Year 10 - iSTEM 2022

<table>
<tr><th colspan="3">TERM 1</th></tr>
<tr><td rowspan="3">TIMING
Weeks: 8</td><td colspan="2">Mechatronics and Robotics

Students learn about robotics and automated systems. It starts by examining robotics and the types, purpose and use of robots. Students learn about the function of robots including the use of sensors and actuators.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>Mechatronics and Robotics

• Robotics is the study of the design, construction, and use of robots.
• Function of robots - Industrial robots often have movable robotic arms. The amount of movement in robots is called the degrees of freedom.
• Automated control devices manage themselves once given suitable instructions.
• Automated systems use automated control to perform tasks. The application of automated systems has grown with developments in information technology.</td><td>Task Number: 1

Nature of Task:
Ongoing Activities
Research Presentation
Assignment

Percentage: 20%

Week: 8

Reported: Semester 1</td></tr>
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Year 10 - iSTEM 2022

<table>
<tr><th colspan="3">TERM 2</th></tr>
<tr><td rowspan="3">TIMING
Weeks: 9</td><td colspan="2">Aeronautical Engineering

Students develop a basic understanding of aeronautical engineering and learn about forces.

Fast and Curious

Students will learn about the design and production process and how to apply it in design projects.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>Aeronautical Engineering
Aeronautical Engineering history, progress and career paths
Physics
Mechanics
Engineering
Vectors and Force calculations
Reaction force Calculations
Basics of aerodynamics
Piloting Drones
Programming Drones using Python
Past technologies, current technology and emerging technologies
Fast and Curious
Students learn about the design and production process, Identifying and defining, Smart cities, Analysis of the design brief, Cybersecurity and encryption, algorithms, Flowcharts, smart city solution, Models and simulations and Social and ethical issues surrounding data use.</td><td>Task Number: 2

Nature of Task:
Practical Task &
Written Report

Percentage: 30%

Week: 9

Reported: Semester 1</td></tr>
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Year 10 - iSTEM 2022

<table>
<tr><th colspan="3">TERM 3</th></tr>
<tr><td rowspan="3">TIMING
Weeks: 7</td><td colspan="2">Designed for Space
Students consider the ways in which space exploration is conducted.
ProtoSat Program
Students have an opportunity to explore the emerging technology of low-cost cube satellites through Arduino (or similar) microcontrollers, sensors, and coding. Students will follow an engineering design process to design, make and evaluate a 1U weather CubeSat for ground testing using industry-inspired processes.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>Designed for Space
Spacex and changes in the space industry
Space flights and vehicles
International Space Station
Docking simulations
ProtoSat Program
Students develop knowledge and an understanding of the role of CubeSats in space science and the benefits of space science research for society. Students working in groups follow an engineering design process to design, make and evaluate a 1U weather CubeSat for ground testing using industry-inspired processes.
Students build on their knowledge and skills of coding using a general-purpose programming language to construct and code a FlatSat (CubeSat component ground testing device) designed to measure temperature, humidity and air pressure. Students use the data collected to compare with other published sources of weather data, and deduce possible causes for any differences.
Students use computer aided design (CAD) software to design a case for their prototype CubeSat which houses the microcontroller and power supply and complies with the requirements definition. Students use cardboard prototyping and available fabrication techniques, which may include advanced manufacturing processes such as laser cutting or 3D printing (in addition to manual fabrication techniques) to develop prototypes based on their CAD designs and the requirements definition.
Students research, plan and conduct an investigation to test the durability of at least one aspect of their CubeSat design and evaluate the results to make any necessary modifications. Students deploy the final design of their ProtoSat to collect weather data for a location within the school for a period of two weeks.</td><td>Task Number: 3

Nature of Task: Practical Task & Portfolio

Percentage: 30%

Week: 7

Reported: Semester 2</td></tr>
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Year 10 - iSTEM 2022

<table>
<tr><th colspan="3">TERM 4</th></tr>
<tr><td rowspan="3">TIMING
Weeks: 7</td><td colspan="2">Exploration Project

Students undertake a project with local industry applications.</td></tr>
<tr><td>UNIT OVERVIEW</td><td>ASSESSMENT</td></tr>
<tr><td>• Local industry challenges the community faces;
• Students have the ability to solve these problems and make a real difference in our community;
• Students have the opportunity to engage in STEM inquiry-based projects to address challenges faced by the local community;
• Solving community challenges and engaging with the Council on those issues;
• Positive STEM-based activities for students, which may increase scientific literacy and encourage interest in continuing STEM-based study and careers;
• Enhanced connections between local schools, local Industry and the broader STEM networks;
• Heightened awareness of local STEM career pathways and opportunities; and
• Increased number of ‘work-ready’ students transitioning into the local STEM workforce.</td><td>Task Number: 4

Nature of Task: Yearly Examination

Percentage: 20%

Week: 3

Reported: Semester 2</td></tr>
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