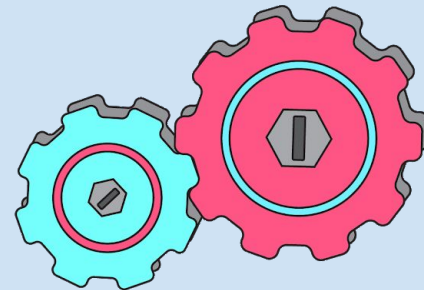
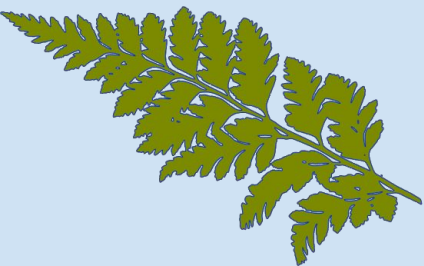


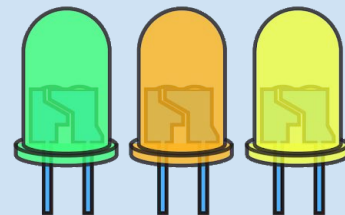
**STEAM**



**WORK EXPERIENCE**



**PROGRAM**



General Orientation, July 1st 2019

## Schedule:

- Staff Introductions
- What is STEAM?
- Program Overview
- Lab Tours
- Safety Overview
- Surveys + Paperwork
- Design Challenge (time permitting)

# Staff Introductions

*Rakeem Washington* (Opening Doors Project Director) [Rakeem.Washington@pcc.edu](mailto:Rakeem.Washington@pcc.edu)

*Julie Stocker* (Opening Doors Education Coordinator) [Julie.Stocker@pcc.edu](mailto:Julie.Stocker@pcc.edu)

- Oversee Opening Doors Project, manage student payments, administrative, and student issues.

*Francesca Frattaroli* (STEAM Program Coordinator/Instructor) [Francesca.Frattaroli@pcc.edu](mailto:Francesca.Frattaroli@pcc.edu)

- Oversees STEAM WE curriculum, scheduling, and Fab Lab access.

*Jordan Laurent* (Instructor) [Jordan.Laurent@pcc.edu](mailto:Jordan.Laurent@pcc.edu)

- STEAM WE instructor with experience in design, microelectronics, music, and coding. Oversees curriculum and TEB 119 STEAM Room access.

*Adam Greene-Haley* (Instructor) [HoodRichardson@gmail.com](mailto:HoodRichardson@gmail.com)

- STEAM WE Drone instructor based out of the Airway Science Program. Oversees Drone Curriculum and Airway Science Room Access.

What is S.T.E.A.M. ?

Science

Technology

Engineering

Art

Mathematics

# SCIENCE

## Actions:

- Systematic study
- Observation and Experiment

## Goal:

- To know about the physical and natural world



“The intellectual and practical **activity** encompassing the **systematic study** of the structure and behaviour of the physical and natural world through **observation and experiment.**” - Oxford English Dictionary (OED)

From Latin scientia, from scire 'know'.

# SCIENCE Careers

## **For who?**

Academic, Government, and Private institutions.

## **Doing what?**

Documenting and researching physical, social, or natural phenomena

## **Example Fields?**

Medicine, Environment, Social Services, Biology, Chemistry, Agriculture, Anthropology, Material Sciences, Physics, Archaeology.....

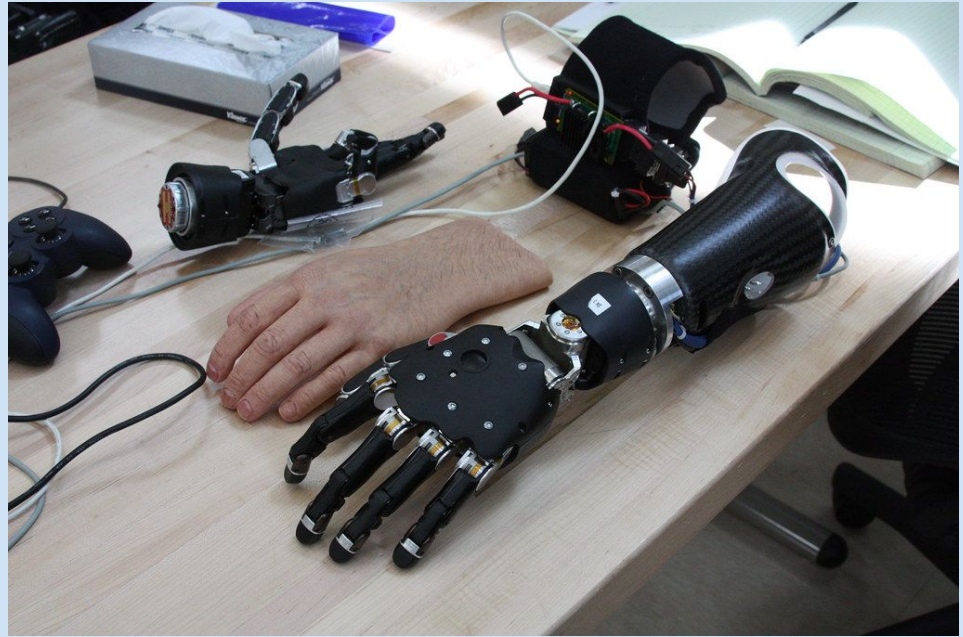
# TECHNOLOGY

## **Actions:**

Application of *Scientific* Knowledge

## **Goal:**

Equipment for Practical Purposes



“The **application of scientific knowledge** for **practical purposes**, especially in industry. Machinery and **equipment** developed from the application of scientific knowledge.” - OED

From Greek tekhnologia 'systematic treatment', from tekhnē 'art, craft' + -logia ("a speaking, discourse, treatise, doctrine, theory, science,")

# Technology Careers

## **For who?**

Academic, Government, and Private institutions & yourself.

## **Doing what?**

Designing, researching, programming, and prototyping tools

## **Example Fields?**

Medicine, Environment, Software, Commercial and Consumer Product Development.



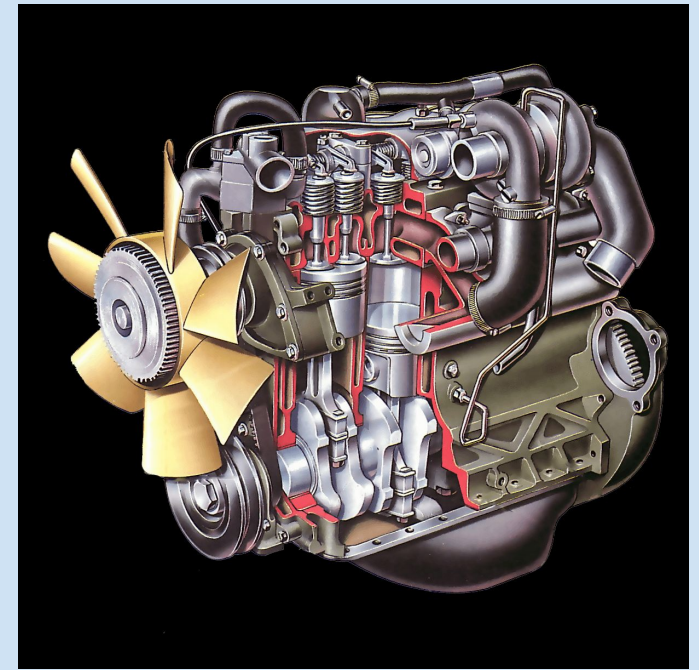
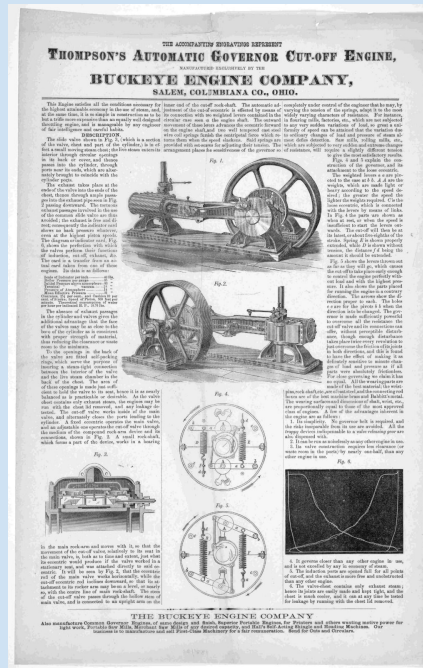
# ENGINEERING

## Actions:

Design, Build  
Working *Artfully*

## Goal:

Create, bring about  
machines and structures.



“The branch of *science and technology* concerned with the **design, building,** and use of engines, machines, and structures.”

“The action of **working artfully** to **bring something about.**” - OED

From medieval Latin *ingeniator*, from *ingeniare* 'contrive, devise', from Latin *ingenium* (engine);

# Engineering Careers

## **For who?**

Academic, Government, and Private institutions & yourself.

## **Doing what?**

Consulting and Designing, researching, evaluating, programming, prototyping, and certifying tools, materials, and infrastructure.

## **Example Fields?**

Medical, Environmental, Civil, Mechanical, Electrical, Material, Software, Commercial and Consumer Product Development,

# ART

## Actions:

Expression of imagination

Application of creative skill

## Goal:

Produce works to be appreciated for their beauty or emotional power.



“The expression or **application of human creative skill and imagination**, typically in a visual form such as painting or sculpture, producing works to be appreciated primarily for their beauty or emotional power.” -OED

From middle english, "skill as a result of learning or practice," from Old French art (10c.), from Latin artem "work of art; practical skill; a business, craft," from \*ar(ə)-ti- ("Greek artizein "to prepare"), suffixed form of root \*ar- "to fit together."

# Art Careers

## **For who?**

Public and private institutions & Yourself (freelance).

## **Doing what?**

Designing, creating, consulting, and performing sensory experiences and physical objects.

## **Example Fields?**

Graphic and Product Design, Audio Visual Production, Game Design, Architecture, Interior Design, Fashion, landscaping, etc.

# MATHEMATICS

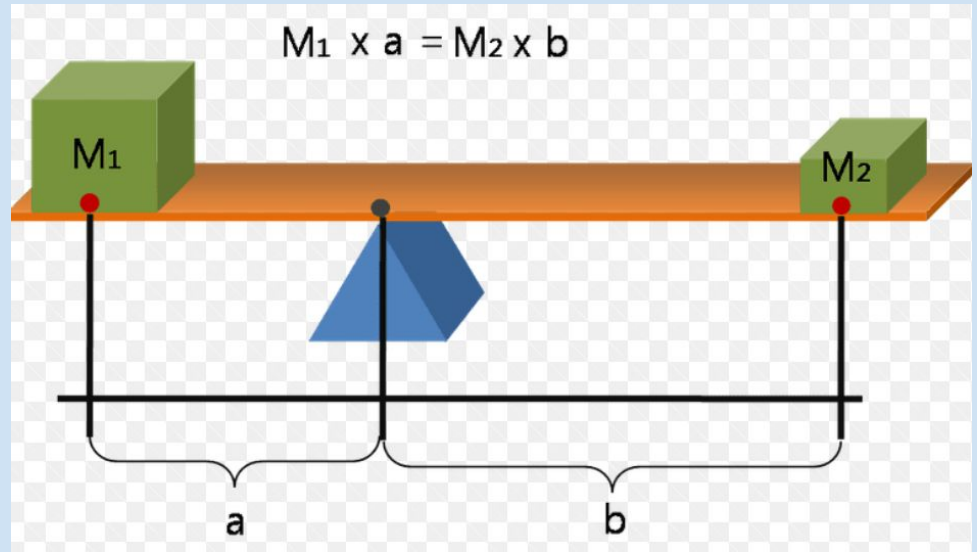
Actions:

Systematic study

Observation and Experiment

Goal:

Learn about numbers, quantity, and space, and apply them to other fields



“The abstract **science** of number, quantity, and space, either as abstract concepts (pure mathematics), or as applied to other disciplines such as physics and *engineering* (applied mathematics)” -OED

From Old French *mathematique*, from Latin (ars) *mathematica* ‘mathematical (*art*)’, from Greek *mathēmatikē* (*tekhḗnē*), from the base of *manthanein* ‘*learn*’.

# Mathematics Careers

## **For who?**

Academic, Government, and Private institutions.

## **Doing what?**

Pure mathematics research; Designing predictive and optimization models, statistical analysis, an interpreting and processing data, building out engineering principles.

## **Example Fields?**

Medical, Environmental, Engineering, Electrical, Material, Software, Commercial production and finance.

# STEAM Spaces on Campus

## **Makerspaces on Campus:**

- TEB STEAM Room (TEB 119)
- Airway Sciences Room (TEB 121)
- Paragon Fab Lab (PAR)
- Interactivity Sonic Arts Lab (MAHB 223)
- AV/Virtual Reality Development Lab (MAHB 216)

## **Computer Labs on Campus:**

- Cascade Library
- Margaret Carter Learning Center
- Multimedia Computer Labs (MAHB 215, 217, 219)
- Mixing and Ableton Lab (TEB 215)

# STEAM Work Experience (Syllabus) Overview

## **What this program is:**

An opportunity to explore creative and technical fields through hands-on workshops, field trips and special topic lectures.

## **Goals of the program:**

- Teach STEAM related tools and skills.
- Develop general workplace skills including teamwork, time and project management, workplace communication, and shop safety.
- Identify interests as they relate to potential career paths and develop those interests through projects that build relevant skills.
- Encourage documentation of projects- showcasing skills and accomplishments.



# STEAM Work Experience (Syllabus) Overview

Where this program is:

## Physical Location:

PCC Cascade Campus, 705 N Killingsworth St, Portland, OR, 97217

- **Margaret Carter STEAM Room**, TEB 119 (N Killingsworth & Kerby)
- **Airway Sciences**, TEB 121

## Website:

[STEAMWE.github.io](https://STEAMWE.github.io)

# STEAM Work Experience (Syllabus) Overview

## Program Content and Outcomes:

The STEAM Work Experience Program is a selection of group and individual learning opportunities.

## Program Elements:

1. **Tool Mastery:** interns can focus on mastering a specific tool or set of tools, building out documentation and example work.
2. **Group Projects:** interns can work to contribute to a long-term group project with an established goal.
3. **Independent Projects/Independent Study:** interns can choose to focus on a specific theme or academic discipline, taking online courses and designing projects that align with a specific field of study.

# STEAM Work Experience (Syllabus) Overview

## Summer 2019 Sample Projects

- 1. Drone Building and Flying Workshop:** Weekly drone workshop where students are able to assemble, program, modify, and fly remote controlled drones. *(skills: general fabrication, soldering, electronics, programming, piloting)*
- 2. Farmbot Project:** Multi-term project where students assemble a garden bed and autonomous gardening robot, select optimal plants for climate, monitor garden, and harvest produce. *(skills: general fabrication, electronics, programming, environmental science, agriculture)*
- 3. Sonic Arts Workshop:** Workshop where students learn basics of Ableton music software, recording, and beat mixing techniques. *(skills: Audio Technology & Production, Interface Design, creative expression)*

# STEAM Work Experience (Syllabus) Overview

Interns are encouraged to participate in all scheduled offerings or work with the project director and education coordinator to develop an independent project or personalized goal for the term.

All students are encouraged to generate documentation of their work.

Success in this program is largely dependent upon the time and effort investment of each intern, for which there is no set requirement (max. 18hrs/week). However, there are a set of outcomes that an intern who actively participates can expect to achieve.

# STEAM Work Experience (Syllabus) Overview

**Upon successful completion of this program, students will be able to:**

- Identify PCC's career pathway programs
- Identify and use common measurement and hand tools (Calipers, Measuring Tape, Hammer, Drill, etc.)
- Respect standard shop safety and maintenance protocols
- Operate a 3D Printer, Laser Cutter, Soldering Iron, & CNC Router
- Generate simple designs using 2D and 3D Modeling Software
- Identify common electronic components and apply basic circuit theory to microelectronic projects
- Apply Design Process, project management, and teamwork techniques to hands-on projects
- Clearly document their skills and projects and be able to explain their accomplishments to a layperson
- Share a portfolio of completed projects and acquired skills to a potential employer or educator

# Program Rules and Expectations:

- **Treat fellow interns as colleagues** - When you can, help your classmates when they are struggling with a problem by sharing your skills and acquired expertise.
- **Avoid swearing and use respectful language** - when communicating ideas and disagreements. Even if nobody is being insulted, swearing it is considered highly unprofessional in many workplaces.
- **No phone use allowed in the workspace** - (except with prior approval - let us know if you are expecting an important call). Working with hand and power tools requires undivided attention and phones pose a dangerous distraction.
- **Sign in at the beginning and end of the day** - Pay is dependent on attendance
- **Maintain good communication attendance** - Let us know when you won't be coming in.

# Program Benefits:

- **There are no minimum attendance requirements**, with the exception of orientations and safety trainings (though lack of participation may make it harder to re-engage ongoing projects).
- **Students can request 1:1 training for subjects** or technologies not covered in group orientations.
- **Students may make products for sale**, using work experience tools and resources.

# Instructor Contract:

- What are our duties as Educators?:
  - Share our knowledge and skills
  - Provide you with challenging but achievable problems to solve
  - Give you the tools to be successful
  - Answer questions and offer constructive feedback
- What does it mean to be a respectful educator?
  - Show up on time and prepared to educate
  - Give you our undivided attention during class time
  - Actively listen to and acknowledge your concerns and experiences
  - Constantly try to improve our educational content and methods as we continue to learn
  - Maintain a compassionate and positive attitude, especially at times of disagreement



# Intern Contract

- What are my duties as an STEAM Work Experience Intern?
- What does it mean to be a respectful student?
- What does it mean to be a respectful team member?

# Program Schedule:

**2019 Summer Term:** *July 1st - September 4th*

**General Weekly Format:** *(for students who cannot attend all regular hours, let instructors know your availability)*

<b>LOCATION:</b>	<b>TEB 119/121</b>	<b>TEB 119/121</b>	<b>TEB 119/Remote</b>
<b>TIME:</b>	<b>MONDAY</b>	<b>TUESDAY</b>	<b>WEDNESDAY</b>
<b>10PM - 11PM</b>	<b>Career Training</b>	<b>STEAM Topic Workshop</b>	<b>Field Trip</b>
<b>11PM - 12PM</b>	<b>Career Training</b>	<b>STEAM Topic Workshop</b>	<b>Field Trip</b>
<b>12PM - 1PM</b>	-----LUNCH BREAK-----		
<b>1PM - 2PM</b>	<b>STEAM Topic Lecture</b>	<b>STEAM Topic Workshop</b>	<b>Field Trip</b>
<b>2PM - 3PM</b>	<b>Drone Workshop</b>	<b>Drone Workshop</b>	<b>Field Trip</b>
<b>2PM -4PM</b>	<b>Drone Workshop</b>	<b>Drone Workshop</b>	<b>Field Trip</b>
<b>ACTIVITY:</b>	<b>New Topic Lecture</b>	<b>Group Workshop</b>	<b>Field Trip</b>

# Program Schedule:

WEEK	DATES	EVENTS/TOPICS
1	7/01 - 7/03	Orientation and Introductions / Radio Soldering Project
2	7/08 - 7/10	Laser Cutting Trainings / Sylvania Automotive Tour
3	7/15 - 7/17	3D Printer Trainings / Rebuilding Center Workshop
4	7/22 - 7/24	Online Portfolio Development / Free Geek Computer Workshop
5	7/29 - 7/31	BREAK
6	8/05 - 8/07	BREAK
7	8/12 - 8/14	CNC Training / Swan Island Tour and Workshop
8	8/19 - 8/21	Robotics Workshop / Metalwood Welding Workshop
9	8/26 - 8/28	Arduino Microcontroller Workshop / Free Project Day
10	9/03 - 9/04	(Labor Day Monday) E-Textile Workshop / Scrap Art Workshop

Schedule changes from week to week, see course website for detailed, up-to-date schedule

Website Overview: [STEAMWE.github.io](https://STEAMWE.github.io)

PCC STEAM Work Experience Spring 2019 

**Portland Community College** Follow/Connect

Portland Community College Cascade STEAM Work Experience Program



**STEAM** 

**WORK EXPERIENCE**

**PROGRAM** 

# Work Experience and Fabrication Skills Surveys

For this you will need an **Email address**.

Please Navigate to ~

[STEAMWE.github.io](https://STEAMWE.github.io) > Spring 2019 > Week 1

There are 2 surveys, please fill out in as much detail as possible.