**Course Number:** ID 2510

**Course Title:** Intro to Smart Product Design

**Instructor:** TBD

**Credit Value**: 3 credit hours

**Course times:** Wednesday 8:05am – 10:55 am

**Location:** West Architecture 1st Floor Atrium + Interactive Product Design Lab

**Pre-requisite:** ID 1012 Ind Des Fundamentals 2

**Catalogue Description:**

This course provides an introduction to smart product design including the basics of sensor technologies, electronics and programming required to produce working product concept prototypes.

**Objectives:**

New technologies are all too often used to redesign existing products and systems without investigating opportunities to fully leverage the efficiencies of new capabilities. The Intro to Smart Product Design Course will focus on the potential to enhance user experience while providing more ecologically sensitive solutions in a broad cross-section of ‘real life’ situations including: design for mobility; design of wearable technologies; design for health and well-being; and design of interactive systems to support a more sustainable future. Course materials will provide a hands-on introduction to interactive technologies through easy-to-use kit-based systems then step up to more sophisticated microcontroller and sensor-based technologies to support the design development of fully operational “proof of concept” prototypes.

**Learning Outcomes:**Upon completion of the course students are expected to demonstrate knowledge, skill and abilities in the following areas:

* Understanding of capabilities of entry level microprocessors and related sensor technologies.
* Sufficient knowledge of electronics and programming to produce working interactive prototypes.
* Ability to use a variety of techniques to visually communicate ideas persuasively through sketches, illustrations, photographs, multiple types of sketch models and prototype.
* Ability to work effectively in teams.
* Articulate ideas in both written & verbal presentations.
* Demonstrate a high standard of quality and attention to detail in models and presentations.

Course Format:

Instructional methods for teaching the course include:

* Faculty-lead short lectures, presentations, discussions, and reviews
* Workshop/ demonstration sessions, may include a combination of project production, one- on- one/group tutorials, and desk critiques

Weekly Learning Activities:

* + Lectures (3 hours)
  + Assignments (3 hours)
  + Total Hours (6 hours)

**Weekly Schedule**

* W 1-3 • Course Intro & Prototyping with Modular Electronics: Project 1
* W 3-6 • Design & Prototyping Interactive Products: Project 2
* W 7-10 • Design & Prototyping Wearables: Project 3
* W 11-15 • Controlling Interaction between Devices: Project 4
* W 16 • Review, Reflection & Discussion

**General Responsibilities and Expectations:**Attendance:  
Students are expected to attend and participate during each class session. Attendance for all scheduled exams or any in class presentation is required. If you know that you will miss a class, please advise your instructor at least 24 hours in advance. If an unexpected situation occurs, it is your responsibility to contact the instructor within 24 hours of the scheduled class time. Please refer to the Institute attendance policies here: <http://www.catalog.gatech.edu/rules/4/>, and contact me with any questions.

**Participation:**Students are expected to actively engage in any in-class discussions and activities.

**Deadlines:**Students are expected to complete any assigned readings and come prepared to each class. Deadlines for all assignments and projects will be specified when they are given. Any in-class assignments will be due by the end of class unless otherwise specified. Late or incomplete projects will result in grade reduction. In-class activities may only be made up if you are absent for a valid reason. The instructor reserves the right to change the dates and modify assignments as necessary, with advanced notification.

**Evaluation Criteria:**Students will be evaluated on the quality of presentations made before the class and on the quality of their contributions in class discussions.

**Grading:**Grading will be based on the Georgia Institute of Technology system. No plus or minuses will be applied to the final grade. However, plus and minuses will be used for all the submissions during the semester. Students will have one week after each project grade submissions to discuss any grading matters to the instructor.

The grade ranges are defined as follows:

90-100% = A  
80-89% = B  
70-79% = C

60-69% = D

0-59% = F

Grades will be based on projects and exams according to the following grading distribution:

Project 1 10%

Project 2 20%

Project 3 30%

Project 4 30%

Participation 10%

Total 100%

**On-Line Resources (T-Square):**The course will utilize T-Square (t-square.gatech.edu) for the distribution of class materials (such as lecture slides or supplemental readings), announcements, and for turning in class assignments.

**Facilities & Equipment:**All students enrolled in ID 2510 Intro to Smart Product Design will be required to purchase a Sensor Starter Kit. The kit will support students’ design of interactive products throughout their undergraduate education. Current costs are < $100/kit [for Arduino brand].

This course may make use of support facilities such as the workshop, computing lab and other resources. The College of Design workshop (basement east building) and laser-cutters (third floor east building) are available to support design activities. Students wishing to use the facility and equipment must have completed the required introductory course and /or have been checked out in the proper use of the equipment by lab personnel. The College of Design computing Lab room #104a is the primary computer lab for the ID Program. The normal operating schedule for the lab is the same as the other College of Design computing facilities.

**Required Books/Reference Materials:**

* Whenever possible reference and reading materials will be provided in digital format via the class website.
* Sensors for basic lab exercises will be provided on a loan basis subject to replacement if lost or damaged.
* Students will be required to provide any custom electronic components they may wish to incorporate in the development of prototypes at their own cost.

**Recommended Books/Reference Materials:**

* Banzi, Massimo; Getting Started with Arduino
* Buxton, Bill; Sketching User Experiences
* Igoe, Tom; Making Things Talk: Practical Methods for Connecting Physical Objects. Make: Books, O’Reilly Media Inc., Sebastopol, CA 2007
* Igoe, Tom and Dan O'Sullivan; Physical Computing: Sensing and Controlling the Physical World with Computers, 2004
* Kuniavsky, Mike; Smart Things: Ubiquitous Computing User Experience Design
* Moggeridge, Bill; Designing Interactions
* Pakhchyan, Syuzi; Fashioning Technology: A DIY Intro to Smart Crafting (Craft: Projects)
* Reas, Casey; Processing: A Programming Handbook for Visual Designers and Artists
* Reas, Casey and Ben Fry; Getting Started with Processing
* Saffer, Dan; Designing Gestural Interfaces: Touchscreens and Interactive Devices
* Seymour, Sabine; Fashionable Technology: The Intersection of Design, Fashion, Science and Technology
* Snyder, Carolyn; Paper Prototyping: Fast and Simple Techniques for Designing and Refining the User Interface
* Thackara, John; In The Bubble: Designing in a Complex World
* Winograd, T.; Bringing Design to Software

**Reference Books Currently Available in the Lab: (for in-Lab use Only)**

* Astolfo, Ferrari, Ferrai; Building Robots with Lego Mindstorms NXT D Banzi, Massimo; Getting Started with ArduinoBanzi, Massimo; Getting Started with Arduino
* Igoe, Tom; Making Things Talk: Practical Methods for Connecting Physical Objects. Make: Books, O’Reilly Media Inc., Sebastopol, CA 2007
* Boogaarts, Daudelin et al; The Lego Mindstroms NXT Idea Book D Hansen, John C.; Lego Mindstorms NXT Power Programming
* Gertz, Emily & Patrick Di Justo; Environmental Monitoring with Arduino
* Hunt, Jamer, Alexandra Midal and Poala Antonelli; Talk to Me: Design and the Communication between People and Objects
* Igoe, Tom; Making Things Talk: Practical Methods for Connecting Physical Objects. Make: Books, O’Reilly Media Inc., Sebastopol, CA 2007
* Igoe, Tom and Dan O'Sullivan; Physical Computing: Sensing and Controlling the Physical World with Computers
* Karvinen & Karvinen; Make: Arduino Bots & Gadgets
* Kelly, James Floyd; Lego Mindstorms NXT-G Programming Guide
* Mims, Forest M.; Electronic Circuits & Sensors
* Monk, Simon; Programming Arduino: Getting Started with Sketches
* Platt, Charles; Make: Electronics – A Hands-on Primer for the New Electronics Enthusiast
* Reas, Casey and Ben Fry; Getting Started with Processing
* Schmidt, Maik; Arduino: A Quick-Start Guide

**Academic Honor Code**

Refer to details of the Institute’s Academic Honor Code here: <http://catalog.gatech.edu/rules/18/>. Please contact me with any questions.

**Special Needs**

All students with special needs, permanent or temporary disabilities are urged to contact me or [troy.whyte@troy.whyte@design.gatech.edu](mailto:troy.whyte@troy.whyte@design.gatech.edu)  (404-385-1275) for information or assistance to coordinate their service needs.

**Office of Disability Services** website: <http://disabilityservices.gatech.edu/>

The Office of Disability Services, located in Suite 221 of the Smithgall Student Services Building, provides support and information regarding students with disabilities at the Georgia Institute of Technology.  Assistance is also available for meeting the requirements of the Americans with Disabilities Act (ADA) and Section 504 of the Rehabilitation Act of 1973. The Disability Services Program assists students self-identifying as having a disability to obtain reasonable accommodations.   Official documentation of disability is required to determine eligibility for accommodations or adaptations that may be helpful on campus.

Staff members in the Office of Disability Services serve as full-time advocates for students with disabilities. Their role is to ensure that all students have physical and programmatic access to all college programs, thereby enhancing their interactions in all activities of the campus community.

Their purpose is to improve the educational development of students with disabilities and to enhance the understanding and support within the institute through equitable access, accommodations, and the provision of programs and services.

**Student Bill of Rights:**

1. The right to attend classes at regularly scheduled times without deviation from such time and without penalty if the student cannot attend instructional, lab, or examination hours not institutionally scheduled.
2. The right to consult with an assigned and qualified advisor for a reasonable amount of time each term.
3. The right to consult with faculty outside usual classroom time such as regularly scheduled office hours by appointment.
4. The right to have reasonable access to campus facilities of which use is required to complete course assignments and/or objectives.
5. The right to receive a syllabus for each course at the first class meeting. The syllabus should include an outline of the course objectives, criteria used in determining the course grade, and any other requirements. Students should be informed of any changes made to the syllabus with reasonable time to adjust to these changes.
6. The right to have reasonable time to learn course material prior to the administration of an examination.
7. The right of each student to receive access to any of his/her records kept by the institution.
8. The right to have reasonable access to grading instruments and/or evaluation criteria and to have graded material returned in a timely fashion.
9. 9. The right to be informed of the grade appeals process.
10. The right to have reasonable facilities in which to receive instruction and examinations.
11. The right to be informed in each course of the definition of academic misconduct.

**Contacting the Instructor for an Appointment:**If you would like to arrange a meeting or appointment, please speak with the instructor after class or contact the instructor via email. Please allow 24 hours for a response.

This syllabus may be subject to change during the course of the semester. If so, the syllabus will be updated online and you will be informed of the change.