CMPS 402
COMPUTER ARCHITECTURE
SPRING 2018

2017 - 2020 Catalog Data: CMPS 402 COMPUTER ARCHITECTURE
(Credit, 3 hour) (Lecture, 3 hours). An overview of computer systems, data representation, memory hierarchies and storage, input/output, addressing stack architecture, pipeline architecture, microprogramming, basics of pipelines and multiprocessors, and performance evaluation. Prerequisites: CMPS 302

I. COURSE INFORMATION

Course Information: CRN 24039
Rubric No CMPS 402
Section 1
Title Computer Architecture
Credit Hours 3

Lectures: 12:30 PM – 1:50 PM, MW
Henry Thurman Jr. Hall,
Lecture Classroom 206

II. TEXTBOOK AND MATERIALS


Textbooks

III. INSTRUCTOR INFORMATION

Instructor(s): Name: Yaser Banadaki, Ph.D.
Office Location: East Henry Thurman Jr. Hall, Room 114, Southern University Baton Rouge
Office Phone: 225-771-3941
Office Hours: MWF 2:00 PM – 3:00 PM
or by appointment
E-mail: yaser_banadaki@subr.edu

Course Coordinator: Dr. Yaser Banadaki

IV. COURSE LEARNING OUTCOMES

ABET Learning Outcomes:
  a. An ability to apply knowledge of computing and mathematics appropriate to the discipline

Course Objectives:
The objectives of this course are to cover:

  1. The basic knowledge of Basic Computer Organization and Design including the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.

  2. The good understanding of the Central Processing Unit: Data Representation, Fixed Point Numbers, and Computer Arithmetic as well as Memory Hierarchy Design: Memory Technology – RAM, ROM; Memory Systems; Cache Memory Design; Virtual Memory.

Course Learning Outcomes:
Upon completion of this course, students will be able to:
1. demonstrate the ability to identify the basic computer architecture components such as control unit, arithmetic and logical unit, memory unit and I/O units.
2. demonstrate the ability to identify the duties of central processing unit with regard to data representation, fixed point numbers, and computer arithmetic as well as the structure of memory hierarchy and system design including RAM, ROM, cache and virtual memories.
3. demonstrate the ability to identify the input and output organization with regard to external devices, I/O modules, I/O communication methods: programmed I/O, interrupt-driven I/O, and direct memory access.

Course Educational Strategies:
1. Provide clear lectures and discussions of appropriate computer architecture concepts.
2. Provide students with the opportunity to learn course material through reading and homework assignments.
3. Allow students to demonstrate mastery of the course concepts through submitted exercises such as exams, quizzes, and homework problems.
4. Provide students with the opportunity to learn more about the components of computer architecture through understanding their tasks and procedure in computer organization.

V. COURSE OUTLINE

Course Topics:
This course will cover the following topics (with tentative time throughout the semester):
1. Introduction 2 classes
2. Computer evolution and performance 3 classes
3. A top-level view of computer function and interconnection 3 classes
4. Cache memory 2 classes
5. Internal memory 2 classes
6. External memory 2 classes
7. Input / Output 3 classes
8. Operating system support 3 classes
9. Computer arithmetic 3 classes
10. Digital Logic 3 classes
11. Instruction Sets: Characteristics, Functions, Addressing Modes and Formats 3 classes

VI. EVALUATION AND GRADING

Grading Distribution
A student’s grade at the end of the semester will be determined by following percentages:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Class participation/Activities</td>
<td>10%</td>
</tr>
<tr>
<td>Assignments/Quizzes/Projects</td>
<td>10%</td>
</tr>
<tr>
<td>Exam-1</td>
<td>15%</td>
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<tr>
<td>Exam-2 (Midterm exam)</td>
<td>20%</td>
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<tr>
<td>Exam-3</td>
<td>15%</td>
</tr>
<tr>
<td>Exam-4 (Final exam)</td>
<td>30%</td>
</tr>
</tbody>
</table>

Students will demonstrate knowledge of the subject through 3 tests, 5 assignments, and the final exam.

Grading Scale
Course grades at the end of the semester will be given based upon performance using the standard grading scale:

- 90–100%  A
- 80–89%  B
- 70–79%  C
- 60–69%  D
- Below 60%  F

Grades may be curved at the end of session at the instructor’s discretion.
VII. COURSE RULES AND PROCEDURES

Exam policy: Exams will emphasize concepts developed in the course. Exams will be closed book and notes unless stated otherwise (if formulas, tables, etc. are needed, the instructor will supply them). Students will not be able to leave the classroom while they are taking an exam. There will be no sharing of any materials (including calculators) during exams. Communicating to one another is not permitted while taking an exam. If there are questions, they should be directed to the instructor. Students who communicate to one another will receive a zero for that exam.

Attendance policy and class participation: Students are expected to be present and on time and participate in class from the beginning throughout the end of the class period. Though attendance is strongly encouraged, merely attending classes does not guarantee a passing grade. It is every student responsibility to make sure that he/she signs the roll in class when one is provided, or he/she pays attention during the roll call.

Makeup test or exam: No makeup test or exam will be given except in the case of emergency such as the student being sick, or he/she is unable to come to class due to some unforeseen event. An official proof MUST be presented to the instructor and student is required to take the makeup test/exam as soon he/she returns to class in the following class session. Failure to comply will result in the grade of zero (0) for the test/exam.

Use of electronic devices while in class: Students are not allowed to use the classroom computers or laptop during the lectures unless authorized by the instructor of this course for the purpose of the course. Please turn off (or place on silence) your cellular phones before the lecture starts.

Missing or late assignments/quizzes/exams: At the instructor’s discretion, students may be given opportunity for late submission of an assignment or retake of a quiz or exam upon presentation of a valid excuse.

Academic honesty and plagiarism: Please review the Southern University – Baton Rouge Student Handbook for information regarding the university’s academic conduct policy and what constitutes plagiarism. Academic dishonesty and plagiarism will NOT be tolerated.

Assignment policy: Students are NOT allowed to share their assignments or to communicate during the tests or exam. No late assignment will be accepted and no make up for assignments and quizzes.

Change to syllabus: Any aspects of this syllabus may be subject to change. However, any substantive changes affecting distribution of grades for various components of the course will be accompanied with prior notice given to students via class announcement and Blackboard announcement or email.

Livetext Access: Each student is required to have access to LiveText. Southern University and A&M College-Baton Rouge has entered into partnership with LiveText, Inc. to provide online academic resources for student collaboration and learning outcomes assessment. Therefore, all students enrolled in this course are required to purchase a subscription from LiveText, Inc. through the Southern University Bookstore. LiveText, Inc. provides students with the electronic tools and services needed to serve them in their courses and in their career or academic pursuits beyond graduation.

Moodle Access: Southern University and A&M College at Baton Rouge will used Moodle extensively in this course. Moodle is a learning management system designed to help teachers and students communicate effectively online. The course syllabus, class materials (e.g., handouts, PowerPoint slides, journal articles, assignments, readings, etc.) will be placed on Moodle. The student should check Moodle DAILY for all assignments submitted via Moodle. All course communications will be primarily via SUBR email or Moodle. Students are responsible for regularly checking their emails and Moodle. If the student has problems with his Moodle account, he/she should contact Ms. Chrisena Williams-Brown in the Division of Information Technology via email at chrisena_williams@subr.edu or via phone at (225) 771-5017.

Academic Dishonesty: The University defines academic dishonesty as premeditated and un-premeditated fraudulent behavior. Premeditated fraud is defined as conscious, pre-planned, deliberate cheating with materials prepared in advance. Unpremeditated fraud is defined as cheating without the benefit of materials prepared in advance. See the Southern University and A & M College Catalog for a more detailed definition of academic dishonesty. In addition, administrative regulations governing the conduct of students enrolled at the University are contained in the Code of Student Conduct. A copy of the Code of Student Conduct may be obtained from the Office for Student Affairs.

ADA Compliance: Students with documented disabilities who believe that they may need accommodations in this class are encouraged to contact the Disability Services Coordinator in the Office of Disability services, 234 A.C. Blanks Hall, 225-771-3950 (Voice/TTD), 225-771-5652 (Fax), as soon as possible to ensure that such accommodations are implemented in a timely fashion. Students who need accommodations must be registered with the Office of Disability Services. Students are responsible for informing the instructor of any instructional accommodations and/or special learning needs at the beginning of the semester. All discussions will remain confidential.
### VIII. COURSE ASSESSMENT

<table>
<thead>
<tr>
<th>Course Objectives</th>
<th>Course Learning Outcomes</th>
<th>Methods of Assessment</th>
<th>Target</th>
<th>Relationship to Program Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective 1: The knowledge of basic computer organization and design including the organization of the control unit, the arithmetic and logical unit, the memory unit and the I/O unit.</td>
<td>Students will demonstrate the ability to classify the basic computer architecture components such as control unit, arithmetic and logical unit, memory unit and I/O units.</td>
<td>Outcome Rubric a will be assessed through 3 tests, 5 assignments, and the final exam</td>
<td>70% will perform at the level of performance 2, 3 or 4 in achieving Outcome a</td>
<td>Outcome a</td>
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<td>Objective 2: Students will be able to describe the function(s) of central processing unit: data representation, fixed point numbers, and computer arithmetic as well as memory hierarchy design: memory technology – RAM, ROM; memory systems; cache memory design; virtual memory.</td>
<td>Students will demonstrate the ability to identify the duties of central processing unit with regard to data representation, fixed point numbers, and computer arithmetic as well as the structure of memory hierarchy and system design including RAM, ROM, cache and virtual memories.</td>
<td>Outcome Rubric a will be assessed through 3 tests, 5 assignments, and the final exam</td>
<td>70% will perform at the level of performance 2, 3 or 4 in achieving Outcome a</td>
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<td>Objective 3: The knowledge of input and output organization: external devices; I/O modules; I/O communication methods: programmed I/O, interrupt-driven I/O, and DMA: direct memory access.</td>
<td>Students will demonstrate the ability to identify the input and output organization with regard to external devices, I/O modules, I/O communication methods: programmed I/O, interrupt-driven I/O, and direct memory access.</td>
<td>Outcome Rubric a will be assessed through 3 tests, 5 assignments, and the final exam</td>
<td>70% will perform at the level of performance 2, 3 or 4 in achieving Outcome a</td>
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