

Year 9/10 - ISTEM 2024

TERM 1		
	Topic 1: STEM fundamentals	
TIMING Term 1, Weeks 2-9 8 weeks	UNIT OVERVIEW	ASSESSMENT
	<p>‘STEM fundamentals’ develops knowledge, skills and understanding of essential STEM principles and processes. Students engage with engineering design processes to solve a range of problems. They develop fundamental skills required to complete other elective topics which form the basis of this course.</p> <p>Students:</p> <ul style="list-style-type: none"> • undertake a range of activities that highlight STEM principles and processes • describe components of an engineering design process, define real-world problems or needs, • apply data science principles to activities or projects, • iterate and improve on design solutions using experimentation and testing • construct the completed design and test against design specifications • document and communicate design solutions, • demonstrate basic 2D and 3D drawing techniques, • use project management techniques in the completion of projects • develop basic computer-aided design (CAD) skills using suitable drawing software <p>Problem solving and design</p> <ul style="list-style-type: none"> • identify and use a range of problem-solving strategies in the development of practical solutions, • work individually and collaboratively to apply an engineering design process to complete real-world problems and challenges, 	Task Number: 1 Nature of Task: Practical tasks and portfolio Percentage: 50% Week: 9 Reported: Semester 1

STAGE 5: Year 9/10 - iSTEM 2024

TERM 2

Topic 2: Computer-aided design (CAD)

UNIT OVERVIEW

Technological advancements in manufacturing combined with innovations in 3D modelling software have created an evolving need for a workforce with computer-aided design skills.

In this topic students develop skills in computer-aided design (CAD) with an emphasis on 3D modelling. Practical activities prepare students to develop skills in rapid prototyping, including additive and subtractive manufacturing. Students will be learning to competently use CAD skills and 3D modelling to create, test, and present solutions to real-world problems.

Content

- outline the historical perspectives that have led to the development of computer-aided design (CAD)
- describe a range of CAD concepts, compare the benefits of CAD systems with traditional drawing methods
- identify CAD (3D modelling) representations and techniques,
- explore the relationship between CAD applications and advanced manufacturing
- explore 3D coordinate geometry
- use a range of CAD (3D modelling) techniques,
- investigate the nature of work and pathways into professions which utilise CAD (3D modelling) skills, Problem solving and design
- use CAD (3D modelling) and rendering techniques to develop solutions to real-world problems
- work individually and collaboratively to apply engineering design processes to create, analyse, and iterate CAD (3D modelling) solutions
- incorporate quality CAD drawings produced from 3D modelling into engineering reports and presentations.

ASSESSMENT

Task Number: 2

Nature of Task: Task 2 CAD modelling task

Percentage: 50%

Week: 3

Reported: Semester 1

TIMING

Term 1,
Week 9
to Term
2 Week
3

6 Weeks

STAGE 5: Year 9 - iSTEM 2024

TERM 3 & 4		
	Topic 3: STEM project-based learning	
TIMING Term 3 Week 4 to Term 4 Week 4, 10 Weeks	UNIT OVERVIEW	ASSESSMENT
	<ul style="list-style-type: none"> • Project-based learning is an approach to teaching and learning that engages students in rich and authentic learning experiences. In project-based learning environments, students gain knowledge and skills by investigating and responding to engaging questions, problems, or challenges. • In this topic, students develop and realise solutions to STEM focused project-based learning tasks. It requires students to utilise problem-solving strategies to apply appropriate design, production, and evaluation skills to real-world problems. • To complete this topic, students will follow design thinking processes and complete an iSTEM engineering design process and engineering report. Working in a team students will develop a STEM based solution to one of 6 challenges in the local area provided by the CSIRO STEM Community partnerships. Students will create a presentation of their solution to be delivered at the STEM Community Partnerships Showcase in November. Students will participate in site visits and will be mentored by an Industry Partner. The project will be chosen from the following scenarios or updated ones supplied by CSIRO. <ul style="list-style-type: none"> ○ Western Sydney Aerotropolis ○ Aging Population ○ Heat Stress ○ Managing Natural Environments ○ Mental Health ○ Recycling and Waste Management ○ Sustainable Transport 	Task Number: 3 Nature of Task: Project portfolio Percentage: 100% Week: 4 Reported: Semester 2