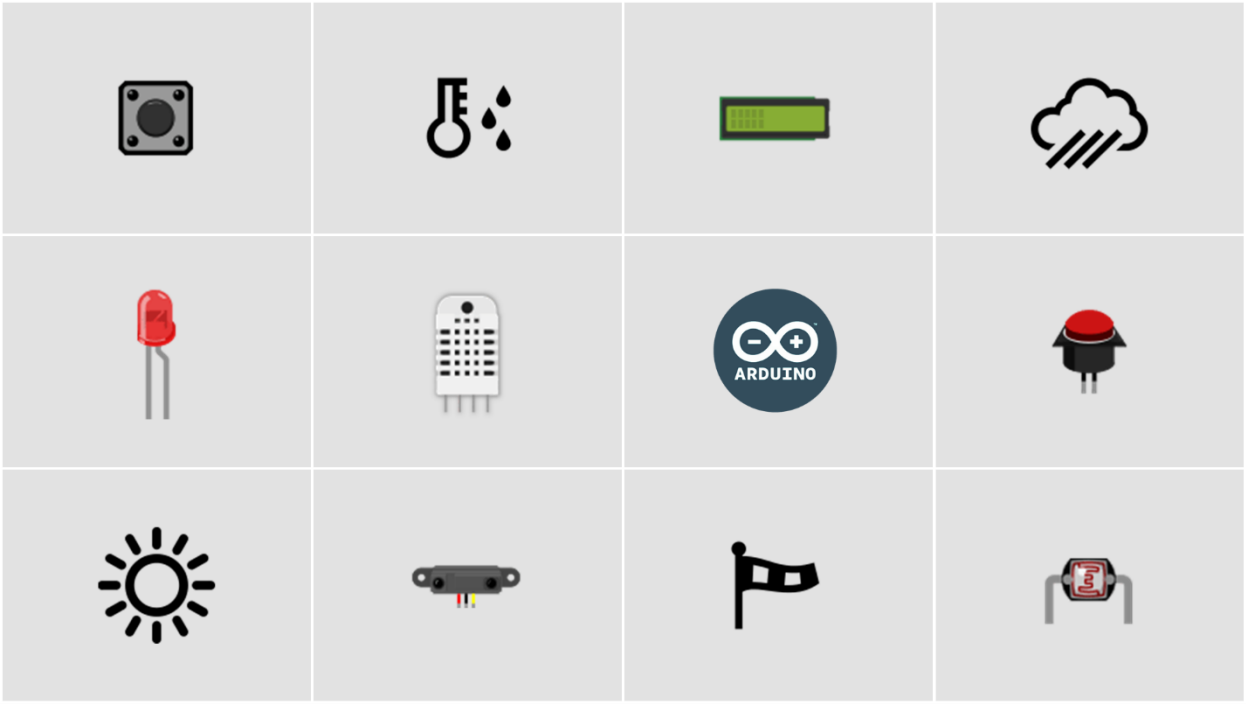
Sensing the Environment



Instructor: Junhak Lee (junhakl@uoregon.edu), Dept. of Landscape Architecture, Univ. of Oregon
LA 410/510 Sensing the Environment: Spring 2019 - online course (4 units).

This course introduces how to build small, inexpensive, connected electronic devices ("things") to sense our environment and explores their design implications. We will use Arduino (microcontroller - affordable, small-scale, open source prototyping platform intended for designers, artists, hobbyists, and anyone interested in creating intercave objects or environments) to build prototype sensing devices to monitor both indoor and outdoor environments. The course also covers the basics of electronic components, circuits, coding, and environmental sensors. Step-by-step instruction videos will be provided for making the sensing devices that can monitor various environmental factors such as temperature, humidity, light, sound, water, barometric pressure, etc. Through weekly lab exercises, students will build an interactive "thing" that records the sensor measurements and monitors a particular space/site. Then students will visualize and explore the data collected from their own sensing devices. The course aims to help students better understand how designed spaces and natural landscapes affect various environmental conditions and human comforts with DIY sensors that make the invisible visible.

This course is intended for landscape architecture, architecture, interior architecture, planning, or environmental studies students but anyone interested in converting creative ideas into physical interactive "things" is welcome.

Prior experience or knowledge in hardware/software is NOT required for this course, and this course assumes that students have no knowledge of either programming or electronics.

Course Objectives

- Be introduced to the basics of electronic components, circuits, coding, and environmental sensors
- Develop core skills in building interactive electronic devices with various environmental sensors using open source hardware prototyping platforms
- Gain experience of building environmental sensors, logging sensor measurements, and analyzing collected data
- Gain practical experience of making a prototype device from creative idea to solve real-world problems by combining multiple sensors
- Understand how designed spaces and natural landscapes affect various environmental conditions and human comforts with sensors

Textbook

- No required textbook

Materials

- Hardware
    - Computer (Linux, Mac, or Windows)
    - Device with a camera (smartphone, digital camera, action camera, laptop, etc)
    - Arduino board and electronics parts (including sensors) – will be leased by the instructor
    - Extra electronics parts and materials to make the prototype (optional)

- Software (and web service)
    - Sketch - Arduino IDE (Integrated Development Environment)
    - Adobe Spark (free account)
    - Tinkercad Circuits (free account)
    - Spreadsheet program (Excel, Numbers, Google Sheets, etc)
    - RStudio (optional)
    - Adobe Illustrator (optional)

Course Mechanics

This course is online (via the Canvas system) and conducted asynchronously (i.e. students can access class materials and conduct lab exercises anytime with their own schedule). However, the class activities and assignments (video lectures, readings, quizzes, and lab exercises) will be released on a weekly basis (with weekly due dates), so that course workloads are evenly distributed throughout the term. The materials for building environmental sensing devices will be leased with no cost, and students will return them at the end of the term.

In addition to online assistance, the instructor will be available during office hours to work one-on-one with students wishing in-person assistance.