COURSE OUTLINE

INTRODUCTION

Electronics 10 course meets the general aims of the Technology Education curriculum.
https://curriculum.gov.bc.ca/curriculum/adst/9

BIG IDEAS AND GENERAL LEARNING OUTCOMES

User needs and interests drive the design process.

Social, ethical, and sustainability considerations impact design.

Complex tasks require the sequencing of skills.

Defining: Identify insights from research, a design issue, potential users, relevant contextual factors in the design space, criteria for success, intended impact, and any constraints.
Ideating: Take risks in generating ideas. Add to others' ideas in ways that enhance them. Screen ideas against criteria and constraints. Critically analyze and prioritize competing factors, including social, ethical, and sustainability considerations, to meet community needs for preferred futures. Choose an idea to pursue, keeping other potentially viable ideas open.
Prototyping: Identify and use sources of inspiration and information. Choose a form for prototyping, Develop a plan/pictorial drawings, sketches, flowcharts, etc. that includes key stages and resources. Evaluate a variety of materials for effective use and potential for reuse, recycling, and biodegradability, Prototype, making changes to tools, materials, and procedures as needed, Record iterations of prototyping.
Testing: Identify sources of feedback. Develop an appropriate test of the prototype. Conduct the test and collect and compile data. Evaluate data and decide on changes. Make the prototype or abandon the idea.
Making: Identify and use appropriate tools, technologies, materials, and processes for production. Make a step-by-step plan for production and carry it out, making changes as needed. Use materials in ways that minimize waste.
Sharing: Decide on how and with whom to share: (may include showing to others, use by others, giving away, or marketing and selling the product and processes.) Demonstrate the product to potential users. Provide a rationale for the selected solution, modifications, and procedures, using appropriate terminology. Critically reflect and evaluate the design thinking process and the success of the product. Identify how the design ideas contribute to the individual, family, community, and/or environment. Identify new design issues. Evaluate the ability to work effectively both as individuals and collaboratively in a group, including the ability to share and maintain an efficient co-operative work space.

COURSE CONTENT: REQUIRED LEARNING OUTCOMES

1. **Uses of electronics and robotics:** Through Lab work, theory, project work, and collaborations.
2. **Components of an electric circuit and electrical theory:** Theory and lab work, capacitors, resistors, switches, diodes, transistors, LED's, IC chips, potentiometers, etc.
3. **Ohm's Law:** Theory and practical use through labs and projects
4. **PCB Design and Production:** Various etching, computerized and hand drawn methods.
5. **Basic Robotic behaviours using input/output devices:** Introduction to curriculum and theory on shop based robots and equipment
6. **Mechanical Devices:** Introduction to DC motors, Servo motors, Bluetooth devices, levers, wheels. Will include Mechanical advantage and efficiency; friction, force, and torque.

7. **Robotics Platforms:** Introduction to Rasberry Pi, Arduino's, AT Tiny's, Trinket, Java script, Python, Creation of STL files for 3D printing.
8. **Robotics Coding:** Flow Charts, block-based coding or logic based programming.
9. **Safety and Machine Theory:**
   General Shop Safety: Safety sense, personal conduct, mindfulness, and responsibility
   Specific training to the correct, safe use of power machines and hand tools in the electronics shop

STUDENT LEARNING ACTIVITIES

- Students will participate in general theory lessons, group activities, and individual work.
- Project work will include: Hand Drawing, Computer Aided Design and Model Making

ASSESSMENT & EVALUATION

1. Theory - 15% - Quizzes, assignments, dedicated notebook.
2. Practical Work - 70% - Projects, design portfolios
3. Social Responsibility 15% clean-up habits, accountability, **student service**

Teacher and Personal Self-Evaluations/Assessments are used to evaluate your ability to work effectively as an individual and collaboratively in a group, including your ability to share and maintain an efficient co-operative work space. You will be expected to reflect on your designs/projects with marking criteria.

EXPECTATIONS

Lab Equipment - Before using equipment, computers, tables you must **be instructed how to use them** appropriately. Any damage caused due to negligence/neglect, or improper use will be **charged to the student.** All books/equipment must remain in the lab.

Attendance - This is an APPLIED course, **ATTENDANCE IS MANDATORY**

Project Completion - Open shop times are a privilege. It is expected that students who are behind in their work will attend open shop periods.

**** ALL PROJECT WORK MUST BE COMPLETED IN ORDER TO PASS THE COURSE ****

Clean-up - **All** students are expected to actively participate in clean-up

Notebook - A **notebook** and a **pencil** and an **eraser** must be brought to **every** class

EQUIPMENT AND MATERIALS

Projects All materials and special equipment not covered in the course fee, and materials required for extra credit project work must be paid for by the student. Example: Model kits.

PARENT/GUARDIAN ACKNOWLEDGEMENT

I have read this course outline. I am aware of the course content, policies, expectations, student activities, evaluation procedures, and approximate costs.

Student Signature: _____ Date:_____

Parent Signature: _____Date:_____

Tutorial Time and Schedule: [redacted]

Tutorial Time is available each day from 8:30 AM – 9:30 AM for those students that require extra time or help to finish projects and coursework. This time can also be used for special setups on tooling as required.

Please Note: Tutorial Time should be pre-arranged with the teacher upon request by either the teacher or the student.