

A **STEAM** High School Program for 11th and 12th Graders
Meet your future, head on.

MECHATRONICS

STEAM CLOWN™ PRODUCTION

READY TO HEAR ABOUT MECHATRONICS?

Mecha = Mechanical Engineering & Design

Tronincs = Electrical Engineering & Design

And that = **Fire Breathing Robots**

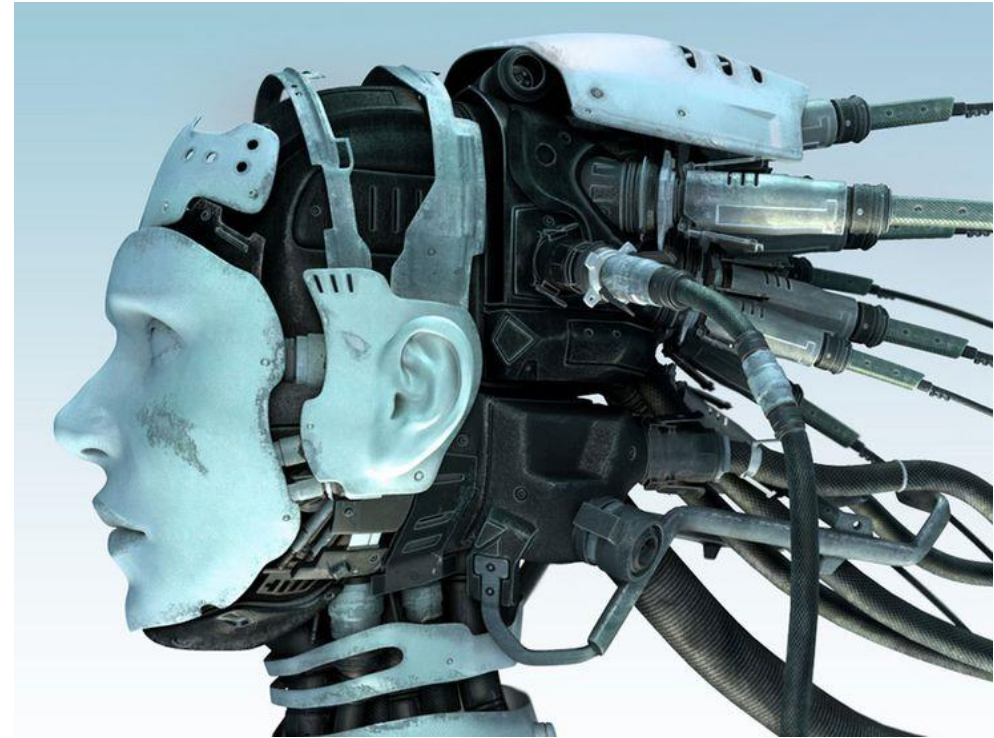


Fire-Breathing Pony

MECHATRONICS WILL BE EPIC NEXT YEAR....

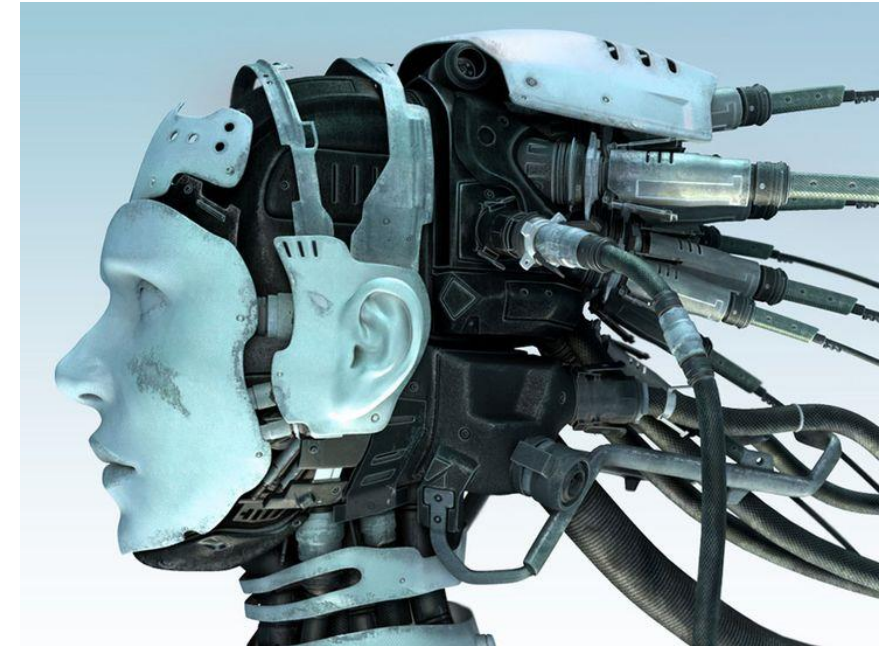
AND YES... WE WILL BUILD STUFF LIKE THAT!!!

- Mechatronics Is A Mashing Together Of:
 - Robotics Engineering
 - Electronic & Mechanical Technology
 - Computer Control Systems



MECHATRONICS - WHAT WILL YOU LEARN?

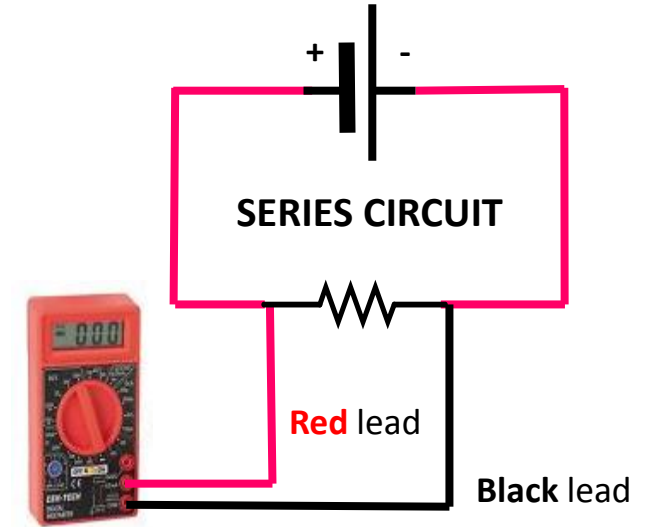
- Hands on Physics <-- this is planned to be interleaved as part of the other modules, but to satisfy the A-G "D" Science requirement
- AC/DC Electronic Fundamentals
- Digital Electronic Fundamentals
- Programming with Microcontrollers
- Programmable Logic Devices
- Mechanical 3D design & mechanical drawing
- Robotic Theory and Application
- Pneumatic Systems



MECHATRONICS - WHAT WILL YOU LEARN?

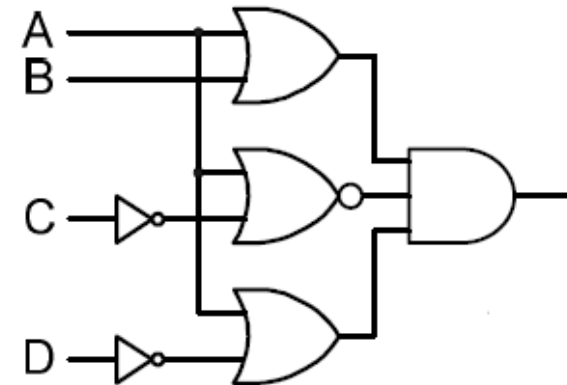
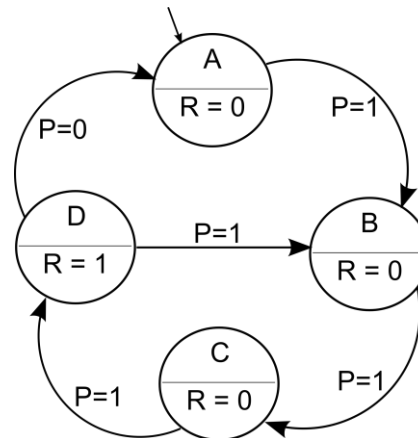
- Introduction to Analog Electronic Circuits

- Ohms Law
- Serial and Parallel Circuits
- Digital Logic



- Introduction to Digital Logic

- AND gates and OR gates
- Boolean Logic
- Registers
- State Machines



https://learn.digilentinc.com/Classroom/RealDigital/M3/RealDigital_Module_3.pdf

<https://www.allaboutcircuits.com/technical-articles/implementing-a-finite-state-machine-in-vhdl/>

MECHATRONICS - WHAT WILL YOU LEARN?

- IT Essentials

- fundamentals of computer hardware and software
- advanced concepts Assembling and Imaging Computer Systems
- responsibilities of an IT professional.



<https://www.netacad.com/courses/it-essentials/>

- CPA Programing Essentials In C++

- Learn the C++ Language
- Create & Execute C++ Programs

```
class GameOverScene : public cocos2d::CCScene {
public:
    GameOverScene():_layer(NULL) {};
    ~GameOverScene();
    bool init();

    //SCENE_NODE_FUNC(GameOverScene);
    static GameOverScene* node()
    {
        GameOverScene *pRet = new GameOverScene();

        //Error: undefined reference to 'GameOverScene::init()'
        if (pRet && pRet->init())
        {
            pRet->autorelease();
            return pRet;
        }
        else
        {
            //Error: undefined reference to 'vtable for GameOverScene'
            delete pRet;
            pRet = NULL;
            return NULL;
        }
    };
    CC_SYNTHESIZE_READONLY(GameOverLayer*, _layer, Layer);
};
```

- Python Programing

- Learn the Python Language
- Scripting
- Control Hardware

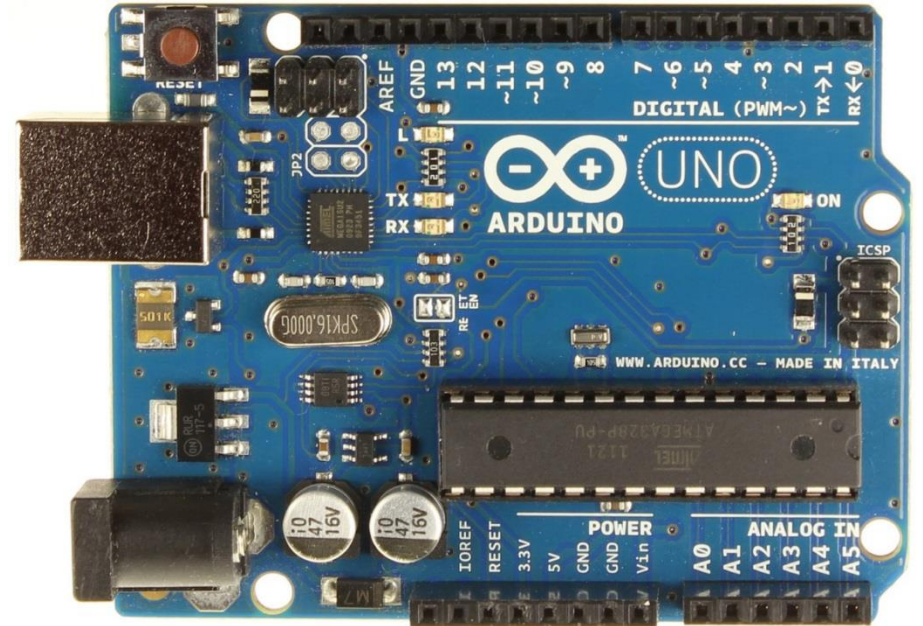


<https://www.python.org/static/img/python-logo.png>

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& **Squeaky Hinge**
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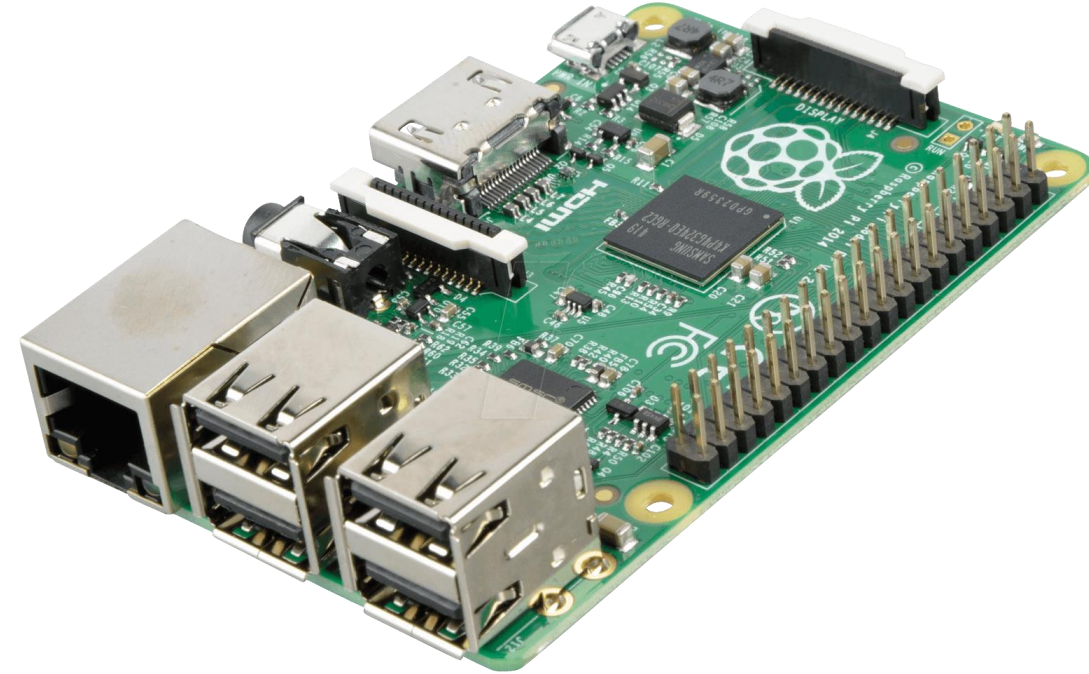
LEARN C++ USING THE ARDUINO

- Arduino Is An Open-source Electronics Platform
 - With easy to use hardware & software.
 - Intended for anyone making interactive projects
- Arduino Can Sense & Control It's Environment
 - Receiving information from sensors on input pins
 - Affecting it's surroundings by controlling lights, motors, actuators, etc on output pins
- You Tell Your Arduino What To Do
 - Writing code in the Arduino programming language
 - Using the Arduino development environment



LEARN PYTHON USING A RASPBERRY PI

- The Raspberry Pi Is A Tiny And Affordable Computer
 - Learn programming through fun, practical projects
 - Easy to use hardware & software.
- Step-up Your Programing Skill With Linux
 - Learn Linux
 - Build complex applications
- You Tell Your Pi What To Do With Python
 - Learn to code in the Python programming language
 - Use the Python development environments



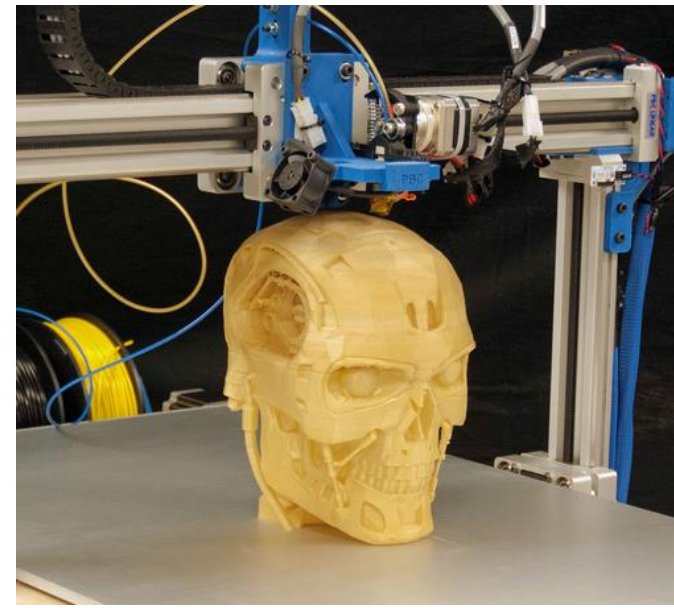
https://wiki.openwrt.org/_media/media/raspberry_pi_foundation/rpi1bplus.png



<https://www.python.org/static/img/python-logo.png>

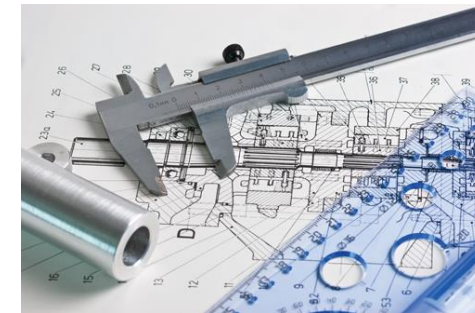
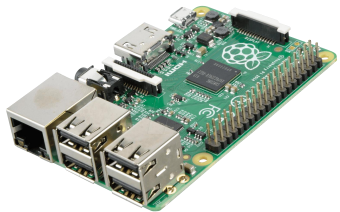
3D PRINTING

- Learn SolidWorks CAD tools
- Design And Print Projects



MECHATRONICS- WHAT WILL YOU LEARN?

- Mechanical System
- Motors & Servos
- Industrial Robots
- Pneumatic Control
- REC (Vex Robotics Club)
- And much much more...



AND WE GET TO BUILD COOL STUFF FOR HALLOWEEN

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