FSEM 131: From Paintings to Pixels Fall 2018

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Office hours	M 1:30–3:00 W 2:00–3:30 R 3:00–4:00 and by appointment
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Course Time	MWF 9:20–10:10
Classrooms	Curtis 563 McGregory 315 McGregory 329
Course Homepage	http://moodle.colgate.edu/
Course Schedule	https://cs.colgate.edu/~efourquet/fsem131

Course Description

From the beginning of history art and technology have influenced each other. For example, during the Renaissance, Piero della Francesca, an artist-mathematician, and Leonardo da Vinci, an artist-engineer, made both scientific and artistic breakthroughs. The thread that links art and science, experiment and theory, is problem solving, which demands creativity and rigor.

This course introduces students to interdisciplinary thinking: they learn the elements of computer programming in the context of the visual art, developing problem solving skills that bridge disciplines. Students formally analyse the visual structure of paintings to create abstractions, sketches and collages, which provide templates that structure the programs they create.

Through this inter-disciplinary lens, students see that the principles of computer science respond naturally with other aspects of a liberal arts education, intergrating today's technology into the spirit of humanism.

In particular in this seminar we will be exploring the creative aspects of coding as an introduction to computer science. You will exercise creativity in visual design while learning how to design programs in a language called Processing. Processing is a language/environment built upon the programming language Java, it was created by artists, designers, and computer scientists.

Some time outside of class to attend extra-curricular events will be required so as to cultivate critical thinking and visual sensibilities and to help you develop some confidence in craftsmanship.

No prior programming experience is expected. This course does not count toward a major or minor in Computer Science.

Course Objectives

The goals of this course are as follow.

- To learn the basics of programming.
- To be able to write simple programs incorporating functions, loops, and conditionals in Processing.
- To practice problem solving while creating images and interactive content.
- To learn the rudiments of how a computer works.
- To gain a basic understanding of how computers represent and manipulate data and in particular images: the difference between pixel and vector graphics and rudiment of image processing.
- To understand some of the factors that limit the power of computers.
- To appreciate, reflect and analyze works of art.
- To practice and improve writing skills.
- To learn and respect the expectations of academic honesty at Colgate.
- To understand how scientific knowledge is obtained and to appreciate the complexities of applying scientific findings to broader issues.
- To learn about the library resources and develop skills for research projects, specifically reference tools and citation practices.

Specifically in terms of programming we will cover the following concepts and topics.

- Introduction to computing: algorithms and pseudo-code
- Drawing primitives: points, lines, simple shapes, arcs, curves
- Color
- Functions
- Variables and primitive data types
- Images
- Expressions and operators
- Conditionals
- Interaction and animation

Course Materials

Required Texts. Available in the bookstore, we will mainly used the following three books.

- *Reductionism in Art and Brain Science: Bridging the Two Cultures*, by Eric R. Kandel. ($20) **Red**
- *Line Color Form: The Language of Art and Design*, First Edition by Jesse Day. ($15) **LCF**

Optional Texts. See bookstore suggested book on writing references such as *A writer's reference* by D. Hacker. Available on reserve for 3 hours in the library. You will also found on reserve at Cooley the following two books that are used for the preparation of my lecture material

- *Picture This: How Pictures Work* by Molly Bang. Short book strongly recommended to read early in the term. It will help you create an effective visual design for your first programming project. **PT**

- *Processing: A Programming Handbook for Visual Designers and Artists* by Casey Reas and Ben Fry. The Processing reference, which is dense and thorough (not our handbook). We will read a few chapters, posted on Moodle, from this reference. **PR**

In addition to the above books, links to supplemental articles from journals, conference proceedings, news sources, web pages, or blogs will be posted on Moodle.

Coursework

The requirements for this course are as follows.

Attendance. It is mandatory to come to class. Your final grade will be lowered significantly after 5 unexcused absences. Consistently late arrivals will negatively affect your grade.

- Missing 10 or more classes will result in a final grade of F.
- Do not miss a class unless you are ill, or have your academic Dean's approval. The health Center can/should send a message to your academic dean if you are too ill to attend classes (which, in turn, gets sent to your professors)make sure this happens.
- If your life takes a difficult turn, seek out resources and be proactive. Things only become more difficult if skipping classes becomes the operative means of coping. I am your academic advisor and here to help you adapting to college: you have to feel free to come to me.
- If you are an athlete, be organized and communicate. Give each of your professors a schedule at the start of the term, and discuss how any absences will be addressed.

Learning activities. The purpose of our class time is for discussion, often based on the required readings and for coding practice with interactive activities done with the instructor leading or in small groups. Come to class prepared to participate and with the assigned readings and exercises completed. Students will be called on in class. My role as the instructor is to guide you through the process of learning concepts from computer science and beyond, i.e., from science in general to its position relative to art. However, the ultimate responsibility for learning the material is your own. I encourage you to be curious, opened to new ideas and engage with everyone contribution. I will do my best to adapt to you and your many backgrounds, motivations, and interests. Although our class time will be composed of interactive and discussion-based lectures, it will be structured differently according to our schedule (MWF), favoring multiple ways to approach and grapple the topics of the course.

Programming projects. There will a minimum of two programming projects. Each is based on a work of art of your own choosing, thus you will have to solve your unique problems of geometry. Each project demands good planning to guide the significant and challenging code that reproduces your piece of art. We will have milestones to monitor your progress with the project. Generally late projects will not be graded. Please talk to me for an extension beforehand if you need.

Homeworks. Every week or bi-weekly you will have to complete a lab homework. Usually we start these small programming questions in class on Friday and you will have to complete on your own for the following week.

Writings. Writing is a process of exploration and refinement; you will be developing key ideas and supporting them while working to communicate them through clear, well crafted writing. There will be writing assignments, two of which will be a written response to events you are required to attend. Details, and grading rubrics, will be distributed in class and also posted on Moodle.

Midterm Exam. There will be one exam during the semester.

Final Exam. There will be a final exam for this course, held during the University-scheduled exam time.

Policies

Academic honesty. You are expected to abide by Colgate's Code of Student Conduct and by Colgate's Academic Honor Code. If you're having trouble with an assignment, if you are unclear how to properly cite a source, or if you're having trouble meeting a deadline, please see me as soon as possible.

Accommodations. If you have special circumstances that you believe may affect your learning and performance in this class, please contact me as soon as possible so appropriate arrangements can be made. You should also contact Lynn Waldman, Director of Academic Support and Disability Services who reviews documentation to determine and help coordinate reasonable and appropriate accommodations. Any information you share will be kept confidential.

Attendance. Students are expected to attend class and participate fully in discussion and activities. Especially for discussion-oriented and hands-on activities class periods, attendance by all is essential as it enables the richest learning experience. Three or more absences and/or consistently late arrivals will negatively affect your grade. If you will not be in class, please let me know in advance.

Deadlines. Deadlines for labs, writing assignmenta and programming projects (and associated milestones), and other activities will be clearly noted on the course website. Late work will not be graded, unless you have made prior arrangements with me due to extenuating circumstances.

Classroom etiquette. You are expected to practice common courtesy with regard to all course interactions. Mobile phones must be off before class begins. Laptops should be off or closed unless a classroom activity requires their use.

Unexpected circumstances. If unexpected circumstances arise that might compromise your performance in the course (inability to attend classes, complete the homework on time, etc.), please let me know as soon as possible so that we may arrange appropriate accommodations. Usually these accommodations will be made in consultation with your administrative dean.

Grading. The final grade for the class is calculated on the following weighting. Grading is on an absolute scale (i.e., no curve).