Computer Architecture (COSC 2334.002)
Department of Computing Sciences
Spring 2019

A. COURSE INFORMATION

Course number/section: COSC 2334/002
Class meeting time: MW 2:00 – 3:15 pm
Class location: IH-156
Course Website: Blackboard website

B. INSTRUCTOR INFORMATION

Instructor: Sayed Atef Banawan
Office location: CI 340
Office hours: TR 10:00 am – 12:00 pm, W 12:00 – 1:00 pm
Telephone: 361-825-2478
e-mail: sayed.banawan@tamucc.edu
Appointments: By e-mail

C. COURSE DESCRIPTION

Catalog Course Description

COSC 2334 - Computer Architecture 3 sem. hrs. (3:0) A concentrated study of internal computer concepts. Computer organization, machine and assembly language are emphasized.

Extended Course Description
An overview of computer architecture, which stresses the underlying design principles and the impact of these principles on computer performance. General topics include design methodology, processor design, control design, memory organization, system organization, and parallel processing.

D. PREREQUISITES AND COREQUISITES

Prerequisites
COSC 1435 (Introduction to Problem Solving with Computers I) and MATH 2305 (Discrete Mathematics I). If you do not have the prerequisites (or equivalents from another university) shown on your TAMUCC records, you may be dropped from class at any time.

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
- Computer System Architecture (3rd Ed.), M. Morris Mano, Publisher: Pearson;
F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to:

1. Describe how data is represented internally in different computer platforms.
2. Explain functions of various logic gates and flip-flops that are used in the design of digital components.
3. Apply K-maps and Boolean Algebraic techniques in designing simplified digital circuits.
4. Explain functions and usages of various digital components such as decoders, encoders, multiplexers, adders, flip-flops, registers, etc. and use them in design.
5. Design a simple Arithmetic Logic Unit (ALU) using components such as adders, multiplexers, etc.
6. Apply processor design techniques to control unit design.
7. Explain various architectures of computer systems including accumulator machines, stack machines and general purpose register machines, instruction types, instruction formats, and addressing modes.
8. Describe the organization of the memory subsystem and techniques to enhance its performance via cache memory.
9. Explain techniques of pipelining used in computer architecture.

Assessment of course learning outcomes will be conducted through quizzes, exams and homework assignments.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Lectures using online electronic documents and slides.

H. MAJOR COURSE REQUIREMENTS AND GRADING

This is a difficult course that demands all students attend all classes! Regular completion of
all reading, homework, and other outside assignments, are absolutely essential for success in
this course.

Your course grade will be decided on your performance in the homework assignments, quizzes, and two exams. The distribution of points is as follows:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>60</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15</td>
</tr>
<tr>
<td>Homework Assignments</td>
<td>20</td>
</tr>
<tr>
<td>Attendance and participation</td>
<td>5</td>
</tr>
</tbody>
</table>

**Grading scale:** A: 100-90, B: 89-80, C: 79-70, D: 69-60, and F: 59-0.

**Homework Assignments:** Approximately 6-9 homework assignments will be given. No late homework assignments will be accepted. Partial credit will be given for incomplete assignments.

**Quizzes:** There may be 2-4 (possibly pop-up) quizzes. A quiz typically covers a chapter and may take 10-30 minutes.

**Exams:** The first exam will be given on Wednesday, February 20th, 2019, the second exam will be given on Wednesday, April 3rd, 2019 during the scheduled class time, and the final exam will be given (as per the university schedule) on Wednesday, May 8th, 2019 from 1:45–4:15 pm.

### I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Data Representation</td>
<td>Chapter 3</td>
<td>HW1</td>
</tr>
<tr>
<td>Weeks 2-5</td>
<td>Boolean Algebra, Map Simplification, Combinational Circuits, Sequential Circuits.</td>
<td>Chapter 1</td>
<td>HW2,HW3,HW4</td>
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<tr>
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<td><strong>Exam 1 on Wednesday, February 20, 2019</strong></td>
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<tr>
<td>Weeks 6-7</td>
<td>Digital Components</td>
<td>Chapter 2</td>
<td>HW5</td>
</tr>
<tr>
<td>Weeks 8-9</td>
<td>Register Transfer and Microoperations</td>
<td>Chapter 4</td>
<td>HW6</td>
</tr>
<tr>
<td>Weeks 10-11</td>
<td>Central Processing Unit</td>
<td>Chapter 8</td>
<td>HW7</td>
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<tr>
<td></td>
<td><strong>Exam 2 on Wednesday, April 03, 2019</strong></td>
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<td></td>
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<tr>
<td>Weeks 12-13</td>
<td>Basic Computer Organization and Design</td>
<td>Chapter 5</td>
<td>HW8</td>
</tr>
<tr>
<td>Weeks 14-16</td>
<td>Pipeline and Vector Processing, Memory Organization</td>
<td>Chapter 9, Chapter 12</td>
<td>HW9</td>
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<tr>
<td></td>
<td><strong>Final Exam (per university schedule) on Wednesday, May 08, 2019 from 1:45 4:15 PM.</strong></td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. **COURSE POLICIES**

**Attendance/Tardiness:** You must attend all classes and arrive on time. 5% of the overall course grade is allocated for attendance and participation. Being absent without an excuse or tardy is penalized by deducting points from the “Attendance and Participation” grade.

The class meets on Tuesday and Thursday, when new material will be presented. We will follow the text generally, but non-text material may also be included in the lectures.

You are responsible for any materials covered or handed out or announcements made for the tests and assignments in your absence.

The assignments and exams will be given during the class hours. You are responsible for all the material presented during the lecture.

**Late Homework:**
Late assignments are not accepted unless an excuse approved by the instructor is submitted to justify the delay.

**Exams:**
Exams will cover all lecture and reading material discussed in the class. Exams must be taken on the hour they are scheduled. The final exam is comprehensive.

**Extra Credit:**
No extra credit.

**Cell Phone Use:**
Please refrain from using electronic devices during class, as it is distracting to not only you, but also to your instructor and peers. Silence your phones and put them away so you are not tempted to stray off task.

**Laptop Use**
Laptops, Tablets cannot be used in the class.

**Food in Class**
No food in the class or labs.

**Missed Exam:**
In the event, if you cannot attend the class to take the exam due to some emergency or some
unavoidable situation (such as serious illness, death in the family, participation in university sports, religious observations, and so on) you must notify me as soon as possible before the exam and also you must validate your absence by providing me a document (e.g., with a letter from your doctor). Once your cause is validated a make-up exam may be given or the weight of the missed exam is distributed on other assessments.

**Participation:**
You must attend all classes and arrive on time. 5% of the overall course grade is allocated for attendance and participation. Being absent without an excuse or tardy is penalized by deducting points from the “Attendance and Participation” grade.

**Grading Error:** All questions concerning a test score or grading of a returned test or assignment must be resolved within one week. It is always a good idea to keep all of your work until the end of the semester. In case of any recording errors or doubts, you may produce them for correction or verification.

**Academic Honesty Policy:** You are expected to avoid all forms of academic dishonesty as defined in Catalog. In addition, students are expected to behave in an ethical manner in all class activities. If you feel uncertain about a particular activity, please speak to me BEFORE problems arise. Ethical behavior is a requirement for passing this course. All work submitted for grading must be the student's own work. Plagiarism will result in a score of 0 (zero) for the work or dismissal from the course and the Dean of Students office will be notified. No copying from another student's work, of any class, is allowed. It is the student's duty to allow no one to copy his or her work. Anyone found cheating and/or copying, in the exams or assignments, in the instructor's opinion, will receive an automatic F for the course.

K. **COLLEGE AND UNIVERSITY POLICIES**

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic
classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. *Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.* Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you
believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.