

# COSC2325-003 Course Syllabus

**Title:** Computer Architecture and Machine Language  
**Instructor:** Roie R. Black  
**Term:** Spring 2018 (16 week)  
**Synonym:** 57761  
**Start Date:** Jan 17, 2017  
**website:** <http://www.co-pylit.org/classes/fall2017/cosc2325-001>

## Basic Course Information

### Course Description:

The organization of computer systems is introduced using assembly language. Topics include basic concepts of computer architecture and organization, memory hierarchy, data types, computer arithmetic, control structures, interrupt handling, instruction sets, performance metrics, and the mechanics of testing and debugging computer systems. Embedded systems and device interfacing are introduced

### Course Prerequisites:

COSC 1336 - Programming Fundamentals I or department approval.

### Required Text:



| Author(s) | title                            | ISBN          | Publisher |
|-----------|----------------------------------|---------------|-----------|
| Patterson | Computer Organization and Design | 9780128017333 | Elsevier  |

### Instructor Information

|        |  |
|--------|--|
| Name   | Roie R. Black  |
| email  | <a href="mailto:rblack@austincc.edu">rblack@austincc.edu</a> |
| Phone  | 512-223-3199   |
| Office | not available  |

### Class meetings

| Event   | Day | Time             | Room      |
|---------|-----|------------------|-----------|
| lecture | MW  | 12:30pm - 1:25pm | SAC1-1208 |
| Lab     | MW  | 1:25pm - 3:10pm  | SAC1-1208 |

### Office Hours

| Day | Time             | Room                   |
|-----|------------------|------------------------|
| TTh | 8:30am - 9:15am  | NRG 4212 (or open lab) |
| TTh | 11:45am - 1:00pm | NRG 4212 (or open lab) |
| MW  | 10:30am-12:30pm  | SAC 1208 or open lab   |

These times are available for both classroom and distance students. If you plan on stopping by during these periods, please let me know by email, as I might be at SAC instead of HLC. Contact me by email to arrange meetings at other times. I can meet you at either SAC or NRG this term.

### Instructional Methodology:

This course will have 2.4 hours of lecture and 2 hours of lab per week. If the students are unable to finish the assigned lab work within the lab time, they will need to visit the CIS open labs. Teaching methodology will be to use a hybrid approach utilizing traditional in-class lectures and lab sessions coupled with distance-learning techniques utilizing computers and the Internet. The students will be expected to use the lab workstations for all homework submissions. Submission techniques will be taught during the first few lectures. No homework will be accepted through any submission channel except through the class lab workstations! Exams will be given in class.

### Course Rationale:

This course is required as part of the Associate of Applied Science degree.

## Degree Plans:

- This course will transfer in some form to other colleges.

## Learning Outcomes/Course Objectives:

1. Explain contemporary computer system organization.
2. Describe data representation in digital computers.
3. Explain the concepts of memory hierarchy, interrupt processing, and input/output mechanisms.
4. Measure the performance of a computer system.
5. Design and develop assembly language applications.
6. Explain the interfaces between software and hardware components.
7. Explain the design of instruction set architectures.
8. Develop a single - cycle processor.
9. Explain the concept of virtual memory and how it is realized in hardware and software.
10. Explain the concepts of operating system virtualization

### Note

In this course, we will also explore tools all modern developers should be able to use. Specifically, we will use *virtual machines* and *source code control systems* for class projects.

## Scans Competencies:

Maintained in Computer Studies office (RGC1-113)

## Grading Policies

### Grading Policy:

Grade will be based both on concepts and practical application. Exams, quizzes and homework assignments may be a part of the grade. An overall grade will be assigned based on the following grading scale:

| Percentage | Letter Grade |
|------------|--------------|
| 90%-100%   | A            |
| 80%-89%    | B            |
| 70%-79%    | C            |
| 60%-69%    | D            |
| 0%-59%     | F            |

### Point Values:

| <b>Item</b>         | <b>Points</b> |
|---------------------|---------------|
| Orientation Exam    | 50            |
| Exams (2)           | 200 ea = 400  |
| Labs (12)           | 15 ea = 180   |
| Homework (10)       | 10 ea = 100   |
| Group Projects (2)  | 100 ea = 200  |
| Class participation | 70            |
| <b>Total</b>        | 1000          |

### **Lab grade computation:**

|                                     |            |
|-------------------------------------|------------|
| Compile with no errors              | 15 percent |
| Run with no errors                  | 15 percent |
| Produce correct output              | 20 percent |
| Algorithm design                    | 20 percent |
| Follow recommended style guidelines | 15 percent |
| Includes documentation              | 15 percent |

Each homework or lab project is due one week following the class in which the task is assigned. (For distance students, the assignment date will be Sunday of the week the assignment is posted.) Late assignments will be accepted for one week with a late penalty of 20%. Any work received more than one week after the due date will receive at most 50% of the possible grade. Scheduling of computer time outside of regular lab time is the student's responsibility. Availability of computers is NOT an excuse for being late with any assignment. The last date to submit assignments for consideration this semester is Dec 17.

### **Incomplete Grade:**

A student may receive a temporary grade of **I** (Incomplete) at the end of the semester only if ALL of the following conditions are satisfied:

1. The student is unable to complete the course during the semester due to circumstances beyond their control.
2. The student must have earned at least half of the grade points needed for a **C** by the end of the semester.
3. The request for the grade must be made in person at the instructor's office and necessary documents completed.
4. To remove an **I**, the student must complete the course by two weeks before the end of the following semester. Failure to do so will result in the grade automatically reverting to an **F**.

## **General Class Policies**

### **Attendance Policy:**

For on-campus courses, attendance will be taken during each lecture session. You are expected to attend classes regularly. If you miss a class, you are still responsible for any material covered in that class.

For distance classes, attendance points will be assigned based on email correspondence and on-time homework/lab submissions.

### **Class Preparation:**

Students are expected to read and study the assigned material, per the course schedule, BEFORE each class.

### **Scheduling Computer Time**

Scheduling of computer time outside of regular lab time is the Student's responsibility. Availability of computers is NOT an excuse for being late with a lab project assignment.

### **Testing Policies:**

All courses will require that you take tests to verify that you have learned the material being presented. In my classes, these tests will be in one of these forms:

- In class, multiple choice: you are required to bring a green ScanTron form to class to record your answers.
- In class, short answer: I will provide a printed test with space for you to write your answer. You are not allowed to use any other paper for your answers.
- Distance, any kind: Distance students are required to take tests in an approved ACC Testing center. (See <http://www.austincc.edu/campus-contacts> to find the currently approved center locations.) The test will be taken using the Respondus system. You will log into a "lock-down browser" and view the test in that browser. You will enter your answers in either text boxes, or check boxes in the test pages. Note that it is difficult to enter examples of program code in this system, but this is the only school-approved system we have for distance classes.

Unless specifically told otherwise, all tests are closed-book tests. I do allow using any reference materials for lab assignments associated with a test, but there will be a time limit to complete the work.

### **Missed Exams**

Missed EXAMS must be made up no later than the next scheduled class period. Exams can be missed only for extreme circumstances (Example: hospitalization). Please contact the instructor IN ADVANCE if you will miss one of the exams. There are NO make up exams for un-excused absences. Only one exam may be taken as a make up exam.

### **Incomplete Grade:**

A student may receive a temporary grade of **I** (Incomplete) at the end of the semester only if ALL of the following conditions are satisfied:

1. The student is unable to complete the course during the semester due to circumstances beyond their control.
2. The student must have earned at least half of the grade points needed for a **C** by the end of the semester.
3. The request for the grade must be made in person at the instructor's office and necessary documents completed.
4. To remove an **I**, the student must complete the course by two weeks before the end of the following semester. Failure to do so will result in the grade automatically reverting to an **F**.

### **School Policies**

#### **Academic Integrity**

A student is expected to complete his or her own projects and tests. Students are responsible for observing the policy on academic integrity described in the Current ACC Student Handbook, under "Student Discipline Policy, Section C".

#### **Freedom of Expression:**

It is expected that faculty and students will respect the views of others when expressed in classroom, or in discussion groups on class websites or Blackboard.

#### **Prohibited Acts :**

Acts prohibited by the college for which discipline may be administered include scholastic dishonesty, including but not limited to cheating on an exam or quiz, plagiarizing, and unauthorized collaboration with another in preparing outside work. Academic work submitted by students shall be the result of their own thought, research or self-expression. Academic work is defined as, but not limited to tests, quizzes, whether taken electronically or on paper; projects, either individual or group; classroom presentations, and homework.

#### **Students with Disabilities:**

Each ACC campus offers support services for students with documented physical or psychological disabilities. Students with disabilities must request reasonable accommodations through the Office for Students with Disabilities on the campus where they expect to take the majority of their classes. Students are encouraged to make this request three weeks before the start of the semester. (Refer to the Current ACC Student Handbook) "Communications"

Please let me know as soon as you can (before the need arises) that you need accommodation. I will work with you to make sure you can get this course done as effectively as possible.

## Communications

### Note

For most of my courses, I post lecture materials, and assignments on my class website. Navigate to [Roie Black's ACC Website](#) to find links for your class. For some of my courses lecture materials and assignments will be found on Blackboard. Grades for all classes will be posted on Blackboard.

The ACC online Blackboard system ([Blackboard](#)) and the ACC e-mail accounts will be used as the official communication system during this semester. Lecture notes, handouts, changes to course schedule or assignments and your grades will be posted on Blackboard and all email communication will be via the ACC e-mail accounts. All students are expected to check both Blackboard and their ACC e-mail accounts on a regular basis. For information on how to log onto Blackboard and ACC e-mail, please visit the following sites:

- [Student Support](#)
- [Student Email](#)

## Safety Statement

Each student is expected to learn and comply with ACC environmental, health and safety procedures and agree to follow ACC safety policies. Emergency posters and Campus Safety Plans are posted in each classroom. Additional information about safety procedures and how to sign up to be notified in case of an emergency can be found at [Emergency Notifications](#).

Anyone who thoughtlessly or intentionally jeopardizes the health or safety of another individual will be immediately dismissed from the day's activity, may be withdrawn from the class, and / or barred from attending future activities.

## Concealed Handgun Policy Statement:

Concealed Handgun Policy The Austin Community College District concealed handgun policy ensures compliance with Section 411.2031 of the Texas Government Code (also known as the Campus Carry Law), while maintaining ACC's commitment to provide a safe environment for its students, faculty, staff, and visitors. Beginning August 1, 2017, individuals who are licensed to carry (LTC) may do so on campus premises except in locations and at activities prohibited by state or federal law, or the college's concealed handgun policy. It is the responsibility of license holders to conceal their handguns at all times. Persons who see a handgun on campus are asked to contact the ACC Police Department by dialing 222 from a campus phone or 512-223-7999

## Testing Center Policy(Open Campus sections only)

The academic testing center is to be used for regular testing of open campus students only. All other sections will use the classroom time for regular testing and the testing center may be used to administer make-up tests.

### Privacy Policy:

The information stored on your student drives in the lab may be viewed by the instructor or lab technicians for academic and educational reasons.

### Dishonesty:

For this course, the penalty for scholastic dishonesty is a grade of **F** for the course.

### Withdrawal Policy:

Regular and punctual class and laboratory attendance is expected of all students. If attendance or compliance with other course policies is unsatisfactory, the instructor may withdraw students from the class.

It is the student's responsibility to complete a Withdrawal Form in the Admissions Office if they wish to withdraw from this class. The last date to withdraw for this semester is Apr 23, 2018. It is not the responsibility of the instructor to withdraw the students from their class even though the instructor has the prerogative to do so under the above listed circumstances.

### Tentative Class Schedule

| Week | Date | Topic   | Reading                        | Lab/HW                            | Due  |
|------|------|---|--------------------------------|-----------------------------------|------|
| 1    | 1/14 | Intro, Getting Started ( <a href="#">Lecture1</a> )                     | Syllabus, Ch1.1-1.5            | Exam 0, <a href="#">Week1Labs</a> | 1/21 |
| 2    | 1/21 | Von Neumann Machines, Performance ( <a href="#">Lecture2</a> )          | Ch 1.6-1.10                    | <a href="#">Week2Labs</a>         | 1/28 |
| 3    | 1/28 | Number Systems, Data Types, Basic Circuits ( <a href="#">Lecture3</a> ) | Ch 2.1-2.5                     | <a href="#">Week3Labs</a>         | 2/4  |
| 4    | 2/4  | Boolean Algebra, Digital Components ( <a href="#">Lecture4</a> )        | Ch 2.6-2.9                     | <a href="#">Week4Labs</a>         | 2/11 |
| 5    | 2/11 | CPU Simulator, <b>Exam 1 Review</b> ( <a href="#">Lecture5</a> )        | App A-D, Ch 3.1-3.5            | <a href="#">Week5Labs</a>         | 2/18 |
| 6    | 2/18 | <b>Exam 1</b>   | Lecture Notes (Simulator cont) | <a href="#">Week6Labs</a>         | 2/25 |
| 7    | 2/25 | Instruction Set Architecture ( <a href="#">Lecture6</a> )               | Ch 4.5-4.8, notes              | <a href="#">Week7Labs</a>         | 3/4  |
| 8    | 3/4  | Pentium Processor ( <a href="#">Lecture7</a> )                          | Notes                          | <a href="#">Week8Labs</a>         | 3/11 |
| 9    | 3/18 | Pentium (cont - <a href="#">Lecture7</a> )                              | Notes                          | <a href="#">Week9Labs</a>         | 3/25 |
| 10   | 3/25 | Memory Heirarchy ( <a href="#">Lecture8</a> )                           | Ch 5.1-5.5, 5.7                | <a href="#">Week10Labs</a>        | 4/1  |
| 11   | 4/1  | Cache Memory, Virtual Memory ( <a href="#">Lecture9</a> )               | Notes                          | <a href="#">Week11Labs</a>        | 4/8  |

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| <b>Week</b> | <b>Date</b> | <b>Topic</b>   | <b>Reading</b> | <b>Lab/HW</b>              | <b>Due</b> |
|-------------|-------------|--|----------------|----------------------------|------------|
| 12          | 4/8         | <b>Exam 2 Review, Exam 2</b>                               | Notes          | <a href="#">Exam2Lab</a>   | 4/15       |
| 13          | 4/15        | Enbeded System Intro<br>( <a href="#">Lecture10</a> )      | Notes          | <a href="#">Week13Labs</a> | 4/22       |
| 14          | 4/22        | Pulse Width Modulation<br>( <a href="#">lecture12</a> )    | Notes          | <a href="#">Week14Labs</a> | 4/29       |
| 15          | 4/29        | Interrupts, Multi-tasking<br>( <a href="#">lecture13</a> ) | Notes          | <a href="#">Week15Labs</a> | 5/6        |
| 16          | 5/6         | <b>Group Project Demo</b>                                  | Notes          | ".."                       | 5/13       |
| 5/13        |             | <b>Last day to submit work<br/>for grading</b>             |                |                            |            |