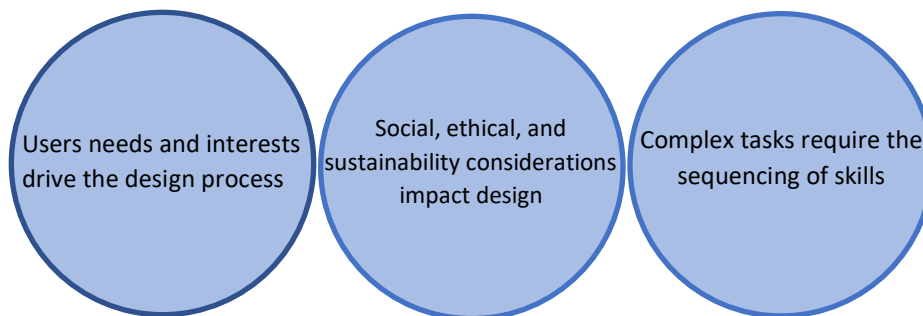# Electronics 10 – Course Outline

Electronics/Robotics 10 is a 2 credit project based theory supported course. Students will gain an appreciation for electricity, its behaviour, and how it is used in electronic/robotic applications.

Applied Design, Skills, and Technology Courses (ADST)

The ability to design, make, acquire, and apply skills and technologies is important in the world today and key in the education of citizens for the future.

ADST curriculum is an experiential, hands-on program of learning through design and creation.

The 'Big Ideas' – overarching organizers for the development and delivery of the course

Users needs and interests drive the design process

Social, ethical, and sustainability considerations impact design

Complex tasks require the sequencing of skills

Content

*Upon completion of the course, students are expected to know the following:*

- ✓ design opportunities
- ✓ Ohm's law
- ✓ electrical theory using parallel and series circuits
- ✓ breadboard circuitry
- ✓ production of simple circuits from schematic drawings
- ✓ electronic diagnostic and testing instruments
- ✓ function and application of components
- ✓ construction sequences involved in making a working circuit
- ✓ function and use of hand tools and operation of stationary equipment
- ✓ cases for enclosing a circuit
- ✓ sequences involved in making a functional robot
- ✓ robot elements
- ✓ block-based coding or logic-based programming for robotics
- ✓ programming platforms for robotics
- ✓ flow charts related to robotics behaviour

As this is a hands on course, projects drive the learning. There will be two main projects undertaken with each aimed to teach you different things.

Electronics – The Useless Box

What could be more worthy of your time than creating a *Useless Box*? This project may appear to be as it is named, but if you let it, it will teach you a lot about electronics and the process of creating circuit boards, programming microcontrollers and developing electronic enclosures.
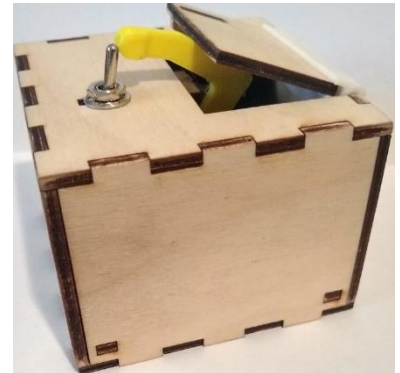
Robotics

Meet Otto. Otto will help us to explore what it means to be a robot. You will assemble and program Otto to help him to move and even dance!

Theory

Theory study is the building of the knowledge that allows us to do cool things. Understanding electrical behaviour and the purpose/use of various electronics components is critical to making things work and, eventually, being able to build/create more complex electronics/robotics systems.

Theory Topics

- ☐ Basic Electricity (voltage, resistance, current)
- ☐ Common Electronic Components
- ☐ Schematic Parts Symbols
- ☐ Resistor Colour Code
- ☐ Basic Tools & Equipment

Curricular Competencies

Students are expected to be able to do the following:

Understand context – how things fit into the larger picture

Define – identify project constraints, associated criteria

Ideate – generate ideas within a project's constraints, critically analyze these, determine (ongoing) viability

Prototype – develop a plan, evaluate potential materials, make changes as needed, keep records of process/iterations

Test – identify sources of feedback; develop appropriate test methods; conduct testing; evaluate results and iterate as needed

Make – use tools, technologies, materials and processes; follow a step by step plan; be sensitive to waste

Share – identify methods and targets for sharing of products and processes; demonstrate; identify new goals

Grades

Grades will be calculated cumulatively and posted to My Ed BC regularly. This course runs every other day for the next 10 weeks (Term 1), approx. 60 hrs. The grade breakdown is as follows:

> Quizzes – 10%
>
> Labs – 30%
>
> Projects – 60%

Safety

Your safety is the highest priority in the shop. Safe work practices, handling of materials, techniques and expected behaviour will be clearly conveyed and it is expected that you will demonstrate your understanding by demonstrating safe work habits at all times.

Class Website (Google: 'Isfeld Makerspace')

A website is maintained to support all courses offered in this room. The direct address is http://makerspace.isfeldschool.com/, however it is often easier to simply Google 'Isfeld Makerspace' to get there. You will be using this site nearly, if not, every day and it cannot be over emphasized how important it is to remember how to get there!

https://curriculum.gov.bc.ca/curriculum/adst/10/electronics-and-robotics