



**NEW JERSEY INSTITUTE OF TECHNOLOGY  
COLLEGE OF ARCHITECTURE AND DESIGN**

### ***PHYSICAL COMPUTING***

**COURSE:** DD 364 – Digital Design Studio II (5 credits)  
**PROGRAM:** Digital Design/School of Art + Design  
**LOCATION:** second semester junior year/spring term  
**INSTRUCTOR:** Taro Narahara

**DESCRIPTION:** Required design studio for students to study physical computing, robotics, product design with sensors, adaptive structures, and so on. All Digital Design students take one semester of physical computing within the design studio sequence, devoting the term to the study and use of Arduino and Processing and the creation of projects emphasizing interactive techniques. They utilize sensors in student-built projects, along with 3D printing and laser-cutting.

**PROJECT:** Individual interactive assignments. Some projects involve the use of Microsoft Kinect to create interactive installations and various ways particles and objects may be remotely manipulated through physical activity (e.g. hand motion, dance). Other projects require the design and construction of algorithmically-based tools to work/interact with a user (e.g. drawing machine).

**REQUIREMENTS:** Deliverables vary by project. In all cases, built proof-of-concept elements are required that demonstrate degree of response to stimuli. Students build all components of physical projects and work with instructor to write code in Processing.

**OBJECTIVES:** (1) Provide design students with an opportunity to learn some computer programming and apply the knowledge to a project that deals either with human/computer interface. (2) Require digital design students to get out of the virtual environment into the physical one by building components and thinking of user interface(s). (3) Provide an introduction to rapid prototyping, CAD/CAM, and algorithmic design for designers. (4) Explore potential relationships between various human senses (touch, hearing) and inanimate objects.

**REFERENCES:** (1) Borenstein, Greg. *Making Things See: 3D Vision with Kinect, Processing, Arduino, and MakerBot*. (O'Reilly Media/Make, 2011). (2) Fry, Ben. *Visualizing Data: Exploring and Explaining Data with the Processing Environment*. (O'Reilly Media/Make, 2011). (3) Igoe, Tom. *Making Things Talk: Using Sensors, Networks and Arduino to see, hear, and feel your world/2<sup>nd</sup> Edition*. (O'Reilly Media/Make, 2011). (4) Margolis, Michael. *Arduino Cookbook*. (O'Reilly Media/Make, 2011). (5) Noble, Joshua. *Programming Interactivity: A Designer's Guide to Processing, Arduino, and Openframeworks*. (O'Reilly Media/Make, 2011). (6) Reas, Casey. *Processing: A Programming Handbook for Visual Designers and Artists*. (MIT Press, 2007) (7) Terzidis, Kostas. *Algorithms for Visual Design Using the Processing Language*. (Wiley, 2009)