that each assignment was turned in, or NO credit will be assigned.* (This policy is **NOT** designed for students who fail to attend the lecture and the work of repeat 'offenders' will no longer be accepted early.)

Each time you turn in an early assignment to the CS Department – CMAL 211 , it is **highly** recommended that you send an e-mail to your instructor as well.

NO CREDIT WILL BE GIVEN TO ASSIGNMENTS PLACED UNDER MY OFFICE DOOR OR TO THOSE ATTACHED OUTSIDE MY OFFICE DOOR VIA TAPE, TACKS, ETC.

NO OTHER "LATE" ASSIGNMENTS WILL BE ACCEPTED!!! NO EXCEPTIONS!

ALLOW FOR NATURAL DISASTERS! The computer system used may 'go down', the printer queues may be 'backed up' on the day an assignment is due, the bus was late, flash drives may have been left 'somewhere', etc. These types of events do **NOT** excuse late work.

GRADE DISPUTES: Must be handled *in my office* and **must** be discussed within **one week** of the return of the graded homework during regularly scheduled class time. (This means within **one week** from the date the assignment is **returned**. It does **NOT** mean one week from the date **you** decide to pick up the returned assignment.) You may **show** me a problem related to your grade at the front desk in the classroom **after** a lecture; however, for complete discussion and possible resolution, you **must** come by the office where all records are readily available. **Come prepared with the graded assignment in hand, and be able to access the electronic version of your work from my office.**

KEEP all graded lecture assignments / exams until you have received a grade in the course you are willing to live with. This will help argue your case in the event of a grade discrepancy. You will need proof of your work in both an electronic and a graded paper form. **(Without the ability to access the electronic copy of your work from my office at the time of your grade dispute, the grade on record stands as is.)**

ACADEMIC OFFENSES:

All assignments submitted for a grade should reflect the work of the **individual** student unless otherwise established in writing by your instructor. Violations will be dealt with according to Academic Procedures and Policies as outlined in the **Texas State Student Handbook**.

You may discuss rough ideas and thoughts about homework and project with your other classmates, but you have to **write up your solution on your own**. You are not allowed to read, copy, or rewrite the solutions written by others (in this or previous terms or from other sources such as internet). For group projects, make sure to indicate the contribution of each person. If you're stuck on a problem and unable to get to the instructor for help, then we suggest you try and use hints from a publicly available source such as a textbook or journal article. The **source should be cited** and you have to write the solution **in your own words**. It should be apparent to us that you understand the solution for full credit. The punishment for heating on an assignment will be the docking of the final grade by one mark (so, a C instead of a B for example). If two people are caught sharing solutions then **both** the copier and copiee will be held equally responsible. Cheating on an exam will result in failing the course.

Go to <http://www.dos.txstate.edu/handbook.html>, and click on **Academic Honor Code** to **3 of 6**

E-MAIL: Notifications , inquires , questions ... etc that are related to this class will be send and received **only** via **Texas State e-mail account**.

ATTENDANCE:

Attendance is strongly recommended. Students are fully responsible for all material presented, assigned in class, and responsible for being in class for all tests. You must read your emails fairly often to keep up with class announcements.

ABSENCE POLICY: If you are absent at the time of a *Assignment Due date or an exam*, a grade of zero will be recorded .

DROP POLICY: (Refer to the Academic Calendar).

- Last Day to Drop with 100% Refund **Ends at 11:59 p.m , Wednesday , September 14th - 2016**
- Automatic “W” deadline and last day to drop a class ends **11:59 p.m. Sunday , October 30th - 2016**
- Last opportunity to *withdraw* from the University ends **5:00 p.m. Tuesday , November 29th 2016**
- Students who withdraw from the University after the automatic “W” date will be assigned a **"W" or an "F" based on class performance up to that point in the semester**. A "W" will be assigned **only** if the class average is *passing* on the day the withdrawal procedure is **officially completed**.

Note: Contact the Registrar’s Office as to the proper procedure to follow in order to successfully complete the drop/withdrawal process. If you decide to withdraw from the University *after* the automatic “W” date previously mentioned, be sure to check with your instructor *prior* to completing the withdrawal procedure in order to verify whether you will be receiving a “W” or an “F”. Contact the Registrar if you have any further questions.

It is *your* responsibility to make sure the drop/withdrawal process is complete. Do *not* come to me later and say that you "thought" you had dropped but the process did not "go through" expecting me to change a grade of ‘F’ to a ‘W’. Be sure to check your revised schedule to make sure the course dropped is no longer listed.

ADA Compliance: Students with special needs as documented by the Office of Disability Services who require accommodations should identify themselves to the instructor as soon as possible but no later than the **12th class** meeting in a long session and no later than the 4th class meeting during a regular summer session. Students with special needs who have not already done so will be required to contact the Office of Disability Services in order to establish accommodations. Every effort will be made to secure the necessary accommodations to facilitate students with special needs/disabilities in order to enhance their performance in the classroom.

Reading Assignment

- Appendix A: Sections 1,2 and 5
- Will discuss :
 - Number Systems [binary, octal and hexadecimal]
 - Base Conversion
 - Decimal Codes [BCD (binary coded decimal)]
 - ASCII Codes
 - Gray Codes