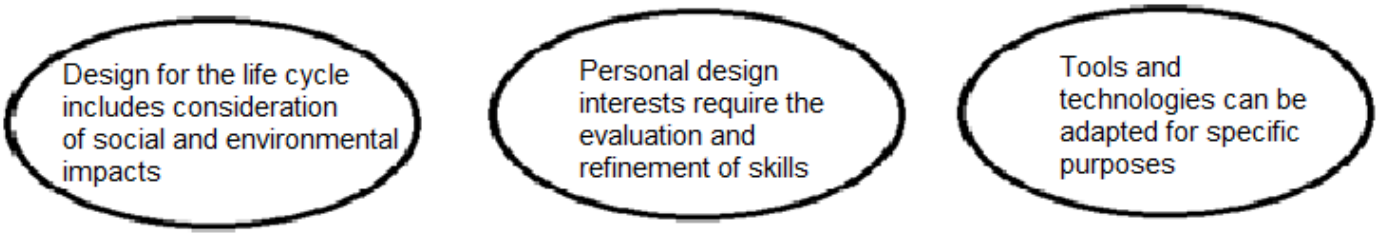
COURSE OUTLINE

INTRODUCTION

The Electronics 12 course meets the general aims of the Technology Education curriculum. https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/adst/en_adst_12_electronics_elab.pdf

BIG IDEAS AND GENERAL LEARNING OUTCOMES



Understanding context: Conduct **user-centred research** to understand design opportunities and barriers

Defining: Choose a design opportunity and point of view. Identify potential users, intended impact, and possible unintended negative consequences. Make inferences about premises and boundaries that define the design space

Ideating: Take creative risks to identify gaps to explore as design space**.** Generate ideas to create a range of possibilities and add to others' ideas in ways that create additional possibilities. Critically analyze how competing social, ethical, and sustainability considerations impact designed solutions to meet global needs for preferred futures**.** Prioritize ideas for prototyping and **designing with users**

Prototyping: Identify and use a variety of **sources of inspiration** and **information.** Choose an appropriate form, scale, and level of detail for prototyping, and plan procedures for prototyping multiple ideas. Analyze the **design for life cycle.** Construct prototypes, making changes to tools, materials, and procedures as needed

Testing: Identify feedback most needed and possible **sources of that feedback.** Develop an **appropriate test** of prototypes. Gather feedback from users over time to critically evaluate their design and make changes to products designs or processes. Iterate the prototype or abandon the design idea.

Making: Identify appropriate tools, technologies, materials, processes, **potential funding sources**, and time needed for production, and where/how these could be available. Use project management processes when working individually or collaboratively to coordinate production

Sharing: **Share** their progress while making: to increase feedback, collaboration, and, if applicable, marketing. Decide on how and with whom to share or promote their **product**, creativity, and, if applicable, intellectual property. Critically evaluate their design thinking and processes, and their ability to work effectively both as individuals and collaboratively in a group, including the ability to implement project management processes. Identify new design issues, including how they or others might build on their concept.

Applied Skills: Demonstrate an awareness of safety issues for themselves, co-workers, and users in both physical and digital environments**.** Identify and evaluate their skills and skill levels, in relation to their project or design interests, and develop specific plans to learn or refine their skills over time.

Applied Technologies: Explore existing new, and emerging tools, **technologies**, and systems and evaluate their suitability for their design interests**.** Analyze the role and impact of technologies in societal change, and the personal, social, and environmental impacts, including unintended negative consequences, of their choices of technology use. Analyze how cultural beliefs, values, and ethical positions affect the development and use of technologies

COURSE CONTENT: REQUIRED LEARNING OUTCOMES

1. **Uses of electronics and robotics:** Through Lab work, theory, project work, and collaborations. Future career opportunities and interpersonal skills for interacting with colleagues and clients.

2. **Components of an electric circuit:** Theory and lab work, capacitors, resistors, switches, diodes, transistors, LED's, IC chips, potentiometers, etc. Resistor Colour Coding.
3. **Ohm's/Watt's Law:** Theory and practical use through labs and projects
4. **PCB Design and Production:** Various etching, computerized and hand drawn methods. Schematic Diagrams.
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.
7. **Circuit Construction:** Design and make circuits using strategies for isolating problems and implementing solutions in circuit construction. Measurement using advanced diagnostic testing instruments.
8. **Robotics Coding:** Introduction to Rasberry Pi, Arduino's, AT Tiny's, Trinket, Java script, Python, Creation of STL files for 3D printing. Purpose and operation of microcontrollers/microprocessors.
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.