

## Shirley Smith High School Vision and Values

### *Grow with us.*

*At Shirley Smith High School, teaching and learning is authentic, rigorous, and designed to maximise student agency. We align deep disciplinary knowledge and excellent pedagogical practice to ensure our learners are empowered to find their purpose, fulfil their potential, and shape their own futures.*

Students at Shirley Smith High School are:

### **Curious**

*brave and open minded inquirers with a desire to know and understand*

### **Connected**

*inclusive young people connected to each other, connected to their community and connected to Country*

### **Learners**

*creative empowered learners with boundless potential for their futures and the future of our planet*

## Subject Details

<b>Subject/s:</b>	Engineering	<b>Learning Area:</b>	Science and Technologies
<b>Teacher/s:</b>	Adam King	<b>Learning Period:</b>	Semester 1, 2026

## Engagement in Learning

In order to facilitate active engagement in their learning, students are expected to:

- Arrive prepared for their lessons, equipped with a fully charged chromebook, a notebook, a pen or pencil, and any other subject-specific materials that may be necessary.
- Independently make an effort to retrieve and complete any missed assignments or coursework due to absences or extracurricular activities during their own time.
- Embrace the principles of the school's Yindymarra wellbeing framework by treading lightly. This involves taking moments to pause, authentically connecting with others, engaging in deep listening, thoughtful reflection, and considering the impact of their actions on others.

## Learning and Assessment Policies

Please see the school website for policies regarding the submission of late work, extension requests for assessment tasks, and plagiarism and academic integrity.

## Description of Learning

### **Unit overview:**

In the Year 9 Engineering elective, students engage in a semester-long program built around four major design challenges: the Solar Oven Challenge, Cardboard Chair Design, RoboCup Line Rescue using LEGO SPIKE kits, and the Agricultural Robotics Challenge. Across these projects, students develop deep conceptual understanding of energy systems, materials science and autonomous technologies. They investigate heat transfer (conduction, convection and radiation), insulation, thermal mass and energy efficiency in the context of sustainable cooking and global health. They explore circular economy thinking and product lifecycle analysis while analysing the structural properties of cardboard, including fluting, grain direction and load distribution. In robotics-focused units, students examine how sensors,

algorithms and control systems enable autonomous decision-making, feedback responses and real-time problem solving in rescue and agricultural environments.

Students apply the engineering design process throughout the semester, defining constraints, prototyping, testing and iteratively refining solutions based on evidence. They design and evaluate a low-cost solar oven using controlled experiments to model heating performance and calculate efficiency; create scale models and full-size cardboard chairs using technical drawings and mathematical reasoning (including Pythagoras' Theorem, ratio, surface area and volume); and construct and program autonomous robots capable of navigating rescue courses or completing agricultural tasks. Through sensor calibration, algorithm development, debugging and data analysis, students strengthen computational thinking and systems reasoning. Emphasis is placed on precise construction, safe workshop practices, technical communication and justification of design decisions using quantitative and qualitative evidence, preparing students for further study in engineering, robotics and sustainable technologies.

**Unit learning outcomes:**

By the end of this unit, students will demonstrate a level of achievement for the following standards:

- Creates, adapts and refines design ideas, processes and solutions and justifies their decisions against developed design criteria that include sustainability
- Communicates design ideas, processes and solutions to a range of audiences, including using digital tools.
- Develops and modifies innovative digital solutions, decomposes real-world problems, and critically evaluates alternative solutions against stakeholder elicited user stories
- Analyses energy conservation in simple systems and applies wave and particle models to describe energy transfer

**Assessment:**

<b>Task</b>	<b>Approximate Due Date</b>
- Solar Oven Product and Presentation	Week 6
- Cardboard Chair Product and Presentation	Week 10
- Line Rescue Challenge	Week 15
- Agricultural Robot Design	Week 19
- Class work	Ongoing

**Learning Experiences**

Throughout the unit, students may have the opportunity to engage in the following learning experiences:

**Incursions/Excursions - N/A**