

# Visualization of Information/ Creative Computation I

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## Course Description:

This course introduces data visualization and creative coding utilizing the Processing programming language. Visual and information design principles will be explored experientially through code examples. Programming exercises, assignments and exams will incorporate 2D and 3D computer graphics, interactivity and data input. Procedural and object-oriented programming approaches to data visualization will be covered, as well as an overview of leading-edge data visualization libraries and APIs, including web-based approaches.

## Recommended Text:

*Processing: Creative Coding and Generative Art in Processing 2*, Ira Greenberg, Dianna Xu, Deepak Kumar, 2013, friends of ED

## Other Texts:

*Processing: A Programming Handbook for Visual Designers and Artists*, Casey Reas, Ben Fry, 2014, MIT Press

*Learning Processing*, Second Edition Daniel Shiffman, 2015, Morgan Kaufmann

*Visualizing Data*, Ben Fry, 2007, O'Reilly Press

*Deitel & Deitel: Java How to Program: Late Objects Version*, 8/E, Pearson Prentice Hall

## Links:

Processing Related and Code Art

<http://processing.org>

<http://openprocessing.org>

<http://reas.com>

<http://benfry.com>

<http://www.shiffman.net>

<http://cs.nyu.edu/~perlin/>

<http://roberthodgin.com>

<http://infosthetics.com>

<http://www.smashingmagazine.com/2007/08/02/data-visualization-modern-approaches>

<http://toxi.co.uk>

<http://www.tobyjoe.com/2009/07/toward-the-bare-metal>

<http://horizon.wiki.nmc.org/2010+Data+Visualization>

<http://design.osu.edu/carlson/history/lesson9.html>

## Java

<http://download.oracle.com/javase/6/docs/api/>

<http://download.oracle.com/javase/tutorial/>

<http://www.java.com/en/>

<http://www.oracle.com/technetwork/topics/newtojava/overview/index.html>

<http://www.oracle.com/technetwork/java/javase/overview/index.html?ssSourceSited=ocomen>  
<http://www.oracle.com/us/technologies/java/index.html>  
<http://math.hws.edu/javanotes/>

**Course Requirements:**

This course includes readings, programming assignments, presentations and critiques. Plan a minimum of three hours of outside preparation for each hour of class. The due date for all assigned materials will be announced in advance. It is the student's responsibility to have all assignments ready on time.

Any student who has to be absent on an assignment due date must arrange to have the assignment submitted early. In addition, it is the student's responsibility to make up any missed work due to absence.

**Method of Presentation:**

Prerecorded lectures will introduce the Processing programming language along with project concepts and specifications. This course is NOT designed as a traditional "sage on the stage" lecture. Class time will be used to discuss concepts and project issues, work collaboratively and to ask questions. Students need to log-in to live sessions prepared to use this time effectively. Being unprepared is equivalent to an absence.

**Method of Evaluation:**

There will be programming assignments, presentations and critiques. Attendance and proactive participation in live sessions is expected. Points will be awarded as described below.

**Total: 100 points**

Weekly Programming Assignments = 65 points

Mid-term Programming Assignment = 15 points

Final Programming Assignment = 20 points

Final grades are determined as follows:

- \* 95 - 100 : A
- \* 90 - 94 : A-
- \* 86 - 89 : B+
- \* 83 - 85 : B
- \* 80 - 82 : B-
- \* 76 - 79 : C+
- \* 73 - 75 : C
- \* 70 - 72 : C-
- \* 66 - 69 : D+
- \* 60 - 65 : D
- \* 0 - 60 : F

**Learning Objectives:**

After successful completion of this course, you should be able to:

1.0 – DEMONSTRATE COMPETENCY IN PROGRAM CONCEPTUALIZATION AND DESIGN

- 1.1 Follow a detailed process for analyzing a program's requirements
- 1.2 Use UML or other graphical process to design a solution to a problem.
- 1.3 Design, code and document a programming project.

- 2.0 – DEMONSTRATE COMPETENCY IN ALGORITHMIC DEVELOPMENT
  - 2.1 Understand memory management and dynamic allocation.
  - 2.2 Develop a complex and efficient algorithm
  - 2.3 Solve a problem iteratively and recursively\
- 3.0 – DEMONSTRATE COMPETENCY IN FUNDAMENTAL PROGRAMMING THEORY
  - 3.1 Understand primitive and reference variables.
  - 3.2 Create parameterized functions.
  - 3.3 Locate and explain syntax errors in a program.
  - 3.4 Use techniques for debugging programs.
  - 3.5 Understand how to compile and execute a program.
- 4.0 – DEMONSTRATE COMPETENCY IN OBJECT-ORIENTED PROGRAMMING
  - 4.1 Create programmer-defined objects
  - 4.2 Use existing class libraries to develop collections of objects
  - 4.3 Use composition in a programming project.
  - 4.4 Use inheritance in a programming project.
  - 4.5 Explain the ideas behind polymorphism.
  - 4.6 Explain the ideas behind object reusability and modularity.

## Programming Assignments

During most live sessions you will be assigned a programming assignment which is due by the next live session the following week.

## Attendance Policy

Students are expected to attend all live sessions. If a student is absent from class on the due date of any assignment, they are expected to make alternative arrangements to assure that the assignment is turned in on time.

## Academic Honesty and Misconduct - The Honor Code

**All Code you create in this course MUST be your own, or clearly stated otherwise – NO EXCEPTIONS.**

All work undertaken and submitted in the course is governed by the University's Honor Code. The relevant section of the Code, taken from the Preamble of the Honor Council's Constitution: *Intellectual integrity and academic honesty are fundamental to the processes of learning and of evaluating academic performance, and maintaining them is the responsibility of all members of an educational institution. High personal standards of honesty and integrity are a goal of education in all the disciplines of the University. Students must share the responsibility for creating and maintaining an atmosphere of honesty and integrity. Students should be aware that personal experience in completing assigned work is essential to learning. Permitting others to prepare their work, using published or unpublished summaries as a substitute for studying required materials, or giving or receiving unauthorized assistance in the preparation of work to be submitted are directly contrary to the honest process of learning. Students who are aware that others in a course are cheating or otherwise acting dishonestly have the responsibility to inform the professor and/or bring an accusation to the Honor Council.* A violation of the Honor Code may result in an "F" for the course, and the student may be taken before the Honor Council. If you are unclear about this policy, either in general or in its specific application, please see the instructor. The Honor Code is in the SMU Student handbook and may be viewed on-line at : [http://smu.edu/studentlife/PCL\\_05\\_HC.asp](http://smu.edu/studentlife/PCL_05_HC.asp)

\* **Disability Accommodations:** Students needing academic accommodations for a disability must first contact Disability Accommodations & Success Strategies (DASS) at 214-768-1470

or [www.smu.edu/alec/dass.asp](http://www.smu.edu/alec/dass.asp) to verify the disability and to establish eligibility for accommodations. They should then schedule an appointment with the professor to make appropriate arrangements. (See University Policy No. 2.4; an attachment describes the DASS procedures and relocated office.)

\* **Religious Observance:** Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

\* **Excused Absences for University Extracurricular Activities:** Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalogue)