

## Syllabus - [PUDT 1203 E] CRN 4065 2013:

# Creative Computing

AMT: Parsons The New School for Design

**Course Dates:** Aug 29, 2013 - Dec 16, 2013

**Meeting Times:** Thursdays 7:00 pm - 9:40 pm

**Location:** 6 East 16th Street 701

**Instructor:** Aisen Caro Chacin

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**Office Hours:** By appointment.

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### Course Description:

Keywords: Processing, Arduino, Java, C, Microcontrollers, Human Computer Interaction, Open Source.

This class offers an in depth introduction to creative computing and other open source platforms used for physical, rapid prototyping. Students will engage in understanding computer programming, from native application to microcontrollers. Students will be guided through crucial tools for developing tools and interactive software applications. We will learn about data types, arrays, for loops and basic circuitry design. Students will adopt strategies for scientific inquiry from an artistic perspective, and are encouraged to pursue new skills in user experience, interface design, and concept development.

### Goals:

As computing devices become more embedded in our environment, understanding computer interfaces and how to prototype them has become a crucial aspect of design practices. Our main goal is to engage in experimentation labs that will fuel independent research. Coding lab sessions will spark new ideas, and propel conceptual models to be executed by the students as functional prototypes. Students are encouraged to activate out-of-the box “what if...?” methods of design thinking to search for the usability and potential applications of the technologies introduced in the classroom.

### Learning Outcomes:

- The creation of fully functional and integrated prototypes.
- Detailed documentation of individual projects and lab exercises.
- Learning introductory theories and practices of code and electronics.
- Becoming proficient in programmatic architectures.
- Learning to identify data types, functions, classes, and electronic components.
- Learning about file structures, libraries.
- Exploration of conceptual models which will critique, enhance, and innovate in the space of Human Computer Interaction.

### Educational Methodology:

Mixing scientific and artistic learning methodologies, such as labs and studios, lead to a more complete understanding of theory and concept. Students can benefit from collaboration, the interchange and materialization of ideas by engaging in hands-on labs to ultimately excel in learning by making. Students are required to provide detailed documentation of individual projects and lab exercises to be archived in the course's blog. This will allow the students to have full access to the blueprints of all the correlative workshops, reading materials, as well as to function as a platform to share learning goals and examples for each class session.

### **Reading Material:**

These are suggested Books that you will find helpful.

Getting Started with Processing, Reas and Fry.

Form+Code in Design, Art, and Architecture, Reas and McWilliams.

Programming Arduino Getting Started with Sketches, Monk.

Code, Petzold

Making Things Talk, Igoe

### **Class Structure Overview:**

Classes will be taught in two parts, conceptual application studio research projects and hands-on lab-workshops that demonstrate the electric principles of each topic.

#### **LABS:**

Introduction to the material, lab prep talk.

Experimenting with a new language and techniques.

Hands-on workshops.

#### **STUDIO:**

Think Tanks, Discussions, Critiques, Making.

Process to be documented on the blog and presented the next day of class.

Students will have 2 major projects due one for Midterm and one for Final review.

(+ Blog entry: Documentation and Synthesis)

#### **GRADES:**

Students will be graded upon the quality of work based on concept development and technical execution. Major projects are expected to be fully functional and completed integrated prototypes. Blog should be updated weekly, all projects must be documented, homework labs, midterms, and finals.

Participation: 25%

Blog: 20%

Innovation: 5%

Midterm: 25%

Final: 25%

#### **POP QUIZZES:**

These quizzes are meant as reminders of the material, and do not count towards your grade. However; participating in sharing the solutions to some of the problems will be noted, and will be counted as extra credit.

### **Course Outline:**

**Week 1, 08/29/2013**

**Introduction:**

What is code?

[LAB] Download IDEs, web resources.

**[STUDIO]**

What are some cool projects that use code?

How is code used in nature?

**Week 2, 09/05/2013**

**No Class:** Rosh Hashanah

Optional Conference: NYCCHI

Connected Spaces, The Internet of Things <http://connectedspaces.eventbrite.com>

**[STUDIO]**

[Read] <http://processing.org/>- Overview, Reference/ Environment.

Make an account in <http://www.openprocessing.org>

Browse Open Processing, Run a few examples

**Week 3, 09/12/2013****Processing: Hello World! Environment & Syntax**

[LAB] Data Types, Color, Shapes, Bezier, Lines, Coordinates, Background.

[STUDIO] Recreating an image using coordinates.

**Week 4, 09/19/2013****Architecture & Interaction**

[LAB] Mouse Control, Logical Operators, Relational Operators, Conditionals, Arithmetic, Movement.

[STUDIO] Make a simple interaction using Conditionals and Mouse Control.

**Week 5, 09/26/2013****File & Code Structures**

[LAB] Importing Images, Push() and Pop() Matrices, Functions, Keyboard Input, Arrays.

[STUDIO] Review Maker Faire Awesome Projects. What are you making?

**Week 6, 10/03/2013****Composite & Iteration**

[LAB] Arrays (many of one kind), For Loops (Iteration: Increasing or Decreasing Operations).

[STUDIO] Update one of your sketches to make multiples of an object.

**Week 7, 10/10/2013****Libraries & Classes**

[LAB] Introduction to Object Oriented Programming, Make your Own Class, Import a Library (Minim).

[STUDIO] Interactive Software Midterm Project!

**Week 8, 10/17/2013**

[STUDIO] Midterm Presentations

[read] <http://arduino.cc/> -Getting Started: Introduction, Environment, Libraries,\*\*

**Week 9, 10/24/2013**

**Arduino: Hello World! Environment & Microcontrollers**

[LAB] Physical Programming, Bread Boarding, Components, Blink, Fade, SOS, Buttons.

[STUDIO] What common devices use a microcontroller?

What kinds of projects have been done with arduino?

How can lights be translated to concepts and language?

**Week 10, 10/31/2013**

**Analog Sensors & Sound**

[LAB] Serial Communication, Measuring Data, Sensing, Mapping Values, Tones Library, RGB LED color Mixing.

[STUDIO] Making Sense of Data. Can you make a project with cool sound effects?

**Week 11, 11/07/2013**

**PCB Soldering**

[LAB] Soldering LOL Shield, Intro to Matrix animation.

[STUDIO] Make an animation on and an enclosure for the LOL shield.

**Week 12, 11/14/2013**

**Arduino & Processing**

[LAB] Serial Communication,

[STUDIO] Creative inquiry on Serial Communication.

**Week 13, 11/21/2013**

**The Spark of Life: Electrogenesis & Biopower**

Volta, Galvanic Electricity, Energy Conversion, Energy Storage, Electric Organisms.

[LAB] Building Microscopes, Wet Pong, Joysticks.

How do Paramecia sense electrical fields?

What methods can we use to capture electrical power from our bodies?

How can we convert mechanical, thermal, chemical to electrical energy?

**Week 13, 11/25/2013\*\* TUESDAY CLASS**

[STUDIO] Finish Wet Pong.

**Week 14, 11/29/2013**

THANKSGIVING

**Week 15, 12/06/2013**

[STUDIO] Code Help Session.

## Week 16, 12/13/2013

[STUDIO] Final Presentations

### RESOURCES:

#### Materials:

Required:

Laptop

Sparkfun Starter Kit (Recommended\*) <https://www.sparkfun.com/products/11930>

\*You will still need to add more components than the kit provides.

Or you can buy things separately:

Arduino Uno or Sparkfun Equivalent

(Mult) Push Buttons <https://www.sparkfun.com/products/10302>

Analog Sensors (Any such as: photoresistor, force, accelerometer, flex, etc.)

(Mult) LEDs and RGB LEDs 4 legs

(2) Breadboards [www.sparkfun.com/products/9567](http://www.sparkfun.com/products/9567)

USB Cable

(3) Potentiometer - Linear (10k ohm)

Piezo Buzzer

Jumper Wire Kit

Jewelry Tools (Snips, Pliers, [etc.](#))

Multimeter

Solder (Smallest you can find in RadioShack)

LOL shield (Adafruit has lots of colors.)

Cheap Webcam (We will hack this, so don't spend too much money on it! \$5-7)

Joystick

#### Local Component Stores:

Radio Shack

[NYU Computer Bookstore](#)

Home depot

Dollar Stores

The Container Store

#### Online:

SparkFun

Adafruit

Mouser

Digikey

Jameco

All Electronics

#### University Resources:

The university provides many resources to help students achieve academic and artistic excellence. These resources include:

- The University (and associated) Libraries: <http://library.newschool.edu>
- The University Learning Center: <http://www.newschool.edu/learning-center>
- University Disabilities Services:  
<http://www.newschool.edu/student-services/student-disability-services> .

In keeping with the university's policy of providing equal access for students with disabilities, any student with a disability who needs academic accommodations is welcome to meet with me privately. All conversations will be kept confidential. Students requesting any accommodations will also need to contact Student Disability Service (SDS). SDS will conduct an intake and, if appropriate, the Director will provide an academic accommodation notification letter for you to bring to me. At that point, I will review the letter with you and discuss these accommodations in relation to this course.

## **University, Divisional/School, and Program Policies:**

### **Academic Honesty and Integrity**

Compromising your academic integrity may lead to serious consequences, including (but not limited to) one or more of the following: failure of the assignment, failure of the course, academic warning, disciplinary probation, suspension from the university, or dismissal from the university.

#### University Policy

The New School views "academic honesty and integrity" as the duty of every member of an academic community to claim authorship for his or her own work and only for that work, and to recognize the contributions of others accurately and completely. This obligation is fundamental to the integrity of intellectual debate, and creative and academic pursuits. Academic honesty and integrity includes accurate use of quotations, as well as appropriate and explicit citation of sources in instances of paraphrasing and describing ideas, or reporting on research findings or any aspect of the work of others (including that of faculty members and other students). Academic dishonesty results from infractions of this "accurate use". The standards of academic honesty and integrity, and citation of sources, apply to all forms of academic work, including submissions of drafts of final papers or projects. All members of the University community are expected to conduct themselves in accord with the standards of academic honesty and integrity.

Students are responsible for understanding the University's policy on academic honesty and integrity and must make use of proper citations of sources for writing papers, creating, presenting, and performing their work, taking examinations, and doing research. It is the responsibility of students to learn the procedures specific to their discipline for correctly and appropriately differentiating their own work from that of others. Individual divisions/programs may require their students to sign an Academic Integrity Statement declaring that they understand and agree to comply with this policy.

The New School recognizes that the different nature of work across the schools of the University may require different procedures for citing sources and referring to the work of others. Particular academic procedures, however, are based in universal principles valid in all schools of The New School and institutions of higher education in general. This policy is not intended to interfere with the exercise of academic freedom and artistic expression.

Academic dishonesty includes, but is not limited to:

- Cheating on examinations, either by copying another student's work or by utilizing unauthorized materials.
- Using work of others as one's own original work and submitting such work to the university or to scholarly journals, magazines, or similar publications.
- Submission of another students' work obtained by theft or purchase as one's own original work.
- Submission of work downloaded from paid or unpaid sources on the internet as one's own original work, or including the information in a submitted work without proper citation.
- Submitting the same work for more than one course without the knowledge and explicit approval of all of the faculty members involved.
- Destruction or defacement of the work of others.
- Aiding or abetting any act of academic dishonesty.
- Any attempt to gain academic advantage by presenting misleading information, making deceptive statements or falsifying documents, including documents related to internships.
- Engaging in other forms of academic misconduct that violate principles of integrity.

(This is an abridged version of the policy. For the full policy text, which includes adjudication procedures, visit: [www.newschool.edu/WorkArea/DownloadAsset.aspx?id=81698](http://www.newschool.edu/WorkArea/DownloadAsset.aspx?id=81698) )

### Guidelines for Studio Assignments

Work from other visual sources may be imitated or incorporated into studio work if the fact of imitation or incorporation and the identity of the original source are properly acknowledged. There must be no intent to deceive; the work must make clear that it emulates or comments on the source as a source. Referencing a style or concept in otherwise original work does not constitute plagiarism. The originality of studio work that presents itself as "in the manner of" or as playing with "variations on" a particular source should be evaluated by the individual faculty member in the context of a critique.

Incorporating ready-made materials into studio work as in a collage, synthesized photograph or paste-up is not plagiarism in the educational context. In the commercial world, however, such appropriation is prohibited by copyright laws and may result in legal consequences.

### Open Source Policy

You are encouraged to work in groups, but unless otherwise specified you must turn in your own work. Copying/pasting and reusing code is a key part of the programming process, especially while learning. You often learn best by modifying working examples rather than starting from scratch. We stand on the shoulders of giants; that's the essence of the opensource philosophy. However, there is a very important caveat: any code you borrow and/or modify must be labeled as such. That is, you must include, in your work, the name of the author, the source URL, and you must make clear which lines of code are not yours. If you fail to do this, you will fail the class. It is very, very easy to get this right, though, so if you take a moment's time to label your work correctly, you will not have a problem. Just be diligent and honest.

## **Course Policies**

### Responsibility

Students are responsible for all assignments, even if they are absent. Late papers, failure to complete the readings assigned for class discussion, and lack of preparedness for in-class discussions and presentations will jeopardize your successful completion of this course.

### Participation

Class participation is an essential part of class and includes: keeping up with reading, contributing meaningfully to class discussions, active participation in group work, and coming to class regularly, prepared and on time.

### Delays

In rare instances, I may be delayed arriving to class. If I have not arrived by the time class is scheduled to start, you must wait a minimum of thirty minutes for my arrival. In the event that I will miss class entirely, a sign will be posted at the classroom indicating your assignment for the next class meeting.

## **Additional Course Information**

### Student Course Ratings

During the last two weeks of the semester, students are asked to provide feedback for each of their courses through an online survey and cannot view grades until providing feedback or officially declining to do so. Instructors rely on course rating surveys for feedback on the course and teaching methods, so they can understand what aspects of the class are most successful in teaching students, and what aspects might be improved or changed in future. Without this information, it can be difficult for an instructor to reflect upon and improve teaching methods and course design. In addition, program/department chairs and other administrators review course surveys.

## **Attendance Policy**

Parsons' attendance policy was developed to encourage students' success in all aspects of their academic programs. Parsons promotes high levels of attendance because full participation is essential to the successful completion of coursework, and enhances the quality of the educational experience for all, particularly in courses where group work is integral. Students, therefore, are expected to attend classes regularly and promptly and in compliance with the standards stated in course syllabi. Faculty members may fail any student who is absent for a significant portion of class time. A significant portion of class time is defined as three absences for classes that meet once per week and four absences for classes that meet two or more times per week. During intensive summer sessions a significant portion of class time is defined as two absences. Lateness or early departure from class may also translate into one full absence. Faculty will make attendance standards clear, in writing, at the beginning of the semester. Students may be asked to withdraw from a course if their habitual absenteeism or tardiness has a negative impact on the class environment. Students who must miss a class session should notify his or her instructor and arrange to make up any missed work as soon as possible. Students who anticipate a potentially lengthy absence must immediately inform the program Chair or Director and must explain the extenuating circumstances in writing. Students must

receive advance approval for the absence in order to ensure successful completion of the course. A Leave of Absence or Withdrawal from Program will be recommended if the absence would compromise the student's ability to meet course requirements and standards.

### Absences

Classes meeting 2 time per week: 4 absences are grounds for failure.

### Tardiness

Two (2) tardies will be counted as one absence.

5 minutes is considered tardy.

The following may be counted as tardy:

- Coming to class without the required materials
- Sleeping in class
- Being asked to leave class because of disruptive behavior.
- Doing other course work in class.

### Academic Warning

Students who do not complete and submit assignments on time and to a satisfactory standard will fail this class. It is a student's responsibility to obtain missed assignment sheets from other classmates and make-up the work in time for the next class.

### Course Expectations

In order to receive a grade for this course, students must actively participate in classroom discussions and critiques, and complete all the assigned projects, including mid-term & final projects.

### Mid-semester Evaluations:

Mid-semester evaluations are issued to help students improve performance and make progress. Although a grade may not be given, the comments will indicate your standing on a below - average - above scale.

### Grade Descriptions (from SDS Guidelines):

A 4.0 Work of exceptional quality. 95-100%

These are projects that go above and beyond the expectations and requirements described in the assignment. They demonstrate substantial effort and achievement in the areas of critical thinking, technique and presentation.

A- 3.7 Work of very high quality. 90-94%

B+ 3.3 Work of high quality, higher than average abilities. 86-89%

B 3.0 Very good work that satisfies goals of course. 83-85%

The "B" student offers a clear and convincing structure to a visual endeavor that is more

complex and unique than a project at the average level. The creator's point of view and point of the project are merged successfully and organized fairly consistently throughout the project. Although minor structural problems may be present in the assignment, they do not hinder the overall outcome.

B- 2.7 Good work. 80-82%

C+ 2.3 Above Average work, Average understanding of course material. 76-79%

C 2.0 Average work; passable. 73 -75%

The student demonstrates an engagement with the assignment. The project will show that the creator can identify and work with key ideas and examples found in reference material. Typical of a "C" project is that the original problem or assignment once approached, does not develop further. Projects may also have organizational, technical weaknesses.

C- 1.7 Passing work but below good academic standing. 70-72%

D 1.0 Below average work; does not fully understand the concepts of the course. 60-70%

Although this is passable work, the project only answers the minimum requirements of the assignment. The projects shows very little effort, is incomplete, late or incorrect in its approach. The outcome shows a lack of full understanding and commitment on the part of the creator.

F 0 Failure, no credit. 0-59%

WF Withdrawal Failing.

Instructors may assign this grade to indicate that a student has unofficially withdrawn or stopped attending classes. It may also be issued when a student fails to submit a final project or to take an examination without prior notification or approval from the instructor. The WF grade is equivalent to an F in calculating the grade point average (zero grade points) and no credit is awarded.