A. COURSE SYLLABUS

1. General Information:
   - Course Number: INEL 4215
   - Course Title: Computer Architecture and Organization
   - Credit-Hours: 3

2. Course Description:
   Architectural aspects of general purpose computers; instruction sets, addressing modes, data types, register, support for programming languages and operating systems. Comparative study of commercial architectures. Organizational aspects of general purpose computers; central processing unit, control unit, microprogramming, arithmetic and logic units, memory system, input/output systems.

3. Pre/Co-requisites:
   Pre-requisites: INEL4206 (Microprocessors I)

4. Textbook, Supplies and Other Resources:
   Textbook:

   References:

5. Purpose:
   Understand the basic architectural concepts of contemporary microprocessors. Understand the operation of a central processing unit.

6. Course Goals:
   Design a central processing unit (CPU).

7. Requirements:
   Knowledge of microprocessors concepts.
A. COURSE SYLLABUS

8. Laboratory/Field Work (If applicable):
none

9. Department/Campus Policies:

9a. Class attendance: Class attendance is compulsory. The University of Puerto Rico, Mayagüez Campus, reserves the right to deal at any time with individual cases of non-attendance. Professors are expected to record the absences of their students. Frequent absences affect the final grade, and may even result in total loss of credits. Arranging to make up work missed because of legitimate class absence is the responsibility of the student. (Bulletin of Information Undergraduate Studies, pp 39 1995-96)

9b. Absence from examinations: Students are required to attend all examinations. If a student is absent from an examination for a justifiable reason acceptable to the professor, he or she will be given a special examination. Otherwise, he or she will receive a grade of zero of "F" in the examination missed. (Bulletin of Information Undergraduate Studies, pp 39, 1995-96)

9c. Final examinations: Final written examinations must be given in all courses unless, in the judgment of the Dean, the nature of the subject makes it impracticable. Final examinations scheduled by arrangements must be given during the examination period prescribed in the Academic Calendar, including Saturdays. (see Bulletin of Information Undergraduate Studies, pp 39, 1995-96).

9d. Partial withdrawals: A student may withdraw from individual courses at any time during the term, but before the deadline established in the University Academic Calendar. (see Bulletin of Information Undergraduate Studies, pp 37, 1995-96).

9e. Complete withdrawals: A student may completely withdraw from the University of Puerto Rico, Mayagüez Campus, at any time up to the last day of classes. (see Bulletin of Information Undergraduate Studies, pp 37, 1995-96).

9f. Disabilities: All the reasonable accommodations according to the Americans with Disability Act (ADA) Law will be coordinated with the Dean of Students and in accordance with the particular needs of the student.

9g. Ethics: Any academic fraud is subject to the disciplinary sanctions described in article 14 and 16 of the revised General Student Bylaws of the University of Puerto Rico contained in Certification 018-1997-98 of the Board of Trustees. The professor will follow the norms established in articles 1-5 of the Bylaws.

10. Campus Resources (If applicable):
General Library and University Computer Center is available to obtain professor’s reference materials. The University’s Counseling Office has a tutorial program for students who need extra help.

11. General Topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Lectures</th>
<th>Text Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to computer architecture</td>
<td>3</td>
<td>Ch 1, Notes</td>
</tr>
<tr>
<td>2. RISC and CISC architectures</td>
<td>3</td>
<td>Ch 2, Notes</td>
</tr>
<tr>
<td>3. Contemporary RISC microprocessors</td>
<td>3</td>
<td>Notes</td>
</tr>
<tr>
<td>4. Data paths</td>
<td>4</td>
<td>Ch 4, Notes</td>
</tr>
<tr>
<td>5. Control unit</td>
<td>4</td>
<td>Ch 4, Notes</td>
</tr>
<tr>
<td>6. Microprogramming</td>
<td>3</td>
<td>Ch 5, Notes</td>
</tr>
<tr>
<td>7. Arithmetic units</td>
<td>3</td>
<td>Ch 6, Notes</td>
</tr>
<tr>
<td>8. Caches</td>
<td>3</td>
<td>Ch 7, Notes</td>
</tr>
<tr>
<td>9. Virtual memory</td>
<td>3</td>
<td>Ch 7, Notes</td>
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<tr>
<td>10. Projects</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>11. Exam</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Total 45
B. Instructor Information Sheet

1. General Information:
   Instructor: Nayda G. Santiago Santiago
   Title: Assistant Professor
   Office: Stefani 215
   Phone: 832-4040 Ext. 3510
   Office Hours: Lunes (2:00-3:00pm), Miercoles (3:00-4:30pm), Viernes (2:00-4:00pm)
   E-mail / URL: Nayda.Santiago@ece.uprm.edu / http://www.ece.uprm.edu/~nayda
   Course URL: http://www.ece.uprm.edu/~nayda/Courses/Inel4215S06/

2. Course Description:
   Course Number: INEL 4215
   Course Title: Computer Architecture and Organization
   – See item number 2 in Course Syllabus Section for Course Description.

3. Purpose:
   The purpose of the course is to provide each student an understanding of several topics related to
   computer architecture including: memory addressing modes, instructions sets, registers, stacks,
   arithmetic and logic units, control units, memories and I/O systems.

4. Course Goals:
   • To understand the basic architectural concepts of contemporary microprocessors
   • To understand the operation concept of the central processing unit (CPU)
   • To design a CPU

5. Requirements:
   All students are expected to:
   • Complete all lessons.
   • Do all assigned readings and related homework.
   • Come to class all the time and on time.
   • Pass all tests to receive credit for the course.

6. Laboratory/Field Work (If applicable), General Rules
   Approximately three (3) works for grade will be assigned: a program to simulate the operation of CPU
   and circuit designs of an ALU and a CPU. Students are expected to make additional works related to
   the course.
   The PC cluster student lab (S105D) will be used for running the simulations and writing reports.
   Radios, tape recorders, and other audio or video equipment are not permitted in the classroom at any
   time.
   Cellular Phones and pagers should be in quiet mode in the classroom and OFF during exams.
   Smoking is not permitted in any area other than those areas designated for smoking.
B. Instructor Information Sheet

7. Instructional Strategy:
The course will consist mainly of lectures. Students will be assigned projects for grading both on software and hardware design. Major emphasis will be made on the development of microprocessor and computer architecture related circuits and software.

8. Evaluation/Grade Reporting:
Evaluation will be based on one midterm exam, quizzes, projects, attendance, and a final exam weighted as indicated below:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
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<tbody>
<tr>
<td>Midterm 1</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm 2</td>
<td>15%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>5%</td>
</tr>
<tr>
<td>Projects</td>
<td>45%</td>
</tr>
<tr>
<td>Attendance</td>
<td>5%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>15%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Final grades will be assigned according to the following scale:

<table>
<thead>
<tr>
<th>Score</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>F</td>
</tr>
<tr>
<td>60</td>
<td>D</td>
</tr>
<tr>
<td>70</td>
<td>C</td>
</tr>
<tr>
<td>80</td>
<td>B</td>
</tr>
<tr>
<td>90</td>
<td>A</td>
</tr>
</tbody>
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9. Deadlines:

Important dates:
- Midterm Exams: To be announced, in the classroom
- Projects: To be announced
- Final Exam: To be arranged by registrar's office

Deadlines for projects will be announced during the semester. Works are due at the beginning of the class (unless otherwise stated). Late works will be accepted under the following penalties:

- 10% the same day after the class is over
- 25% the next day
- 15% for each additional day

11. Attendance and Behavior:

- Attendance will be daily monitored in class.
- Students are not allowed to leave the classroom unless it is justified.
- It is the student responsibility to ensure signing-up everyday the attendance list to be circulated by the professor at the beginning of each class.
- Approximately, every 15 lectures an attendance report will be generated.
- A student with more than 3 (three) missed lectures in a reporting period will be considered not to be regularly attending class.
- Make-up for exams will be furnished only upon "valid excuse". Your professor reserves the right to determine what is a "valid excuse".
- No baseball caps and sunglasses allowed during quizzes or exams.
B. Instructor Information Sheet

- No “special” projects will be given to anyone to improve grades or for any other reason.
- Students are not allowed improper behavior.
- Honesty is expected from all students. If a student is caught cheating during an exam, quiz or homework, this clearly demonstrates that he or she is not capable of producing individual intellectual property material. Therefore the student will face the following sanctions:
  - The grade will be zero in the piece of work where cheating was found.
  - The department will be notified of the student name and evidence of cheating so the department determines if disciplinary action should be taken to the “Junta de Disciplina”. If there is a pending case at the “Junta de Disciplina”, the student will be awarded an incomplete with F until the “Junta de Disciplina” decides the case.
- Cellular phones and pagers should be in quite mode in the classroom.
- Smoking is not permitted in any area other those designated for smoking.

12. Instructor Responsibilities (If applicable):
Your instructor will provide handouts for material discussed in class not covered in the textbook.

13. Course Outline And Schedule:
--See item 11 in Course Syllabus Section

14. Additional References:
--See item 4 in Course Syllabus Section