

Toolkit: Multimedia (Physical Programming)

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Availability:	during class time or by appointment
Location:	8.7.153 (unless noted)

Toolkit Description

This course provides an opportunity to explore programming techniques and basic electronics within a design environment. The course provides a useful introduction to interaction design, including embedded technology, wearable devices, intelligent products and immersive environments. The software and hardware used in the course have been designed specifically for artists and designers and allow for quick, low-cost development and prototyping of interactive projects.

Learning Objectives & Outcomes

The course will:

- Encourage you to explore the field of interaction design and reflect upon interactive design projects.
- Introduce you to basic programming principles and develop procedural thinking.
- Enhance your ability to select and use appropriate software and hardware tools.
- Promote peer-learning, collaborative development and self-directed learning.
- Introduce you to basic electronics including embedded microcontrollers.
- Extend your soldering, prototyping and construction skills.
- Develop your ability to shift information between virtual and real world environments.

Learning Activities

Student skills will be developed in a hands-on learning environment. Peer learning is highly encouraged and it is expected that students will bring a diverse range of skills and experience to the course. Classes will involve step-by-step tutorials and supervised individual and group work.

While undertaking learning activities you will:

- Examine and reflect on procedural systems.
- Investigate electronic components and sensor technology.
- Explore the *Pure Data* visual programming environment.
- Develop interactive *sketches* for the *Processing* and *Arduino* programming environments.
- Experiment with the *Arduino* microcontroller.
- Collaborate on interactive design experiments.
- Develop and implement an embedded, interactive design project.

Semester Schedule (Thursday 9:00-11:00, 11:30-13:30, 14:00-16:00)

Semester Calendar:

Wk 1	Jul. 22	Introduction
Wk 2	Jul. 29	Building a <i>Pure Data</i> patch.
Wk 3	Aug. 5	Writing a <i>Processing</i> sketch.
Wk 4	Aug. 12	<i>Processing</i> and the <i>Arduino</i> .
Wk 5	Aug. 19	Ins and Outs of the <i>Arduino</i> .
Wk 6	Aug. 26	Excursion (TBC)
Mid-semester break (Aug 30 - Sep 5) No classes		
Wk 7	Sep. 9	Basic Electronics
Wk 8	Sep. 16	Sensors
Wk 9	Sep. 23	Outputs
Wk 10	Sep. 30	Arduino Advanced
Wk 11	Oct. 7	Arduino Advanced
Wk 12	Oct. 14	Arduino Advanced
Wk13	Swot Vac Week (No Classes)	
Wk14	Oct. 28	Final Submission (Location & time TBD)

Project Briefs:

Flow chart.

Produce a diagram of your daily activity. Upload the diagram and a short explanatory text to the class wiki.

Due: week 2 – July 29

Pure Data patch.

Develop a *Pure Data* patch that responds to a specific input. Upload the patch (as a zipped file) to the class wiki and provide a short explanatory text with appropriate screen shots.

Due: week 4 – August 12

Sensor technology report.

Choose a sensor technology that you would like to incorporate into your final project. Investigate its use within interactive projects. Prepare a short report that outlines how the device operates, what the device is typically used for, and how it may be interfaced with the *Arduino* microcontroller. Publish the report on the class wiki and include it in your reflective journal. Use images and diagrams where appropriate.

Due: week 5 – August 19

Processing sketch.

Develop a *Processing* sketch that mirrors the patch developed for the previous project. Upload the sketch (as a zipped file) to the class wiki and provide a short explanatory text with appropriate screen shots.

Due: week 6 – August 26

Box, Basket, Bowl, Bag - Final Project.

The technology course asks you to develop a project incorporating skills from each of your three toolkits (Fibre, Wood, and Multimedia) into a single object. This object may take the form of a box, basket, bowl, or bag. For the multimedia stream you are required to develop an interactive component. This interactive component must be based around the *Arduino* microcontroller and should be designed to take an input from the object's environment and, using this data, produce a visible/audible/sensible output. You are free to choose the type of sensor technology used and the nature of the output.

Due: week 13 – October 28

Reflective Journal.

During the semester you are required to keep a journal of your research. This journal will cover all three technology toolkits and should include documentation of your experiments and investigations, references to interesting or inspiring projects, information about technical processes, links to information resources, and reflections on your learning experience.

Due: week 13 – October 28

References and Links

The subject will make intensive use of online resources. Relevant links will be placed on the class wiki. See www.openobject.org/physicalprogramming

Assessment

Flow chart. – 10%

Pure Data patch. – 15%

Sensor technology report. – 15%

Processing sketch. – 15%

Box, Basket, Bowl, Bag - Final Project. – 30%

Reflective Journal. – 10%

Participation. – 5%

Late Submission

Due dates for all projects should be considered as final deadlines. Any extension to these dates needs to be negotiated with you lecturer before the due date. Your lecturer may refuse to accept any late work for assessment.

For extensions and special considerations, refer to the Course Guide B.

Equipment Required

Students will be required to purchase a small number of electronic components for this class – this cost need not exceed \$25. Classes centred on the Arduino development environment will use RMIT's *Arduino* microcontrollers. Students may wish to purchase their own *Arduino* boards for use outside of class time; this should be done in consultation with teaching staff.

Most classes will take place in a computer lab with students using a variety of free, open source software. These tools are freely available for download and students with their own computer (Mac or PC) are encouraged to install this software for use outside of class time.

Classes focused on circuit construction may require students to use soldering irons and associated equipment. This equipment will be supplied by RMIT however students are expected to provide their own safety glasses.

You will be required to pay for the associated expenses of field trips to manufacturers (travel costs etc).

If you have issues related to the costs associated with the course please contact the course coordinator so that alternative arrangements can be made.