

EEL 3701C: DIGITAL LOGIC AND COMPUTER SYSTEMS

<http://mil.ufl.edu/3701/> [@eel3701](#) [UF's Canvas](#)

INSTRUCTOR

Dr. Eric M. Schwartz MAEC 106 352-392-2541 ems@ufl.edu Office Hours: Wed: 12:50pm, Fri 1:55pm

LECTURES

Tues & Thur 5th - 6th (2:00-4:45pm) in PUGH 170

LAB SECTIONS (NEB 248)

Mon			Tues			Wed			Thur			Fri		
Sec	Per	α^*	Sec	Per	α									
9118	2-3		72H4	1-2		9122	2-3		7259	1-2		72H1	1-2	
74C8	4-5		777D	3-4		74C9	4-5		777E	3-4		71HB	3-4	
77DF	6-7					7679	6-7					73GB	5-6	
7287	E1-2		7675	E1-2		9472	E1-2		7677	E1E2		71HC	7-E1	

* α = Lab Ninja / Grader

REQUIRED TEXTBOOK (Share, Borrow, Buy, or Rent one of the below. See https://mil.ufl.edu/3701/admin/3701_Textbook.pdf for more info)

- Charles H. Roth Jr., *Fundamentals of Logic Design, 7th edition*, Cengage Learning, Stamford, Connecticut, 2014. ISBN: 1133628478
- Charles H. Roth Jr., *Fundamentals of Logic Design, 6th edition*, Cengage Learning, Stamford, Connecticut, 2009. ISBN: 0495471690
- Charles H. Roth Jr., *Fundamentals of Logic Design, 5th edition*, Thomson Brooks/Cole, Belmont, California, 2004. ISBN: 0534378048

RECOMMENDED REFERENCE TEXTBOOK

Reprinted Chapters 1-7 from H. Lam, and J. O'Malley, *Fundamentals of Computer Engineering: Logic Design and Microprocessors, 1st edition*, 1988, John Wiley and Sons, New York, available at <https://tinyurl.com/UF-Lam>.

COURSE OBJECTIVES (ABET Design Content 50%) [Lab fee: \$89.40]

Official: Overview of logic design, algorithms, computer organization and assembly language programming and computer engineering technology. Laboratory.

Actual: To learn to: perform elementary manipulations of Boolean algebraic equations; simplify logic expressions; design combinational and sequential circuits; use a digital design and simulation package, use a hardware description language (HDL), analyze binary storage device behavior and applications. Also to study the fundamentals of microprocessor architecture, including assembly language programming, and to understand the design of a basic microprocessor.

ALPHA OFFICE HOURS

You may go to any α available (in NEB 248 if no lab; else NEB 222), not just the one teaching your lab section. The instructor will hold office hours (posted above and on our web page) or by appointment. You are encouraged to use e-mail to communicate with the instructors and α 's. α (s) will also hold a few **help sessions**: _____.

α name	Matthew Benda	Tom Hanes	Jim Gruber	Kassandra Crompton	Beichen Su	Noah Zinn	Kevin Naughton
office hours							
e-mail	bmbenda@ufl.edu	thanes@ufl.edu	jamesegruber@ufl.edu	kcrompton@ufl.edu	su1998@ufl.edu	nzinn08@ufl.edu	kevinbnaughton@gmail.com

α name	Marquez Jones	Alex Barrera	Yikai Mao	Daniel Olis	Stephanie Mackenzie	Daniel Chalco
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e-mail	marquezjones@ufl.edu	creepingmaiden@ufl.edu	yymao@ufl.edu	daniel.olis@ufl.edu	mackenzie124124@ufl.edu	daniel1712@ufl.edu

EXAM SCHEDULE

Some of our exams may be administered in the evening.

Exam Schedule

Exam	Date	Time	Location
1	Tues, 3 July	During Class	In Class
2a	Tues, 7 Aug		
2b	Thur, 9 Aug	During Class	In Class

REQUIRED HARDWARE

The *National Instruments (NI) Analog Discovery 2 (NAD) board* or *Digilent Analog Discovery 2 (DAD) board* is required for this course (and many other ECE courses). Board ordering information for the NAD can be found at <https://tinyurl.com/NAD-UF-u18> and the DAD-2 at <https://tinyurl.com/DAD-UF-u18>, both available for \$179. When purchasing the NAD, other discounted items can be found on the same website. If you are an EE student, I also recommend that you obtain the NI Multisim software (for analog circuit design and simulation). The UF bookstore has the NAD available, for those that want to use financial aid or want it right away. (Online it says that they have the NAD-1 for \$199 and a NAD-2 for \$311.)

CLASS AND EXAM BEHAVIOR

Turn off all cell phones, beepers, laptop sound effects, and other noise making devices before entering our classroom. If a noise-making device goes off during class, I reserve the right to lower your course grade. If a noise-making device goes off during an exam, you will lose a significant number of points on this exam.

COURSE REQUIREMENTS (IMPORTANT!!!)

1. Perform all laboratory experiments. An overall lab grade of 65% or better is **required** in order to obtain a passing grade in the course. Your lowest lab (**not including** Lab 6) will be dropped. But **use this drop wisely**, i.e., do **not** just skip a lab since all labs are important and your next missed lab may be unavoidable. If you need to miss a single lab, it's ok; you can **not** make up the missed lab. (You should do this lab on your own. If necessary, you may visit a **α** during an office hour for help.) **If you have a valid reason for missing this lab, get documentation for your first missed lab and hold on to it.** If you miss a **second** lab, you must show **Dr. Schwartz** (not an **α**) **written documentation for BOTH your first and your second missed labs.** This documentation should be official and from a doctor, judge, etc., so that a make-up can be arranged. You must notify the professor **prior** to your scheduled second missed lab or **as soon as possible after** your second missed lab. **There is rarely an excuse that will allow you to reschedule your first missed lab other than an exam in another course.** You must notify the **professor** at least **8 days** prior to your exam (or other) so that an alternate lab time might be arranged.
 - If you believe that you have valid university-related reason for missing a particular lab (e.g., Lab X), send an email to Dr. Schwartz with the following information (with subject: **3701: Conflict with Lab X**, where X is the lab number).
 - State the cause for missing your Lab X and provide associated documentation for this event.
 - Provide a list of each of the Lab X **days and periods** for which you have no conflict and could attend.
 - If this is for an exam in another course, **first** verify that there are no alternate exam times available. If none, then provide Dr. Schwartz (via email, with subject: **3701: Conflict with Lab X**, where X is the lab number) the course number and name, and also your teacher's name, email, and phone number.
 - Labs **must** be done at scheduled times (except as described above).
 - Students **must** be prepared to demo their lab when they enter. Students will be randomly selected for their demonstration times during their lab period.
 - An average lab grade of **65% or higher** is required to be **eligible** to **pass** the class!
2. Class attendance is mandatory. Roll will be taken. Each missed class when roll is taken will cost 1 points (out of 100) from your overall course total. Roll may be taken more than once in class; if you leave and a second roll is taken, this will be interpreted as an honor code violation.
 - **No excuses accepted, but two free drops.**
 - **Missed classes and quizzes cannot be made up.**
 - Turn off all cell phones, beepers, laptop sound effects, and other noise making devices **before entering** our classroom. If a noise-making device goes off during class, I reserve the right to **lower your course grade**. If a noise-making device goes off during an exam, you will lose a significant number of points on this exam.
3. Do all homework assignments and turn them in **through Canvas before** the time that they are due.
 - **Late homework will not be accepted.**
4. Take all exams as scheduled. (Note that exam 3 is broken up into two parts.)
 - **No makeup exams will be given except in cases of a medically documented incapacity or family emergency.**
 - If you believe that you have a valid exam conflict, please send me the info specified above for a lab conflict (again, at least **8 days** in advance), but with the subject: **3701: Conflict with Exam X**, where X is the exam number. Please specify the times of your conflict and then times immediately before or after the scheduled exam time when you **are available**.

RECOMMENDATION

I recommend that you bring your laptop or tablet computer (or printed notes) to each class, so that you can easily augment these notes with your own notes. Historically, student that take good notes perform much better in this class than those who do not take notes (or take poor notes).

STUDENTS REQUIRING ACCOMMODATIONS

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The University of Florida is committed to providing academic accommodations for students with disabilities. Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, a student should present his/her accommodation letter to me supporting a request for accommodations. The University encourages students with disabilities to follow these procedures as early as possible within the semester.

Students requesting classroom, laboratory or exam accommodations must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. For optimal consideration, you must see the professor **during the first week of classes**.

UF COUNSELING SERVICES (HEALTH AND WELLNESS)

Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling & Wellness Center, <http://www.counseling.ufl.edu>, 3190 Radio Road, (352) 392-1575.
- SHCC mental Health, Student Health Care Center, <http://shcc.ufl.edu/>, Infirmary Building, 1 Fletcher Drive, 392-1161.
- U Matter, We Care, <http://www.umatter.ufl.edu/>, umbrella organization for UF's caring culture and provides students in distress with support.

U Matter, We Care

- Your well-being is important to the University of Florida. The *U Matter, We Care* initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need.
- If you or a friend is in distress, please contact umatter@ufl.edu so that the *U Matter, We Care* Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The *U Matter, We Care* Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center.
- Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.
- Resources for Sexual Violence, http://www.umatter.ufl.edu/sexual_violence, Immediate Response/Advocacy 392-5648 or 392-1111; Medical Care from Student Health Care Center, 392-1161.
- University Police Department, 392-1111 (or 9-1-1 for emergencies), <http://www.police.ufl.edu/>.
- Career Resource Center, <http://www.crc.ufl.edu/>, Reitz Union, 392-1601, career development assistance and counseling.

ACADEMIC RESOURCES

- E-learning technical support, <https://lss.at.ufl.edu/help.shtml>, 392-4357, Learning-support@ufl.edu..
- Career Resource Center, <http://www.crc.ufl.edu/>, 392-1601. Reitz Union. Career development assistance and counseling.
- Library Support, <http://cms.uflib.ufl.edu/ask>.
- Teaching Center, <https://teachingcenter.ufl.edu/>, 392-2010. Broward Hall. General study skills and tutoring.
- Writing Studio, <https://writing.ufl.edu/writing-studio/>, 846-1138, 302 Tigert Hall.
- Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.
- Ombuds office, <http://www.ombuds.ufl.edu/>. Ombuds office exists to assist students in resolving problems and conflicts

STUDENT PRIVACY

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments.

COURSE EVALUATION

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

STUDENT PRIVACY

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments.

SOFTWARE USE

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

TECHNOLOGY

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The use of cell phones and **every other** technology device is strictly prohibited during exams. All use of an electronic devices during an exam will be considered a violation of the student honor code (i.e., cheating). See the *Honesty Policy* section below for the minimum penalties that are incurred for all cases of cheating in our course. Laptop computer and tablets are welcome in class as long as they are used for class-related work. Surfing the web, checking email, making posts, etc., is strictly prohibited (**if distracting to others**) and will result in course grade deductions.

COMMUNICAITION

Twitter is utilized for course announcements. You are also responsible for getting the tweets either with a Twitter account or with software that creates an email or text message from tweets. You are also responsible for regularly checking announcements and course-related postings on the class website, Canvas, and your UF email.

EXTRA CREDIT

Extra credit is sometimes offered during class (or on the web, by tweet, or by email). The amount of extra credit given is at the discretion of the faculty member unless specifically stated with the extra credit opportunity.

HOMEWORK AND EXAM SOLUTIONS

Solutions to homework will be made available on our class web site. Practice exams (some old ones with solutions) are also posted.

All grades are **non-negotiable one week** after the grade is posted. Please don't come to me after the final grades have been posted with a hard-luck story.w

COURSE GRADE DETERMINATION

I have found that attendance is directly correlated to grades. Therefore, attendance is required, but is **NOT** worth positive points. Each missed class results in a deduction of one point (out of 100) from your overall course total. There are no excuses for missed classes, but two classes can be missed without penalty.

Exams 1 and 2 (2@20%)	40%	
Laboratory	30%*	(Lab values vary, i.e. it could count as 1/3 a lab, a single lab, a double lab, etc.)
Homework/Quizzes	4%	(5-10 homework and 0-5 quizzes)
Exam 3a	5%	(5-10 homework and 0-5 quizzes)
<u>Exam 3b</u>	<u>21%</u>	
Total	100%**	(90+ on combined Exam 3a and 3b results in 5% grade bonus, e.g., 86% \Rightarrow 91%)

* A grade of 65% or better in Lab is **required** in order to obtain a passing grade. Your lowest lab (**not including** Lab 6) will be dropped. But use this drop wisely, i.e., do **not** just skip a lab since all labs are important and your next missed lab may be unavoidable. If you need to miss a single lab, it's ok; you can **not** make up the missed lab. (You should do this lab on your own.) **If you have a valid reason for missing this lab, get documentation for your first missed lab and hold on to it.** If you miss a **second** lab, you must show the **professor** (not the **TA**) **written documentation for BOTH your first and your second missed labs.** This documentation should be official, i.e., from a doctor, judge, etc., so that a make-up can be arranged. You must notify the professor **prior** to your scheduled second missed lab or **as soon as possible after** your second missed lab.

** Attendance is required, but is **NOT** worth positive points. Each missed class results in a deduction of one point (out of 100) from your overall course total. There are no excuses for missed classes, but two classes can be missed without penalty.

Note: All grading percentages are subject to change at professor's discretion. Students will be notified of any changes.

GRADING POLICY

Grades are periodically posted on the class web site. **It is your responsibility to check your grades regularly** since mistakes often happen when dealing with a large number of students and **α's**. **All grades are final one week after posting.** After curving exams as needed, course grades are assigned using the 60 (D), 70 (C), 80 (B), and 90 (A) cuts. [90 \rightarrow 100 (A), 86. $\bar{6}$ \rightarrow 89. $\bar{9}$ (A-), 83. $\bar{3}$ \rightarrow 86. $\bar{6}$ (B+), 80 \rightarrow 83. $\bar{3}$ (B), 76. $\bar{6}$ \rightarrow 79. $\bar{9}$ (B-), 73. $\bar{3}$ \rightarrow 76. $\bar{6}$ (C+), 70 \rightarrow 73. $\bar{3}$ (C), 66. $\bar{6}$ \rightarrow 69. $\bar{9}$ (C-), 63. $\bar{3}$ \rightarrow 66. $\bar{6}$ (D+), 60 \rightarrow 63. $\bar{3}$ (D), 56. $\bar{6}$ \rightarrow 59. $\bar{9}$ (D-), and 0 < 59.9 (E)].

Part of your grade on exams, labs, homework, quizzes, etc. is based not only on solving the problem you are presented with, but the manner in which you solve it. For example, there is a difference between two designs that meet the given specifications, but one is an elegant, modular 3-element solution, while the other is an obfuscated 5-element design that also meets the specifications but would be difficult to extend later. Just as your future employer would value the latter design less than the first, so will I in grading your assignments.

The UF grading policies for assigning grade points can be found on the following undergraduate catalog web page: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

HOMEWORK GRADING

Homework is submitted through Canvas by the assigned deadline. Unless other specified (sometimes additional files are requested), a **single pdf** document should be submitted for each homework. Scans are acceptable, but must be compressed and in a single document. *Fast Scanner* (available for Android and iPhone) is a cell phone app that works well. Unclear scans **will not** be accepted. Missed homework can **not** be made up, but your lowest homework (or quiz) is dropped. Homework solutions are sometimes posted on our class web-site **before** they are due. It is **not** appropriate to copy the supplied solutions verbatim; this constitutes cheating. Homework will only be graded in a cursory fashion, i.e., Zen grading is used. The grades will be entered into the grade book as 0 (no significant effort or not

All grades are **non-negotiable one week** after the grade is posted. Please don't come to me after the final grades have been posted with a hard-luck story.

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submitted), 1 (half-hearted attempt) or 2 (significant attempt). The final course grades will be assigned with strict cuts between grades, but HW **could** push you above a cut. Also, the (pop) quizzes will come from the class material, the labs, **and** the homework. In addition, the exams will be partly based on the assigned homework. Since homework is not returned and is graded only for effort, students should compare their solutions to the posted solutions. **Late homework is not accepted.**

IN-CLASS QUIZ GRADING

In-class quizzes will cover material previously covered in assigned readings, homework, class or lab. Quizzes may happen during any class; they are not generally announced beforehand. **Missed quizzes cannot be made up, but your lowest quiz (or homework) is dropped. Therefore, missing a single quiz will not hurt your grade.** See the Course Requirements section above for the policy for missed quizzes.

MULTIMEDIA CLASS/AUDIENCE NOTES

Audience notes are normally available from the class web site every week or so for the subsequent week or more of classes. The notes consist of pdf versions of the class PowerPoint slides with some space for note taking. These notes are not required but are **highly** recommended. Check the class web site for information on exactly when the notes are available. **For optimal performance,** read the notes and examples for a class **before** that class and bring the **printed class notes and examples** to class to augment the printed material with your own notes. Notes will be removed shortly after they are covered in class.

EXAM RE-GRADE POLICY

If you believe an error has been made on an exam score you must make a **written** request to the instructor explaining where the misgrading or error occurred. This request must be submitted **immediately at the end of the class in which the exam is returned.** If you do resubmit an exam, however, the instructor reserves the right to scrutinize and grade the **entire** exam more closely. This definitely places your current score at risk. Consequently, it is not advisable to resubmit an exam for correction unless a blatant error, such as a miscalculation of total points, has been made. You **must** make it clear what writing you added to the exam (by clear indication, e.g., use a different color pen or pencil) after it was returned to you.

HONESTY POLICY

All students admitted to the University of Florida have signed a statement of academic honesty committing them to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. The following pledge is required for all work submitted for credit by University of Florida students: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." This statement is a reminder to uphold your obligation as a student at the University of Florida and to be honest in all work submitted and exams taken in this class and all others. UF students are bound also by the **Honor Pledge** which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code."

CHEATING WILL NOT BE TOLERATED. We will actively search for cheaters; we have and will use excellent software to help us in the search. If you are caught, there will be no negotiations. You will earn a course grade penalty (often failure for the course) and get reported to the honor court. There are **no excuses and no exceptions.** You may talk to other students about assignments, but the final work **must** be your own. You must also report others (anonymously, if desired) that you suspect are cheating. If you are caught cheating on **any** assignment (homework, lab, quiz, or exam, etc.), you **will** be prosecuted. A meeting with the instructor (and, possibly, the UF honor court) will determine penalties, none of which are desirable or pleasant (*i.e.*, cheating in this course always results in notification to the honor court, often results in a failing grade in the course, and can possibly result in suspension or expulsion from the university). If you know someone is cheating, **it is your responsibility to report it.** For more information about cheating, the UF Honor code, and the consequences of academic dishonesty, please refer to <https://sccr.dso.ufl.edu/students/student-conduct-code/>. If you have any questions or concerns, please consult with Dr. Schwartz.

WORKING TOGETHER

You are encouraged to work with other students on assignments in a professional manner. Each person in the group should attempt to solve all problems **independently** and **only** then discuss the results with one's partner(s) to correct errors and resolve differences. Copying your partner's work constitutes cheating and should not be permitted. Matching your solution to your partner's, however, is acceptable, if, after independent study and work you are convinced your partner's solution is correct. All solutions should reflect your style of problem solving, even those you have changed to match your partner's solution. In other words, **verbatim copying or simple paraphrasing of your partner's solution is not an acceptable form of cooperative study.** Your name **and your partner's name(s)** must be on your assignments. You may **not** copy and submit old or new posted solutions as if they were your own.

Although you may **consult** with other students, **α**'s, or instructors for your assignments, you **must** do independent work. Consulting means **"seeking opinions or advice,"** **not** getting working solutions, programs, or designs, understanding them, and then modifying them to make them your own. The latter constitutes cheating (see above section). Working side-by-side to find a solutions, construct a program, or design in a group constitutes cheating. (Solving homework are good practice for

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solving quizzes and exams, which are also **not** group activities.) **You should note that we have used and will continue to use software that can detect similar submissions.**

LABORATORY GRADING

You will not be admitted to the lab without a Summary document, as described in the *Lab Rules and Policies*. The *Summary* document and other files also **must** be submitted through Canvas **BEFORE** the start of your lab. Each circuit diagram, VHDL file, and assembly language program must have your name (computer) printed at the top. **ALL** simulations should be clearly annotated using Quartus annotations. Quartus files should be sent in a **Quartus archive file**. Grading emphasis will be placed upon your producing well documented, well-structured design circuitry that realizes the functional requirements specified by the lab handout and the lab instructor. The remaining portion of your grade will result from observations by your lab instructor on such matters as your understanding of the lab, your lab techniques, your pre-lab preparation, your lab results and your cooperation and compliance with the rules. Having your design perform properly does **not** guarantee a grade of 100, but makes a 100 grade **possible**. Lab designs and/or software that are similar and/or identical to other student's work constitute cheating (see above) and will be reported to the professor for further discipline (and will result in failing the course, honor court charges, or expulsion). There will be a quiz at the beginning of most labs (worth up to 40% of your total lab score). If you are late for a lab, you will get a zero for the quiz.

LABORATORY RULES

0. See the *Lab Rules and Policies* for **complete** information. The first several rules from that handout are repeated below.
1. Lab safety is rule #1. Please play close attention to your α 's instructions about lab safety, will occurs during your first lab. Note that α = Lab Ninja / Grader.
2. No food or drinks in the lab. (No smoking, i.e., keep the magic smoke inside the ICs.)
3. Students work **individually** on each lab project. Do not ask or answer questions from other students during your lab. Students can **NOT** help each other **during** lab. During lab, all questions should be directed to your α .
4. Unless otherwise told by the instructor or an α , do **not** use another student's PCB or other hardware at **any** time. Similarly, do **not** use another student's designs or programs.
5. You can **not** use any pre-built devices where the intention is to have you design them yourself.
6. It is your responsibility to return all equipment and clean your work area before leaving the lab.
7. Students must attend labs during their assigned time.
8. Students must come prepared to the Lab. **No student will be admitted to the lab without the pre-lab work already submitted through Canvas, the required printouts in hand, and the required circuits constructed.** Your files must be submitted through Canvas **at least 15 minutes BEFORE the start of your scheduled lab.**
9. If you arrive more than **10 minutes** after your lab begins, you will **NOT BE ELIGIBLE** to take the lab quiz. If you arrive late, but prior to the 10-minute deadline, you may not get any directions for the quiz.
10. If you arrive more than **20 minutes** after your lab begins, you will **NOT BE ADMITTED**. Note that you may not be able to finish your lab if you arrive late.
11. An overall lab grade of 65% or better is **required** in order to be eligible to pass the course.
12. See the course syllabus for information about the **rare cases** when missed labs can be made up.
13. Most labs will have a quiz. Quizzes might take as long as 1.5 hour (but could be shorter). Quizzes will be graded on a quinary scale of 0, 1, 2, 3, or 4. This will translate into values of 0, 10%, 20%, 30%, or 40%, respectively to account for up to 40% of the lab grade. Quizzes will cover information from the pre-lab material and previous labs and course work. The items permissible to use during a quiz vary; sometimes you will not be allowed any resources and other times you will be allowed access to your parts list and usually Quartus. You will **not** be allowed to access the internet during quizzes.
14. Labs are precisely 115 minutes long (i.e., 2 periods plus the 15 minute break). You will be given **no** extra time. (All ECE labs, starting spring 2018, are 2 periods, not the 3 periods previously allocated.)
15. Students **must** be prepared to demo their lab when they enter. Students are **randomly selected** to demonstrate her/his lab work at **any time after the lab quiz is over**. Each student has only a single attempt to demonstrate his/hers work, i.e., your α will **not** come back to you later. There will be **NO** exceptions.
16. ...

LABORATORY ATTENDANCE

Laboratory attendance during scheduled times is mandatory. **Documented** personal or family emergency will be accepted as an excuse for absence for a **second** missed lab if documentation for a **first** missed lab is **also provided**. In such cases, consult your **Dr. Schwartz** (**not** your α) about a make-up lab **as soon as possible**. See *Course Requirements* for more details. Students should make serious attempts on **all** labs. **Grades less than 50% may be interpreted as not a serious attempt and may be scaled to 0.** Note: **ALL** students **MUST** have everything working **BEFORE** coming to lab.

You will **not** officially makeup your dropped lab. You should do this missed lab at home (or, if necessary, during an α office hour) to be sure you understand the required material.

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LABORATORY TOPICS

Lab Number	Start Date	Possible Topic s
0	Mon, 21 May	Build your CPLD board; intro to software and parts
1	Tues, 29 May	Quartus intro; Logic design and implementation (with discrete parts)
2	Tues, 5 June	MSI circuit design and implementation (with discrete parts & CPLD)
3	Wed, 13 Jun	Counter design and implementation
4	Tues, 10 Jul	Registered Arithmetic Logic Unit (RALU) design & implementation
5	Tues, 17 Jul	State Machine design and implementation
6	Tues, 24 Jul	CPU with ROM-based instructions
7	Tues, 31 Jul	G-CPU simulation and assembly language programming

EEL 3701 Schedule: Part 1 of 2

WEEK/DAY	DATE	LAB #	Lecture #	Tentative Weekly Topics / Comments	
1	M	14-May		Classes Begin Syllabus, web site Digital Design, Basic logic, Number Systems, Math Intro. to Quartus, Mixed Logic ICs, introduction to mixed, positive, and negative logic	
1	Tu	15-May	1-2		
1	W	16-May			
1	Th	17-May	3-4		
1	F	18-May			
2	M	21-May	0	Number Systems, Math Number Systems, Math Boolean Algebra	
2	Tu	22-May	0		5-6
2	W	23-May	0		
2	Th	24-May	0		7-8
2	F	25-May	0		
3	M	28-May		No class	Holiday: Memorial Day MSOP, MPOS, Simplification MSI: MUX, deMUX, decoder; K Maps More MSI: encoder, adder, BCD 7-segment decoder, tristate buffer Arithmetic Logic Unit (ALU)
3	Tu	29-May	1	9-10	
3	W	30-May	1		
3	Th	31-May	1	11-12	
3	F	1-Jun	1		
4	M	4-Jun	1		Introduction to sequential circuits: Flip-flops Flip-flops and next state/excitation tables Design with flip-flop, Counter design, Debouncing
4	Tu	5-Jun	2	13-14	
4	W	6-Jun	2		
4	Th	7-Jun	2	15-16	
4	F	8-Jun	2		
5	M	11-Jun	2		IC Characteristics RAM, ROM and memory expansion MSI sequential circuits - Registers, counters Introduction to VHDL
5	Tu	12-Jun		17-18	
5	W	13-Jun	3		
5	Th	14-Jun	3	19-20	
5	F	15-Jun	3		
6	M	18-Jun	3		ASM implementation, ASM design examples ASM design implementations, ROM based designs & others ASM implementation, ASM design examples
6	Tu	19-Jun	3	21-22	
6	W	20-Jun			
6	Th	21-Jun		23-24	
6	F	22-Jun			
	M-F	23Jun-1Jul		No Class	Holiday: Summer Break

SYLLABUS

Revision **Tentative**

EEL 3701 Schedule: Part 2 of 2

WEEK/DAY	DATE	LAB #	Lecture #	Tentative Weekly Topics / Comments
M-F	23Jun-1Jul		No Class	Holiday: Summer Break
7 M	2-Jul			EXAM 1: in class Holiday: Independence Day ASM design implementations, ROM based designs & others
7 Tu	3-Jul		25-26	
7 W	4-Jul		No Class	
7 Th	5-Jul		27-28	
7 F	6-Jul			
8 M	9-Jul			Exam 1 Solutions / Regrade petitions submitted Addressing modes, Data transfer instructions Instruction set and assembly programming examples
8 Tu	10-Jul	4	29-30	
8 W	11-Jul	4		
8 Th	12-Jul	4	31-32	
8 F	13-Jul	4		
9 M	16-Jul	4		Basic computer operation cycles and timing Intro into computer architecture, registers, assembly & instructions G-CPU, Memory Maps
9 Tu	17-Jul	5	33-34	
9 W	18-Jul	5		
9 Th	19-Jul	5	35-36	
9 F	20-Jul	5		
10 M	23-Jul	5		G-CPU, Special topics
10 Tu	24-Jul	6	37-38	
10 W	25-Jul	6		
10 Th	26-Jul	6	39-40	
10 F	27-Jul	6		
11 M	30-Jul	6		TBD DROP DEADLINE
11 Tu	31-Jul	7	41-42	
11 W	1-Aug	7		
11 Th	2-Aug	7	43-44	
11 F	3-Aug	7		
12 M	6-Aug	7		EXAM 2a: _____ EXAM 2b: in class
12 Tu	7-Aug		45-46	
12 W	8-Aug			
12 Th	9-Aug		47-48	
12 F	10-Aug			