

**CIIC 4082 - Course Syllabus**

**1. General Information:**

Alpha-numeric codification: CIIC 4082  
Course Title: Computer Architecture II  
Number of credits: 3  
Contact Period: 3 hours of lecture per week

**2. Course Description:**

**English:** Study of fundamental computer architecture concepts with the objective of designing efficient processors and computing systems to support operating systems and high-level programming languages. Topics include: subroutines, exceptions, input/output, pipelining, and hierarchical memories. Practice with analysis, design, and programming problems.

**Spanish:** Estudio de conceptos fundamentales de arquitectura de computadoras con el objetivo de diseñar procesadores y sistemas computacionales eficientes para apoyar sistemas operativos y lenguajes de programación de alto nivel. Los temas incluyen: subrutinas, excepciones, entrada/salida, "pipelining" y memorias jerárquicas. Práctica con problemas de análisis, diseño y programación.

**3. Pre/Co-requisites and other requirements:**

Prerequisites: CIIC 3081

**4. Course Objectives:**

Students will learn the techniques necessary to evaluate and design computing systems that satisfy the requirements of modern operating systems and programming languages.

**5. Instructional Strategies:**

☐conference ☐discussion ☐computation ☐laboratory  
☐seminar with formal presentation ☐seminar without formal presentation ☐workshop  
☐art workshop ☐practice ☐trip ☐thesis ☐special problems ☐tutoring  
☐research ☐other, please specify:

**6. Minimum or Required Resources Available:**

Students will use the Departmental computer laboratories to complete course projects.

**7. Course time frame and thematic outline**

Outline	Contact Hours
Instruction sets	7
Machine code and assembly language	6
Memory hierarchy	4
Pipelining	6
Input/Output system	6
Computer Arithmetic	6
Architectural support for operating systems and programming languages	7
Exams	3
<b>Total hours: (equivalent to contact period)</b>	<b>45</b>

**8. Grading System**

☐ Quantifiable (letters) ☐ Not Quantifiable

**9. Evaluation Strategies**

	Quantity	Percent
<input type="checkbox"/> Exams	3	45%
<input type="checkbox"/> Final Exam	1	30%
<input type="checkbox"/> Short Quizzes		
<input type="checkbox"/> Oral Reports		
<input type="checkbox"/> Monographies		
<input type="checkbox"/> Portfolio		
<input type="checkbox"/> Projects	1-3	25%
<input type="checkbox"/> Journals		
<input type="checkbox"/> Other, specify:		
<b>TOTAL:</b>		<b>100%</b>

**10. Bibliography:**

1. David Patterson and John Hennessy, *Computer Organization and Design: The Hardware/Software Interface*, 5th ed., Morgan-Kaufmann, 2013.
2. Andrew S. Tanenbaum and Todd Austin, *Structured Computer Organization*, 6th ed., Prentice Hall, 2012.
3. William Stallings, *Computer Organization and Architecture*, 9th ed., Prentice Hall, 2012.
4. Alan Clements, *Computer Organization & Architecture: Themes and Variations*, Cengage Learning, 2013.

### 11. Course Outcomes

Upon completion of this course the student will be able to:	<a href="#">Program Student Outcomes Impacted</a>
1. identify and use the different types of instructions and addressing modes in an instruction set to solve problems	a, b
2. analyze clock periods, performance, and instruction throughput of single-cycle, multi-cycle, and pipelined implementations of a simple instruction set	a
3. design a memory hierarchy capable of achieving a performance target given a memory access pattern	b, j
4. apply different cache associativity levels and cache line mappings to achieve a target performance level	i
5. use ISA-level arithmetic operations (integer and floating point) to solve computing problems	j
6. identify and explain the architectural structures required to support modern programming languages and operating systems	a, l
7. identify and explain different hazards and other issues in the implementation of pipelined architectures	i

### 12. According to Law 51

Students will identify themselves with the Institution and the instructor of the course for purposes of assessment (exams) accommodations. For more information please call the Student with Disabilities Office which is part of the Dean of Students office (Office #4) at (787)265-3862 or (787)832-4040 extensions 3250 or 3258.

### 13. Academic Integrity

-The University of Puerto Rico promotes the highest standards of academic and scientific integrity. Article 6.2 of the UPR Students General Bylaws (Board of Trustees Certification 13, 2009-2010) states that academic dishonesty includes, but is not limited to: fraudulent actions; obtaining grades or academic

degrees by false or fraudulent simulations; copying the whole or part of the academic work of another person; plagiarizing totally or partially the work of another person; copying all or part of another person answers to the questions of an oral or written exam by taking or getting someone else to take the exam on his/her behalf; as well as enabling and facilitating another person to perform the aforementioned behavior. Any of these behaviors will be subject to disciplinary action in accordance with the disciplinary procedure laid down in the UPR Students General Bylaws.–

