



Course CS 4341: Digital Logic and Computer Design,
and Laboratory CS 4141
Professor Rekha Bhowmik
Term Fall 2008
Meetings MW 10.30-11.45, ECSS 2.201

Professor's Contact Information

Office Phone (972) 883-4688
Other Phone
Office Location ECSS 4. 701
Email Address rxb080100@utdallas.edu
Office Hours MW 12:30-3:30 pm

Other Information

TA information Wei-Che Tseng
wxt043000@utdallas.edu

General Course Information

Pre-requisites, Co-requisites, & other restrictions CS 2310 and PHY 2326. Co requisite: CS 4141
CS4141: The accompanying laboratory, CS 4141 will start a few weeks after the semester starts. The instructor will announce the details in the class.

Course Description

To study topics leading to the understanding and ability to design a computer

Fixed point arithmetic in 2's complement notation: Notation, weighted sum, range, negation, addition, subtraction, multiplication and division by 2.

Boolean algebra and logic circuits: Simplification including K maps
Combinational circuits including NAND, NOR, ROM, and PLA realizations.

Learning Outcomes

Combinational building blocks: Full adder, Ripple Carry Adder, 2's complement adder and overflow detection circuits. Unsigned wrap around increment and decrement. Tristate buffer. Decoder (with and without enable), Multiplexer.

ALSU design: Implementation of arithmetic, logic, and shift operations. Multiplexing them and implementing them in one functional block with two input operands with carry-in, one output operand, and status flag outputs.

Sequential circuits and registers: Analysis of a NAND/NOR latch. Design of a fully synchronous flip-flop. Definition and Analysis of synchronous sequential circuits. Design of simple sequential circuits (simple implies outputs = state variables; that is, no state minimization). Registers.

Data transfer bus design: Register file. Uni- and bi-directional buses. Interaction of a functional block with multiple buses.

Memory unit design: Basic Binary cell with Read, Write, Select, and Tristate Output lines. Binary cell with two sets of input and output lines for memory mapped I/O RAM chip design RAM chip interconnections Complete memory unit with bootstrap loader ROM and memory mapped I/O ports.

Computer cycles: Parts of a machine instruction: Instruction Fetch, Operand Fetch, Execute OPCODE, Status flags. Store result, Check interrupt. Microoperations for fetch, for various addressing modes, stack operations, and interrupt check.
Control unit design.

Input/Output interface: Program controlled and interrupt initiated I/O Interface to handle multiple interrupts. Direct memory access (as time permits)

Required Texts & Materials M. Morris Mano and Charles R. Kime, *Logic and Computer Design Fundamental*, 4/e, Prentice Hall, 2008, ISBN: 013198926X.

Suggested Texts, Readings, & Materials David M. Harris and Sarah L. Harris, *Digital Design and Computer Architecture*. Morgan Kaufmann Publishers, 2007

Course Policies

Grading (credit) Criteria	Grading Policy Home work/Class work 40 % Project 10 % Test 1 15 %; Monday Oct 6, 2008; 10.30-11.45 AM Test 2 15 %; Monday Nov 24, 2008; 10.30-11.45 AM Final 20 %; not comprehensive Grades are assigned according to the following scale: 98=A+, 92=A, 90=A-, 88=B+, 82=B, 80=B-, 78=C+, 72=C, 70=C-, 68=D+, 62=D, 60=D-, 59-0=F
Make-up Exams	Make-up exams are only given to those students who coordinate the missing of an exam prior to the originally scheduled exam date and time.
Extra Credit	No extra credit
Late Work	Assignments are due in class on the dates given. Late assignments will have 10 points deducted. No late assignments accepted after one week.
Special Assignments	There will be one required class project
Class Attendance	Class attendance will be documented
Classroom Citizenship	

Field Trip Policies	Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk related activities. Information regarding these rules and regulations may be found at the website address http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean. Below is a description of any travel and/or risk-related activity associated with this course.
Student Conduct and Discipline	The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the UTD publication, <i>A to Z Guide</i>, which is provided to all registered students each academic year. The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the <i>Rules and Regulations, Board of Regents, The University of Texas System, Part 1, Chapter VI, Section 3</i>, and in Title V, Rules on Student Services and Activities of the university's <i>Handbook of Operating Procedures</i>. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391). A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents' Rules, university regulations, and administrative rules. Students are subject to discipline for violating the standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.
Academic Integrity	The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work. Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one's own work or material that is not one's own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings. Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of turnitin.com, which searches the web for possible plagiarism and is over 90% effective.
Email Use	The University of Texas at Dallas recognizes the value and efficiency of communication between faculty/staff and students through electronic mail. At the same time, email raises some issues concerning security and the identity of each individual in an email exchange. The university encourages all official student email correspondence be sent only to a student's U.T. Dallas email address and that faculty

	and staff consider email from students official only if it originates from a UTD student account. This allows the university to maintain a high degree of confidence in the identity of all individual corresponding and the security of the transmitted information. UTD furnishes each student with a free email account that is to be used in all communication with university personnel. The Department of Information Resources at U.T. Dallas provides a method for students to have their U.T. Dallas mail forwarded to other accounts.
Withdrawal from Class	The administration of this institution has set deadlines for withdrawal of any college-level courses. These dates and times are published in that semester's course catalog. Administration procedures must be followed. It is the student's responsibility to handle withdrawal requirements from any class. In other words, I cannot drop or withdraw any student. You must do the proper paperwork to ensure that you will not receive a final grade of "F" in a course if you choose not to attend the class once you are enrolled.
Student Grievance Procedures	Procedures for student grievances are found in Title V, Rules on Student Services and Activities, of the university's <i>Handbook of Operating Procedures</i>. In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originates (hereafter called "the respondent"). Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy of the respondent's School Dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the School Dean. If the grievance is not resolved by the School Dean's decision, the student may make a written appeal to the Dean of Graduate or Undergraduate Education, and the dean will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff members are available to assist students in interpreting the rules and regulations.
Incomplete Grades	As per university policy, incomplete grades will be granted only for work unavoidably missed at the semester's end and only if 70% of the course work has been completed. An incomplete grade must be resolved within eight (8) weeks from the first day of the subsequent long semester. If the required work to complete the course and to remove the incomplete grade is not submitted by the specified deadline, the incomplete grade is changed automatically to a grade of F .
Disability Services	The goal of Disability Services is to provide students with disabilities educational opportunities equal to those of their non-disabled peers. Disability Services is located in room 1.610 in the Student Union. Office hours are Monday and Thursday, 8:30 a.m. to 6:30 p.m.; Tuesday and Wednesday, 8:30 a.m. to 7:30 p.m.; and Friday, 8:30 a.m. to 5:30 p.m. The contact information for the Office of Disability Services is: The University of Texas at Dallas, SU 22 PO Box 830688 Richardson, Texas 75083-0688 (972) 883-2098 (voice or TTY)

	Essentially, the law requires that colleges and universities make those reasonable adjustments necessary to eliminate discrimination on the basis of disability. For example, it may be necessary to remove classroom prohibitions against tape recorders or animals (in the case of dog guides) for students who are blind. Occasionally an assignment requirement may be substituted (for example, a research paper versus an oral presentation for a student who is hearing impaired). Classes enrolled students with mobility impairments may have to be rescheduled in accessible facilities. The college or university may need to provide special services such as registration, note-taking, or mobility assistance. It is the student's responsibility to notify his or her professors of the need for such an accommodation. Disability Services provides students with letters to present to faculty members to verify that the student has a disability and needs accommodations. Individuals requiring special accommodation should contact the professor after class or during office hours.
Religious Holy Days	The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated. The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment. The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment. If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.
Off-Campus Instruction and Course Activities	Off-campus, out-of-state, and foreign instruction and activities are subject to state law and University policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at http://www.utdallas.edu/BusinessAffairs/Travel_Risk_Activities.htm. Additional information is available from the office of the school dean.

These descriptions and timelines are subject to change at the discretion of the Professor.