Workshop Proposals for DTTA at CS4HS

Workshops on offer

[**Project-Based Learning in Senior Software Projects (Python Flask HTML CSS)**](#b5x1l868zxph)

[**Arduino Programming Electronics and Robotics**](#51ezgo3hr16s)

[**Python and SQL Workshop**](#so6gx7h2hhr6)

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[**Game Design**](#5p2c3hlz405r)

[**Junior Programming with App Inventor**](#arcjr3u0rlt5)

**Project-Based Learning in Senior Software Projects**

We'll look at how to build a senior programming course around project based learning - building a web app in Python with an SQLite database in the back end. While this can be used to gain 14 credits under the current standards - more importantly it teaches valuable industry skills and independence while giving students ownership of their own program of learning and outcomes.

Web apps are a great way to build a truly cross-platform application. Almost everything these days has a browser (look up the iLoo)

Goals

Design and build a simple SQL database with ER diagram

Design and build a simple Flask app, using the database

Design simple templates to view the data in a website

And do it all with industry best practice

https://youtu.be/hgI0p1zf31k

Resources

Laptop

Internet

Coffee

Pad and pen

Coffee.

You will also be working in a collaborative environment so will be able to talk to those around you about how this can be incorporated into a range of junior and senior programs.

We will also look at how this can be used to integrate into the new proposed L1 standards

Design

Develop

Programming

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**Arduino Programming Electronics and Robotics**

The same way Python's popularity has increased, so has the Arduino development platform, with worldwide enthusiast groups developing projects for the beginners to the highly skilled. This is a great way to get students involved in embedded programming and developing their electronic skills. In this full day workshop you will be developing Arduino projects using a variety of components such as sensors, actuators, and light. If you want to further develop your skills and have projects you want to work on you can bring that along as well. We do have a variety of components and subsystems attendees will have access to. People will have the chance to build and problem solve and there will be support helping people with this.

If there are teachers who would like to look at Robotics, I have Vex IQ robots we can use as well as Arduino Robots.

Software Needed(If you want to use your own laptop you can install that beforehand)

**Arduino Platform**

Arduino IDE

TinkerCad Circuits (Online and great way to simulate Arduino Circuits)

**Vex IQ**

Vex IQ Programming Software

Vexos Utility

Vexcode VR - No installation

You will also be working in a collaborative team so will be able to talk to those around you about how this can be incorporated into your junior and senior programs.

We will also look at how this can be used to integrate into the new proposed L1 standards

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**Python and SQL Workshop**

Python’s popularity has continued to increase and is now the de-facto programming language for beginners to learn. Programming without data, however, can be a little limiting. Believe it or not, it is surprisingly easy to add a database to a Python program and with a little SQL you can improve the functionality of your programs immensely. The added benefits are that you can assess at least two standards in one outcome. That and you get to work with two of the coolest languages on the planet.

In this workshop you'll learn how to integrate both languages. You’ll spend the day creating a complete Python application that integrates an SQLite database with help from an experienced teacher who has been teaching and assessing this for more than five years.

This course should be seen as a natural precursor to the other Python/Flask course as this course will cover the fundamentals of database in Python and the other course will take it a step further with HTML/CSS and Server side Python.

As a bonus, you’ll get access to the course and assessment material should you wish to take it back and use it in your school.

These skills cover at least 2 standards at level 1 to 3 (Database and Programming) but could be used in a project based setting to cover Processes.

You will be working in a collaborative team so will be able to investigate how this can be incorporated into your own programs of work and how this will be easily integrated into the new proposed standards for Level 1.

Prerequisites:

Ability to use the internet

Some knowledge of Python

Coffee and/or a “Can Do” attitude.

Software if using own laptop:

Visual Studio Code or Repl.it

SQLite Studio

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**Learning Fusion 360 or Blender 2.8**

Fusion 360 fundamentals

This session introduces key Fusion 360 concepts, before starting with modeling. We will look at design concepts, and working with files and projects. We will then send these to the cnc machine, the laser cutters or the 3d printers.

We will introduce Fusion and look at the capabilities of this software and the interface.

The session will then allow teachers to work their way through a series of tutorials.

This course will allow teachers to work through a series of tutorials covering:

**FUSION 360**

Introduction to Fusion 360

Get started with modeling

Understanding fusion 360 concepts

Working with files and projects

Sketch basics

Solid modeling basics

Mesh modeling

**BLENDER 2.8**

Fundamentals

Woprkspaces

Modelling

Meshes

Extrusion and other tools

UV wrapping etc,

There will be students helping to run the workshops and provide guidance - and support and to help when you get stuck. We are working to confirm support from the UC Product design school currently.

You will also be working in a collaborative team so will be able to talk to those around you about how this can be incorporated into junior and senior programs.

We will also look at how this can be used to integrate into the new proposed L1 standards

Design

Develop

HCI

<https://help.autodesk.com/view/fusion360/ENU/courses/>

<https://www.youtube.com/playlist?list=PLa1F2ddGya_-UvuAqHAksYnB0qL9yWDO6>

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**Game Design**

Game Design is the perfect way to engage students in a creative and challenging way that combines the CT and DDDO curriculum areas perfectly.

In this workshop you'll see how easy it is to apply previous knowledge of Python Programming to a modern game engine called Godot. Learn how art, level design, planning, testing and feedback can help students iteratively develop outcomes that can cover up to 16 credits at level 1 and how these skills can be adapted to cover the entire 20 credits for the new incoming assessment.

In this workshop you'll be guided through the planning and development of a complete 2d game in the Godot game engine including art creation, levels design, audio and coding.

We will investigate how this course can be used at levels 1 to 3 NCEA with the current standards, as a component of a larger course or as a whole and how it might fit perfectly for a complete course using the proposed new Level 1 Standards.

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**Junior Programming with App Inventor**

Block coding is a powerful way to introduce both beginner and more advanced programming concepts. However, lots of students who have started learning to code with block-based languages such as Scratch come into Years 9 and 10 thinking that they have out-grown them. So you need a good hook to keep them engaged. Apps have become so much a part of everyone’s daily lives and making their own app which will run on their own phone is a great way to spark that interest.

MIT App Inventor (http://appinventor.mit.edu/) is a popular educational tool for learning how to code, with more than 10 million users, worldwide. It is a visual blocks-based programming language with a development environment that runs in a browser, to design and build mobile apps.

MIT App Inventor has a large assortment of teaching resources including two teaching programmes suitable for high school age students. This workshop will introduce you to App Inventor and some of the teaching resources. It is hands-on, so teachers should come away with the experience and confidence to teach some or all of the units in their schools.

We will also share resources that have been designed for use with AppInventor in Aotearoa, that match the new and revised DT curriculum material. We will also discuss how this could be stepped down for students in Years 7 and 8.

**Equipment needed and pre-workshop set up**
Note: Participants should come to the workshop with a laptop and a mobile phone to use in the workshop.

Please install the following app on your phone before the workshop. MIT AI2 Companion (Android) or MIT App Inventor (Apple). Look for this logo 

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