

SUM0095 Physical Computing with the Arduino

Based at the Trent Park Campus

Dates:	One week, 16 to 20 July
Times:	10am to 5pm, Monday to Friday
Lecturer:	Alex Zivanovic
Prerequisites:	None but basic knowledge of computers is beneficial
Assessment:	None
Fee:	UK/EU £270 International £270

Physical computing, in the broadest sense, means building interactive physical systems by the use of software and hardware that can sense and respond to the real world. It is a creative framework for understanding human beings' relationship to the digital world.

The Arduino is an electronics prototyping platform based on cheap, flexible, easy-to-use hardware and software. It can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors and other actuators. It was specifically designed for use by designers and artists rather than people with a technical background.

The course will start with the following:

- **Digital inputs** so you can read sensors that are on or off, like switches, passive infrared detectors, etc.
- **Digital outputs** so you can control actuators which are either on or off, like LEDs, lights, speakers, etc.
- **Analogue inputs** so you can read sensors which have a range of values, like potentiometers and light dependent resistors.
- **Analogue outputs** so you can control actuators which have a range of values, like dimming a light or controlling the speed of a motor.
- **Serial communication** with the host computer so that you can interact with programs running on it, including graphics and sound.

The next stage will be to look at **actuators** that make things move. You'll learn to control DC motors (including their speed), stepper motors, servo motors, solenoids, etc.

Then we'll move onto more advanced techniques which will depend on the specific interests of the participants. These could include:

- Wireless communications using RF modules, Zigbee, etc.
- RFID card reading
- DMX lighting control
- MIDI input/output (you could make your own custom musical instrument)
- GPS input for locative device

For more ideas about what is possible, have a look at the Arduino Playground: <http://www.arduino.cc/playground/>. If you have a specific project in mind please email the tutor before the course on a.zivanovic@mdx.ac.uk

"Before attending the course you should buy the Arduino Starter kit from Oomlout: <http://www.oomlout.co.uk/starter-kit-for-arduino-ardx-p-183.html>

and bring it with you to the course. Other components and modules may be loaned during the course."

The course will be an intensive one, so you are strongly advised not to miss any sessions.