Instructor: Dr. Pablo Rivas  
Email: Pablo.Rivas@Marist.edu  
Phone: 845-575-3000 ext. 2086  
Office: Hancock 3040  
Hours: Mon 11am-12pm, Tue 11am-12pm, and Thu 11am-12pm.

This syllabus is subject to changes during the semester.

Marist Course Description:  
The purpose of this course is to acquire and understanding and appreciation of a computer system’s functional components and their characteristics. Students will learn instruction set architecture, the internal implementation of a computer at the register and functional level, and understand how main activities are performed at machine level as well as gain an appreciation for hardware design at micro level.

Scheduling Information:  
Location: Hancock 0005  
Days: Tuesdays, Wednesdays (Labs), and Thursdays  
Hours: 5:00 to 6:15pm

Prerequisites:  
- CMPT 220 - Software Development I

Credit Hours: 4

Reference Text:  

Course Objectives1:  
1. Understand the basics of computer hardware and how software interacts with computer hardware. [1, 2]  
2. Know the organization of the central processing unit (CPU) and memory hierarchy. [1, 2]  
3. Use critical thinking to make informed decisions in the selection of hardware. [1, 2, 3, 5, 6]

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1 The reference number in brackets [ ] indicates the department goal that is being met with the fulfillment of the objective. For the complete list of department goals please see: [http://www.reev.us/pdfs/goals.pdf](http://www.reev.us/pdfs/goals.pdf)
4. Demonstrate how memory caches and virtual memory work. [1, 2, 5]
5. Learn and demonstrate how program performance is affected by processor cache sizes. [1, 2, 6]
6. Understand how the architecture affects program performance. [1, 2, 6]
7. Demonstrate how instructions can be implemented in a chip. [1, 2, 4]
8. Learn how to use Java or C or assembly language to manipulate registers on a computer architecture performing a specific operation with data. [1, 2, 4]
9. Learn how computer organization influences high-level languages, and vice versa. [1, 2, 6]
10. Develop communication skills in the area of computing technology. [1, 4, 5]

**Course Learning Measures:**

- Create a program in C or assembly language that works with data that fits and exceeds processor cache sizes, and measure the performance impacts of doing so. *Applies to Objective: 2, 4, 5, 6, 8, 9*
- Write a simple program in Java or C or assembly language to implement a high level program segment. *Applies to Objective: 1, 4, 7, 8, 9*
- Using an Arduino board, control an LED display via software. *Applies to Objective: 3, 4, 7, 8*
- Midterm Exam. *Applies to Objective: 1, 2, 3, 4, 5*
- Final Exam. *Applies to Objective: 5, 6, 7, 8, 9*
- Final Project. *Applies to Objective: 1, 2, 3, 7, 8, 10*

**Evaluation:**

Following evaluation methods will be used in this course:

<table>
<thead>
<tr>
<th>Method</th>
<th>Credits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs and Homework</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Final Project</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td>5</td>
<td><em>Extra credit if needed</em></td>
</tr>
<tr>
<td>Total Credits</td>
<td>100</td>
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</tr>
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</table>

**Important:** Each lab assignment not completed by the end of the semester will result in a drop of one letter grade. For example, if you would have received a ’B’, but you did not complete two of the projects, then your letter grade will be a ’D’.

This course also involves a **quiz** for each week of class. Such quizzes will be either given in printed form, or will be made available on iLearn and you should take them and answer them electronically on iLearn. The quizzes not only directly count toward your grade (see percentages above), but they will also help you greatly toward your course preparation. The main idea of the quizzes is that they will help you prepare for the tests,
and the accuracy with which you answer them will give you an idea of the grade you would expect in your tests (mid-term or final). To prepare for the quizzes and the class, you must do the required reading indicated in the tentative course outline for that week, and you must be making timely progress toward your assigned homework, labs, and projects. That is all you need to be successful in each quiz.

**Letter Grade Rubric:**
Following rubric provides a basis for letter grades in this course:

<table>
<thead>
<tr>
<th>Total</th>
<th>0 - 599</th>
<th>600 - 649</th>
<th>650 - 699</th>
<th>700 - 733</th>
<th>734 - 766</th>
<th>767 - 799</th>
<th>800 - 833</th>
<th>834 - 866</th>
<th>867 - 899</th>
<th>900 - 999</th>
<th>1000 +</th>
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<tbody>
<tr>
<td>Letter</td>
<td>F</td>
<td>D</td>
<td>D+</td>
<td>C-</td>
<td>C</td>
<td>C+</td>
<td>B-</td>
<td>B</td>
<td>B+</td>
<td>A-</td>
<td>A</td>
</tr>
</tbody>
</table>

**Course Policies:**

**General**
- The class website contains the official course information (reev.us/cmpt422s17 which is still under construction). Please check it regularly for updates.
- All work in this course is strictly individual, unless the instructor explicitly estates otherwise. While discussion of course material is encouraged, collaboration on assignments is not allowed. Collaboration includes (but is not limited to) discussing with anyone (other than the professor) anything that is specific to completing an assignment.
- You are encouraged to discuss the course material with the professor, preferably in office hours, and also by email.
- Bring any grading correction requests to your professor’s attention within 2 weeks of receiving the grade or before the end of the semester, whichever comes first.

**Grades**
- Grades in the C range represent performance that meets expectations; Grades in the B range represent performance that is substantially better than the expectations; Grades in the A range represent work that is excellent.
- Grades will be maintained in the LMS course shell. Students are responsible for tracking their progress by referring to the online gradebook.

**Attendance and Absences**
- Attendance is expected and will be taken each class. You are allowed to miss 3 class during the semester without penalty. Any further absences will result in point and/or grade deductions.
- A total of 8 absences will automatically cause an F grade.
- Students are responsible for all missed work, regardless of the reason for absence. It is also the absentee’s responsibility to get all missing notes or materials.
**Academic Honesty**

**Introduction**
In addition to skills and knowledge, Marist College aims to teach students appropriate Ethical and Professional Standards of Conduct. The Academic Honesty Policy exists to inform students and Faculty of their obligations in upholding the highest standards of professional and ethical integrity. All student work is subject to the Academic Honesty Policy. Professional and Academic practice provides guidance about how to properly cite, reference, and attribute the intellectual property of others. Any attempt to deceive a faculty member or to help another student to do so will be considered a violation of this standard.

**Instructor’s Intended Purpose**
The student’s work must match the instructor’s intended purpose for an assignment. While the instructor will establish the intent of an assignment, each student must clarify outstanding questions of that intent for a given assignment.

**Unauthorized/Excessive Assistance**
The student may not give or get any unauthorized or excessive assistance in the preparation of any work.

**Authorship**
The student must clearly establish authorship of a work. Referenced work must be clearly documented, cited, and attributed, regardless of media or distribution. Even in the case of work licensed as public domain or Copyleft, (See: http://creativecommons.org/) the student must provide attribution of that work in order to uphold the standards of intent and authorship.

**Declaration**
Online submission of, or placing one’s name on an exam, assignment, or any course document is a statement of academic honor that the student has not received or given inappropriate assistance in completing it and that the student has complied with the Academic Honesty Policy in that work.

**Consequences**
An instructor may impose a sanction on the student that varies depending upon the instructor’s evaluation of the nature and gravity of the offense. Possible sanctions include but are not limited to, the following: (1) Require the student to redo the assignment; (2) Require the student to complete another assignment; (3) Assign a grade of zero to the assignment; (4) Assign a final grade of “F” for the course; and (5) Notify the Dean of the School of Computer Science and Mathematics about the issue. A student may appeal these decisions according to the Academic Grievance Procedure. (See the relevant section in the Student Handbook.) Multiple violations of this policy will result in a referral to the Conduct Review Board for possible additional sanctions.
To Conclude
Dr. Rivas takes academic honesty very seriously, after all, he also teaches Ethics. Many studies, including one by Sheilah Maramark and Mindi Barth Maline have suggested that “some students cheat because of ignorance, uncertainty, or confusion regarding what behaviors constitute dishonesty” (Maramark and Maline, Issues in Education: Academic Dishonesty Among College Students, U.S. Department of Education, Office of Research, August 1993, page 5). In an effort to reduce misunderstandings, here is a minimal list of activities that will be considered cheating in this class:

- Using a source other than the optional course textbooks, the course website, or your professor to obtain credit for any assignment.
- Copying another student’s work. Simply looking over someone else’s source code is copying.
- Providing your work for another student to copy.
- Collaboration on any assignment, unless the work is explicitly given as collaborative work.
- Any discussion of an assignment or project is considered collaboration.
- Plagiarism.
- Studying tests or using assignments from previous semesters.
- Providing someone with tests or assignments from previous semesters.
- Turning in someone else’s work as your own work.
- Giving test questions to students in another class.
- Reviewing previous copies of the instructor’s tests without permission from the instructor.

Data for Research Disclosure:
Any and all results of in-class and out-of-class assignments and examinations are data sources for research and may be used in published research. All such use will always be anonymous.

How to Contact The Professor
Dr. Rivas’ office number is 3040 at the Hancock Center, and office hours are:
- Mondays 11:00 AM - 12:00 PM
- Tuesdays 11:00 AM - 12:00 PM
- Thursdays 11:00 AM - 12:00 PM
He is glad to talk to students during and outside of office hours. If you can’t come to his office hour, please make an appointment for another time, or just stop by. If you are going to stop by it is a good idea to check his schedule at [http://www.reev.us/#schedule](http://www.reev.us/#schedule) and call first to make sure he is there; the number is (845) 575 3000 extension 2086.

If you need additional help, or have issues with the prerequisites of the class, there are private tutors available at the student’s expense at Marist’s Academic Learning Center; find out more here [http://www.marist.edu/academics/alc/tutoring.html](http://www.marist.edu/academics/alc/tutoring.html)
Note: Any student who needs learning accommodations should inform Dr. Rivas immediately at the beginning of the semester. The student is responsible for obtaining appropriate documentation and information regarding needed accommodations from the Office of Special Services in Donnelly 226 (or online here http://www.marist.edu/specialservices) and providing it to the professor early in the semester.

Tentative Course Outline:
The weekly coverage might change as it depends on the progress of the class. However, you must keep up with all the assignments. The full tentative course outline is shown in the page that follows.

<table>
<thead>
<tr>
<th>Wk</th>
<th>Dates</th>
<th>Class</th>
<th>Laboratory</th>
<th>References</th>
<th>LO</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>8/29-8/31</td>
<td>Computer and Systems</td>
<td>Arduino IDE Installation</td>
<td>Ch. 1</td>
<td>Arduino Kit 1, 3</td>
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<tr>
<td>2</td>
<td>9/5-9/7</td>
<td>An Introduction to Systems Concepts and Architecture</td>
<td>Get to Know Your Tools</td>
<td>Ch. 2</td>
<td>Arduino 01 1, 2, 3, 7</td>
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<tr>
<td>3</td>
<td>9/12-9/14</td>
<td>Number Systems</td>
<td>Spaceship Interface</td>
<td>Ch. 3</td>
<td>Arduino 02 1, 6, 7, 8</td>
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<td>4</td>
<td>9/19-9/21</td>
<td>Data Formats</td>
<td>Love-o-Meter</td>
<td>Ch. 4</td>
<td>Arduino 03 1, 6, 7, 8, 9</td>
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<tr>
<td>5</td>
<td>9/26-9/28</td>
<td>Representing Numerical Data</td>
<td>Color Mixing Lamp</td>
<td>Ch. 5</td>
<td>Arduino 04 1, 6, 7, 8, 9</td>
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<tr>
<td>6</td>
<td>10/3-10/5</td>
<td>The Little Man Computer</td>
<td>Light Theremin</td>
<td>Ch. 6</td>
<td>Arduino 06 1, 8, 9</td>
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<tr>
<td>7</td>
<td>10/10-10/12</td>
<td>Midterm &amp; Recap</td>
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<td>Ch. 1-6</td>
<td>Select * From above</td>
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<tr>
<td>8</td>
<td>10/17-10/19</td>
<td>The CPU and Memory</td>
<td>Keyboard Instrument</td>
<td>Ch. 7</td>
<td>Arduino 07 2, 3, 4, 7, 8, 9</td>
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<tr>
<td>9</td>
<td>10/24-10/26</td>
<td>CPU and Memory: Design, Enhancement &amp; Implementation</td>
<td>Motorized Pinwheel</td>
<td>Ch. 8</td>
<td>Arduino 09 2, 3, 4, 7, 8</td>
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<td>10</td>
<td>10/31-11/2</td>
<td>Input/Output</td>
<td>Zoetrope</td>
<td>Ch. 9</td>
<td>Arduino 10 1, 6, 7, 8</td>
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<td>11</td>
<td>11/7-11/9</td>
<td>Computer Peripherals</td>
<td>Make your own design</td>
<td>Ch. 10</td>
<td>1, 2, 3</td>
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<tr>
<td>12</td>
<td>11/14-11/16</td>
<td>Modern Computer Systems</td>
<td>Make your own design</td>
<td>Ch. 11</td>
<td>1, 2, 3, 5, 9</td>
</tr>
<tr>
<td>13</td>
<td>11/21-11/23</td>
<td>Presentations/Extra/Backup (Thanksgiving 11/22-11/26)</td>
<td>Make your own design</td>
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<td>6, 7, 8, 10</td>
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<td>14</td>
<td>11/28-11/30</td>
<td>Presentations/Extra/Backup</td>
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<td>15</td>
<td>12/5</td>
<td>Presentations/Extra/Final Exam Recap</td>
<td>Uno Makerathon</td>
<td>Ch. 7-11</td>
<td>7, 10</td>
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<td>16</td>
<td>12/12</td>
<td>Final Exam at 3:30pm</td>
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