CSE 2100 Practical Computer Hardware/Software Systems  
Spring 2021

Instructor Information

Instructor:  
Chance Eary, Ph.D.

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ERB 647

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Ahaan Rajesh  ahaan.rajesh@mavs.uta.edu  Sections 014, 015

Course Information

Section Information:  
001-022

Time and Place of Class Meetings:  
Lectures:  Videos will be available in Canvas on demand.  
Laboratory:  ERB 132

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Description of Course Content:  
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A practical approach to hands-on computer hardware and software systems in a laboratory environment. Students will be exposed to basic engineering concepts such as simple circuits, digital logic, embedded controllers, computer networking, software design, and Linux operating systems. Prerequisite: C or better in CSE 1310.

**Student Learning Outcomes:**
Upon successful completion of this course, students will have knowledge of:

- Learning basic circuit concepts
- Use of multi-meter to measure basic circuit components
- Implementing simple combinational logic circuits and relation to discrete structures
- Implementing simple sequential logic circuits and relation to microprocessors
- Learning about simple software engineering concepts
- Learning basic source control and repository operations
- Practice in usage of common Linux commands and tools such as cat, cd, echo, grep, mkdir, rmdir, rm, dd, nano, and vim and special characters
- Basic networking concepts such are hardware addresses, IP addresses, and subnets
- Linux networking tools such as ifconfig and ping
- More experience using GCC and GDB tools
- Writing simple UDP-based network applications using C with GCC

**Communication:**

- Course updates will be published via Canvas.
- Students will use their University-provided e-mail to communicate with the instructor outside office hours.
- Students will not use Canvas Messenger to communicate with the instructor.
- Students will not use Microsoft Teams to communicate with the instructor outside office hours.
- E-mails sent to chance.eary@mavs.uta.edu will not be read.
- E-mails received after 4:00pm on a weekday will not receive a response until the next business day.
- E-mails received after 4:00pm on a Friday will not receive a response until the following Monday.

**Textbooks and Other Course Materials:**
No textbook will be required for this course. Extensive references, datasheets, application notes, and class notes will be provided in Canvas.

All students are required to have a Raspberry Pi 3b or 3b+ (with appropriate accessories to power it and make it work) for both CSE1205/2100, CSE2312, and CSE4342. The use of a Raspberry Pi 4b is not recommended at this time as it has not been thoroughly tested with all courses.

The CanaKit Raspberry Pi 3b kit has been used by many students in the past and is recommended: https://www.amazon.com/CanaKitRaspberry-Complete-Starter-Kit/dp/B01C6Q2GSY/.

Students do not need to buy the above kit, however they need to at least have a Raspberry Pi 3b motherboard, power supply, and 16GB or larger micro-SD card and reader for your PC.

In addition, students will need the following components at home to work with the Raspberry Pi 3b/3b+ natively:

1. USB keyboard and mouse (will be provided for the labs for use in the labs)
2. Monitor accepting HDMI or DVI and a proper HDMI cable

Alternatively, instead of using an monitor, keyboard, and mouse, you can configure the RPi for headless operation, using SFTP and SSH access from a PC.

Students in the online section 900 of the course should provide a USB keyboard and mouse, monitor, monitor cable for the RPi, breadboard, and an assortment of electronic components for the course. The online students will also be required to have a laptop with an Ethernet port (or Ethernet adapter) so that their RPi and PC can communicate. Most of these items can be locally sourced from the same vendor from which you purchase the RPi.
Major Assignments and Examinations:
Network-based Game Defense:
   April 26-May 1, in-person, during your lab time, during your group’s half of the lab.

Technology Requirements:
Students will need a computer capable of accessing Canvas and watching the lectures. A computer with an ethernet port may be required for connection to the RPi depending on the configuration used above.

Grading Information

Grading:
- Grade scale: A (90-100), B (80-89), C (70-79), D (60-69), and F (0-59)
- Grade calculation:
  - Lab Deliverables: 100%
- The instructor reserves the right to make reasonable changes in performance evaluation as needed.
- Any request for re-grading must be submitted to the Grader within one week of the completion of grading. If, after requesting a re-grade from the Grader and getting a response, you may refer the case to the instructor if you think further action is needed.

Labs:
- You should complete each week’s lab assignment by the end of your allocated time.
- For lab assignments with hardware components, you must show the running setup prior to leaving the lab.
- For lab assignments with software components, you must show the code running and upload your code to Canvas prior to leaving the lab.
## Course Schedule

Students will be assigned to either group A or B prior to the first day of in-person attendance via Canvas.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic (Group A)</th>
<th>Topic (Group B)</th>
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| 1     | Syllabus and Course Introduction (online asynchronous)  
*(Monday students should view this online before the 1/25 lecture)* +  
*Order Raspberry Pi 3b/3b+ and Other Class Materials this week* |                                               |
| 2     | Basic Circuits and Digital Systems (online asynchronous) +  
 *Setup Raspberry Pi 3b/3b+ (synchronous in lab)* |                                               |
| 3     | Digital Lab (Part 1) (synchronous in lab) | Introduction to the Linux Command Line (online asynchronous) |
| 4     | Introduction to the Linux Command Line (online asynchronous) | Digital Lab (Part 1) (synchronous in lab) |
| 5     | Weather Shutdown |                                             |
| 6     | Make-up Week (in lab only if necessary) |                                             |
| 7     | Digital Lab (Part 2) (synchronous in lab) | Networks and Using Git (online asynchronous) |
| 8     | Networks and Using Git (online asynchronous) | Digital Lab (Part 2) (synchronous in lab) |
| 9     | Basic I/O Interfacing and Virtualization (online asynchronous) +  
*Connecting the RPi to the Outside World (synchronous in lab)* |                                             |
| 10    | Overview of the Project and Deliverables (online asynchronous) |                                             |
| 11    | Project Work Day 1 (synchronous in first 40 minutes of lab) | Project Work Day 1 (synchronous in last 40 minutes of lab) |
| 12    | Project Work Day 2 (synchronous in first 40 minutes of lab) | Project Work Day 2 (synchronous in last 40 minutes of lab) |
| 13    | Project Work Day 3 (synchronous in first 40 minutes of lab) | Project Work Day 3 (synchronous in last 40 minutes of lab) |
| 14    | Project Defense Day (synchronous in first 40 minutes of lab) | Project Defense Day (synchronous in last 40 minutes of lab) |

The instructor reserves the right to make changes in the schedule as needed as the class progresses.
The official dates for registration, census, and dropping are available at [www.uta.edu/acadcal](http://www.uta.edu/acadcal).

**Academic Integrity**

This information is copied from [http://www.uta.edu/conduct/academic-integrity/index.php](http://www.uta.edu/conduct/academic-integrity/index.php).

The University of Texas at Arlington strives to uphold and support standards of personal honesty and integrity for all students consistent with the goals of a community of scholars and students seeking knowledge and responsibility. Furthermore, it is the policy of the University to enforce these standards through fair and objective procedures governing instances of alleged dishonesty, cheating, and other academic/non-academic misconduct.

Scholastic dishonesty includes, but is not limited to, cheating, plagiarism, and collusion on an examination or an assignment being offered for credit. Each student is accountable for work submitted for credit, including group projects.

- **Cheating**
  - Copying another's test or assignment (added note: remember this includes homework!)
  - Communication with another during an exam or assignment (i.e. written, oral or otherwise)
  - Giving or seeking aid from another when not permitted by the instructor
  - Possessing or using unauthorized materials during the test
  - Buying, using, stealing, transporting, or soliciting a test, draft of a test, or answer key
- **Plagiarism**
  - Using someone else's work in your assignment without appropriate acknowledgment
  - Making slight variations in the language and then failing to give credit to the source
- **Collusion**
  - Without authorization, collaborating with another when preparing an assignment

**Safety Rules for ERB 124, 125, 126, 127, and 132 Labs:**

**Scope:**

- All UTA safety rules and regulations must be followed.
- These rules are in addition to UTA lab safety rules.
- In the event that a rule contained below is in conflict with UTA lab safety rules, the UTA safety rules shall supersede.

**General rules:**

- Students can only be in the lab when a graduate teaching assistant (GTA), faculty member, or staff member is present.
- Students should be professional at all times in the lab.
- Food and drinks are not allowed in the lab at any time.
- When leaving the lab, all work surfaces and floors should be clear of breadboards, cables, wires, and tools prior to leaving.
- When leaving the bench, turn off all lab equipment and unplug soldering irons.
- When leaving the bench, make sure that all cables, tools, and soldering equipment are properly stored in the correct location.
- Please ensure that the lab is kept in a neat and tidy manner.
- Please pick up any loose wires or parts on the bench and floor before leaving the lab. There is a push broom and dust pan in each room.
- Note any hazards observed in the lab to the GTA, faculty, or staff member immediately.
For test equipment incorporating multi-language menus, such as oscilloscopes, please return the language to English before leaving the bench.

When returning parts that are not consumables, make certain that the parts are returned to the correct drawer. If you are not certain, please leave them with the GTA, faculty member, or staff member.

Students should store backpacks and similar items in a way that does not create a trip hazard to others.

Personal protective equipment (PPE):

- Safety glasses must be worn at all times when using the soldering irons or using cutting tools, such as diagonal cutters, in the lab.
- Face masks must be worn at all times in the lab.

Soldering irons:

- Soldering must be performed in the labs only at the soldering benches.
- Soldering irons should be used with care, while wearing safety glasses, and only after receiving training.
- When soldering and removing parts, or reworking a board, please use special care to ensure that solder is not splattered.
- Soldering irons must be placed back in their soldering station holder when not soldering to prevent the chance of injury or fire.
- Please keep the soldering station sponges wet when cleaning the iron tip but ensure that water is not spilled on the floor creating a slip hazard.
- Use the soldering iron smoke absorber fan units when soldering. Use them in the horizontal position to prevent directing air flow across the table into the face of another user.
- Some solders can contain lead, so wash hands thoroughly after using the soldering irons. No eating or drinking is allowed in the lab, as previously stated.
- No self-contained butane soldering irons are permitted.

Hand tools:

- Hand tools must be used with care and only when safety glasses are being worn.
- Diagonal cutters in particular can create tension on the wires during the cutting process, ejecting the loose wire, so please use special care.

Small powered rotary tools:

- Short use of powered cutting tools such as “Dremel” or small drill/driver can only be used at the soldering tables using a backup board to prevent damage to the tables.
- Jewelry, necklaces, and lanyards should be removed.
- Long hair should be tied back to prevent being caught in the tool.
- For extended machining tasks, please use the designated Makerspace areas that are designed to handle the additional safety requirements and dust inhalation hazards instead.

Electrical hazards:

- The labs for these classes use voltages of 30V or less, but care must always be shown in using electrical circuits, regardless of the voltage.
- Do not use voltages of more than 30V unless approved in writing by the instructor.
- Do not modify the wiring or attempt repair of any lab equipment.
- Most of the lab equipment operates from 120V AC, which is a lethal voltage. Never pull on a cord to unplug it as this can cause damage to the strain relief and insulation, potentially resulting in exposed conductors.
- Please notify the GTA, faculty member, or staff member and stop using the equipment immediately if you see nicks or damage to a power cord.

Computers:
• Students should not install any software on the lab computers without approval of the GTA, faculty member, or staff member.
• Students should not remove any of the cables on the computer and the monitor on the bench.
• For external connection, an HDMI cable is provided at each workstation for configuring Raspberry Pi and similar computer hardware. This cable should not be disconnected from the monitor.

Institution Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (http://www.uta.edu/provost/administrative-forms/course-syllabus/index.php) which includes the following policies among others:

• Drop Policy
• Disability Accommodations
• Title IX Policy
• Academic Integrity
• Student Feedback Survey
• Final Exam Schedule

Additional Information

Mandatory Face Covering Policy:
All students and instructional staff are required to wear facial coverings while they are on campus, inside buildings and classrooms. Students that fail to comply with the facial covering requirement will be asked to leave the class session. If students need masks, they may obtain them at the Central Library, the E.H. Hereford University Center’s front desk or in their department. Students who refuse to wear a facial covering in class will be asked to leave the session by the instructor, and, if the student refuses to leave, they may be reported to UTA’s Office of Student Conduct.

Attendance:
At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students’ academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients “begin attendance in a course.” UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

Emergency Exit Procedures:
Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Success Programs:
UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring by appointment, drop-in tutoring, etutoring, supplemental instruction, mentoring (time management, study skills, etc.), success coaching, TRIO Student Support Services, and
student success workshops. For additional information, please email resources@uta.edu, or view the Maverick Resources website.

Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381