ECE 109: Introduction to Computer Systems

Syllabus

Spring 2019

Section 001: Hunt Auditorium, Mon/Wed, 11:45am – 1:00pm
Sections 602, 702: Video, Mon/Wed 3:00-4:15 PM

Instructor: Dr. Robert Evans, Teaching Associate Professor, ECE
            Engineering Building II (EB2) Room 2110
            919-513-0987
            rjevans@ncsu.edu

Problem Sessions:

<table>
<thead>
<tr>
<th>Section</th>
<th>Day</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>Wed</td>
<td>4:30-6:20PM</td>
<td>EB1 1007</td>
</tr>
<tr>
<td>402</td>
<td>Wed</td>
<td>5:20-7:10PM</td>
<td>EB3 2240</td>
</tr>
<tr>
<td>403</td>
<td>Th</td>
<td>4:30-6:20PM</td>
<td>EB1 1011</td>
</tr>
<tr>
<td>404</td>
<td>Th</td>
<td>5:20-7:10PM</td>
<td>EB3 2240</td>
</tr>
<tr>
<td>405</td>
<td>Fri</td>
<td>9:35-11:25AM</td>
<td>EB3 2232</td>
</tr>
</tbody>
</table>

Office Hours: Monday 10:00-11:00 AM, Thursday 2:00-3:00 PM, and by Appointment (Subject to Change)

Teaching Assistants:

TBD

Contact them at: ece109-sprg-2019-sup-3ymgz6h@wolfware.ncsu.edu

TA Office Hours will be at their problem sessions or by appointment.

Course Content and Student Learning Outcomes

This course introduces you to the fundamentals of computer engineering from both the hardware and software points of view. It serves as a “roadmap” for the rest of the computer courses that you will take here. After taking this course, you will have a better understanding of how a program is translated into commands for execution on hardware, and how the hardware executes those commands using, ultimately, electrons to do the work.

At the end of this course, students will be able to:

- Demonstrate a basic understanding of computer system architecture,
- Program computer systems at the machine and assembly level,
- Describe what roles are carried out by the microarchitecture, data flow and control flow portions of computers,
- Analyze and design digital logic circuits, using CMOS transistors or logic gates,
- Describe how simple input/output (I/O) devices are controlled by microprocessors.
Prerequisites
You must be familiar with NCSU’s online resources, including email, Unity accounts, etc. If you need help, see the Campus Resources chapter of the E 115 online textbook (http://www.eos.ncsu.edu/e115/text.php) or the main Eos web site (http://www.eos.ncsu.edu).

GER Information
This course is not designated as a General Education Requirement.

Textbook and Fees
There is one required textbook for this course:

  (You will need this book again in 209 -- don’t sell it!)

Online homework assignments will be submitted through the Moodle site -- no cost.

Assignments and Grading
The overall class grade will be a weighted average of the following components:

- **Homework** (5%) - each HW assignment weighted equally  [Drop 1 Lowest HW Grade]
- **Problem Sessions** (10%) -- each PS assignment weighted equally  [Drop 1 Lowest PS Grade]
- **Programming assignments** (14%) (Prog1-2%, Prog 2-4%, Prog 3-8%)
- **In-class TopHat assignments** (5%)  [Drop 2 Lowest In-Class Grades]
- **Two In-class exams** (46%; 23% each)
- **Comprehensive final exam** (20%)

Homework
There will be approximately 8 assignments, approximately one per week during the first part of the course. Homework will be submitted and graded via Moodle. You will be given multiple submissions and immediate feedback. I will drop your lowest one (1) homework grade.

All homework is to be done individually. Though you can discuss concepts with other students, the instructor, and the TA’s, it is crucial that you know how to do every homework assignment on your own. This is the same material that will be on the exams. Evidence of copying or other unauthorized collaboration will be investigated as a potential academic integrity violation. The minimum penalty for cheating on homework is a grade of -100 on the assignment. If you are tempted to copy because you’re running late, you will be better off missing the assignment and taking a zero.

The frequency of homework will decrease in the latter part of the course, as the programming assignments begin.

Problem Session
Attendance at problem sessions is mandatory. Problem sessions will meet (almost) every week, but some will be optional. Mandatory assignments will be graded. I expect approximately seven (7) or eight (8) graded problem session assignments during the semester. Problem session assignments must be turned in by the end of the problem session. On weeks without problem sessions we will offer time with the TAs for questions, program help, etc.

Unlike with homework, I encourage you to work on these assignments in groups, but make sure that everyone in the group is actually working on the assignment, and not simply copying the answers. I also do not want the group to divide the assignment up into pieces for different students to solve. You are all responsible for all of the material. This is a low-risk chance to practice material for the exams. I may also give some “stretch” questions to get you to think beyond what we’ve explicitly discussed in class.
Most of the grade on problem session assignments will be for work shown. So, even if you don’t get the right answer, it’s in your best interest to try.

You must be registered for the problem session section to get credit for this course.

If you miss an assignment due to a university-excused absence, the grade for that assignment will be dropped; the assignment will not be made up. (Note: This means that the other problem session and homework grades will have a larger impact on your total grade.)

**Preliminary Schedule for Problem Sessions (week of):**

<table>
<thead>
<tr>
<th>Problem Session #</th>
<th>Date</th>
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<tbody>
<tr>
<td>#1</td>
<td>January 16</td>
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<tr>
<td>#2</td>
<td>January 30</td>
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<tr>
<td>#3</td>
<td>February 6</td>
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<tr>
<td>#4</td>
<td>February 27</td>
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<tr>
<td>#5</td>
<td>March 6</td>
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<tr>
<td>#6</td>
<td>March 20</td>
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<tr>
<td>#7</td>
<td>March 27</td>
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<tr>
<td>#8</td>
<td>April 17</td>
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**Programming Assignments**

There will be *three* programming assignments during the semester. The programming assignments will use machine and/or assembly language, and will be executed on an LC-3 simulator. Programs will be submitted via Wolfware Classic.

Each programming assignment must be completed individually. Evidence of copying or other unauthorized collaboration will be investigated as a potential academic integrity violation. **The minimum penalty for cheating on a programming assignment is a grade of -100 on the assignment.** If you are tempted to copy because you’re running late, you will be better off missing the assignment and taking a zero.

Note: There will be a programming assignment due on the last day of class, which is during dead week. The assignment will be posted significantly before the due date, so you do not need to work on the program during dead week, if you choose not to.

**In-Class Assignments**

We will be using an online tool called Top Hat to take attendance and for interactive in-class exercises. There is a site-wide license for TopHat so there is not additional charge for this software. Please set up your TopHat account at: [https://tophat.com/](https://tophat.com/) by the end of the first week of class. We will use it on the second week of class! Please link your account to the proper join code based on your location.

**NCSU**: Join Code: *422609*

**Asheville/Wilmington**: Join Code: *697612*

Please use your NCSU Unity ID and Email for your account at TopHat! It allows to synchronize it with our Moodle system.

To use Top Hat, you must have a laptop, tablet, or smartphone in class. A cell phone will not work in Hunt Auditorium -- on-campus students must use a WiFi-enabled device. TopHat assignments **MUST** be completed while in the classroom! Logging into TopHat to complete and assignment while away from the classroom will be considered cheating and the appropriate policies will apply!

Attendance will be taken, but will not be graded. Only the in-class exercises will be graded. 70% of the grade for each exercise is for participation, and 30% for correctness. The **TOTAL** grade for each lecture will be recorded as one grade in the Moodle gradebook. There will be no makeup for missed in-class assignments, even for excused absences. I will drop the lowest two (2) in-class grades. (So you can miss two classes without penalty.) If you miss an extended number of classes due to a university-excused absence, then discuss that with me.)
Exams

There will be two regular exams (20% each) and one comprehensive final exam (25%). All exams will be closed book and closed notes. Regular exams will be administered during regular class periods, on or close to the dates listed below. The final exam will be given according to the university schedule, also given below.

- Exam 1: Wednesday, February 13 (tentative)
- Exam 2: Wednesday, April 3 (tentative)
- Final exam (001): Monday, April 29, 8-11 am

Attendance at all exams is mandatory. Only University-approved excuses will be accepted, provided that they are accompanied by the appropriate official documentation. Makeup exams may be given for excused absences, at the discretion of the instructor. If you miss an exam without an acceptable excuse, you will receive a zero for that exam.

Do not ask for permission to take the final exam early or late because of individual family travel plans. These requests will not be granted.

Evidence of cheating on any exam will be investigated. If there is sufficient cause, the incident will be referred to the Office of Student Conduct as an Academic Integrity violation. The minimum penalty for cheating on an exam is a grade of zero on the exam. See the NCSU Code of Student Conduct for information about what constitutes cheating.

Final Course Grade

The final grade for the course will be based on a weighted average of the above components. The +/- grading system will be used for this course.

<table>
<thead>
<tr>
<th>Numerical Score</th>
<th>Letter Grade</th>
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<tbody>
<tr>
<td>97 ≤ score ≤ 100</td>
<td>A+</td>
</tr>
<tr>
<td>92 ≤ score &lt; 97</td>
<td>A</td>
</tr>
<tr>
<td>90 ≤ score &lt; 92</td>
<td>A-</td>
</tr>
<tr>
<td>87 ≤ score &lt; 90</td>
<td>B+</td>
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<tr>
<td>82 ≤ score &lt; 87</td>
<td>B</td>
</tr>
<tr>
<td>80 ≤ score &lt; 82</td>
<td>B-</td>
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<tr>
<td>77 ≤ score &lt; 80</td>
<td>C+</td>
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<tr>
<td>72 ≤ score &lt; 77</td>
<td>C</td>
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<tr>
<td>57 ≤ score &lt; 60</td>
<td>D-</td>
</tr>
<tr>
<td>0 ≤ score &lt; 57</td>
<td>F</td>
</tr>
</tbody>
</table>

Class Policies and Resources

Preferred Means of Communication:

The best way to reach me is through email. The preferred email is ece109-sprg-2019-sup-3ymgz6h@wolfware.ncsu.edu. Emails to this address will be seen by me and by all of the TAs, so you have a better chance of getting a quick answer. If you get an answer from me, or from a TA, please continue to include ece109-sup in your replies, so that everyone can see the discussion.

If you want to communicate with me personally, send email to rjevans@ncsu.edu. Unless the email needs to be confidential, I will most likely include ece109-sprg-2019-sup-3ymgz6h@wolfware.ncsu.edu when I reply.
I also highly encourage the use of the Moodle Discussion Forum. This allows other students to see your question, and the answer, so that we don’t have to answer the same question 20 times. I also encourage students to answer each other's questions, as long as you don't provide solutions to homework or programming problems.

I am also available by phone during normal office hours: 919-513-0987.

**Computer Resources**

**Course web site:** Login to wolfware.ncsu.edu and click on ECE 109. This will take you to the Moodle site.

Direct link is: [https://moodle-courses1819.wolfware.ncsu.edu/course/view.php?id=6628](https://moodle-courses1819.wolfware.ncsu.edu/course/view.php?id=6628)

**Email aliases:** ece109-fall-2018-sup-yx5azv7@wolfware.ncsu.edu (instructor and TAs)

All class announcements will be posted to the Moodle site’s **Announcements** forum. All announcements will also be emailed to all students, because everyone is forced to subscribe to the Announcements forum. The Moodle site will also contain links to homework assignments and solutions, lecture notes, past exams, and other relevant information. You are expected to check the Moodle site frequently for homework assignments and other timely information.

**Discussion Forums** are provided for on-line class discussions. Students may add a new topic to a forum or reply to a previous posting. Please make sure that posted material is appropriate and course-related. Do not post off-color jokes, offensive material, job listings, for-sale ads, virus alerts, etc. Do not post homework solutions. **Do not post any code** that may be used for programming assignments. If the message board is abused, it will be deleted, and the abusers will be referred to the Office of Student Conduct.

A **feedback** Google form will be provided. This will be set up as an anonymous form, but you may choose to provide your contact information if you want a response. (Don’t expect a response to an anonymous comment, since there will be no way for me to know who to contact.)

Homework assignments will be submitted via Moodle. Programming assignments will be submitted via Moodle. Make sure you know how to do these things before they are required of you.

**Textbook Resources**

Online resources for the textbook, including answers to selected exercises, can be found at: [http://highered.mcgraw-hill.com/sites/0072467509/](http://highered.mcgraw-hill.com/sites/0072467509/)

**Office Hours**

My office hours will be held in EB2 2110 on Monday 10:00-11:00 AM, and Thursday 2:00-3:00 PM, or by appointment (Subject to Change). TA office hours are held during the problem sessions and by request.

You can drop by my office anytime, but if you want to make sure I’m available, email me to arrange an appointment. My door is open, and I will make every effort to meet with you at a convenient time.

**Late Assignments**

Assignments will not be accepted after the due date, except for University-excused absences. In the case of an excused absence, the assignment is due within 24 hours of your return to school. (For extended absences with multiple missed assignments, talk to the instructor.)

**Incomplete Grades**

Incomplete grades will be assigned when a student cannot complete the course due to unforeseeable conflicts or obstacles. Incomplete grades will normally be made up by completing the work during the following semester, on a schedule agreed upon by student and instructor.
**Missed Quizzes and Exams**

Attendance at all exams is mandatory. Only University-approved excuses will be accepted, provided that they are accompanied by the appropriate official documentation. Makeup exams may be given for excused absences at the discretion of the instructor. If you miss an exam without an acceptable excuse, you will receive a zero for that exam.

For more information about University-approved absences, see:  
http://policies.ncsu.edu/regulation/reg-02-20-03

**Regrading Requests**

If you have discussed your grading on an assignment with your TA and are still not satisfied, you may submit a request to me within **one (1) week** of the graded assignment being returned to you. You must write a cover sheet explaining why you feel you deserve additional points on a given problem, attach it to the front of your graded paper, and give it to me either in class or my office. Regrading requests will **NOT** be considered more than one week after the assignments are returned.

**Academic Integrity**

Consultation on assignments is encouraged, but copying of solutions is not. Evidence of copying or any other use of unauthorized aid on exams, homework, programming assignments, or problem sessions will be investigated and potentially referred to the Office of Student Conduct as a violation of the Code of Student Conduct.

For more information on the Code of Student Conduct, see:  
http://studentconduct.ncsu.edu  
http://policies.ncsu.edu/policy/pol-11-35-01

Any work submitted for this class (homework, problem session, exam, programming assignment) is subject to the **Honor Pledge**: “I have neither given nor received unauthorized aid on this test or assignment.” An Honor Pledge statement must be signed for every exam. For other assignments, it is the understanding and expectation of the instructor that the submission of work with your name on it means that you neither gave nor received unauthorized aid.

**Students with Disabilities**

Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. http://dso.dasa.ncsu.edu/

For more information on NC State's policy on working with students with disabilities, please see: http://policies.ncsu.edu/regulation/reg-02-20-01

**Inclement Weather**

The class will follow the University’s closure policy. If classes are not cancelled, I will make every effort to be in class on time, and so should you. Please do not send me email asking whether class is going to meet. Instead, check the University website or the weather hotline (513-8888). If possible, I will provide video material to make up for a cancelled class.

Remote sites: If your local site cancels class due to inclement weather, I do not expect you to come to class. I do, however, expect you to view the recorded lecture and submit online assignments. Extended and widespread power outages can result in deadline extensions.

**Laboratory Safety, Physical Activity, and Field Trips**

There is no laboratory, physical activity, or field trip associated with this course.

**Extra Expenses**

This course has no extra expenses beyond the costs of the required textbook and Top Hat subscription.
Transportation
As there are no field trips or internships associated with this course, there are no expected transportation requirements.

Religious Holidays
I have done my best to not schedule exams and assignments on major religious holidays. If I have accidently scheduled student assignments on a religious day for you, please let me know well in advance so we can make other arrangements.

NCSU Transgender Inclusive Act
“In an effort to affirm and respect the identities of transgender students in the classroom and beyond, please contact me if you wish to be referred to using a name and/or pronouns other than what is listed in the student directory.”

Course Evaluation
Online class evaluations will be available for students to complete during the last two weeks of class:

TBD

Students will receive an email message directing them to a website where they can login using their Unity ID and complete evaluations. All evaluations are confidential; instructors will never know how any one student responded to any question, and students will never know the ratings for any instructors.

Evaluation website:  http://go.ncsu.edu/cesurvey
Student help desk:  classeval@ncsu.edu
More information about ClassEval:  https://oirp.ncsu.edu/surveys/classeval

ABET Accreditation
Our ECE department is participating in ongoing accreditation with ABET. Your complete, graded work (exams, problem sessions, homeworks, etc.) will be randomly copied and held for this accreditation before it is returned to you.

Important Dates

Administrative:
Jan 7        First day of classes.
Jan 21       MLK Day – University Holiday
Jan 18       Census Date / Official Enrollment Date – Last day to drop without a “W”
Feb 13       Exam 1 (tentative date)
March 4      Drop/Revision Deadline
March 11-15  Spring Break
Apr 3        Exam 2 (tentative date)
Apr 19       Spring Holiday
Apr 24       Last day of classes.
Apr 29       Final Exam (8:00-11:00 am)