

Sample Scope and Sequence – Engineering Design EDN215122

Engineering Design, EDN215122

Sample scope and sequence

Below is a possible sequence of content for Engineering Design, EDN215122. This is an example only; to be used to support teachers to develop their own scope and sequence documents that meet the learning needs of their learners. While Work Requirements have been identified within this possible sequence of content, additional opportunities to elicit evidence of learning provided by the teacher should also be included in the development of a localised scope and sequence.

The Office of TASC have specific advice and requirements for the development of school-based scope and sequence documents for the purposes of quality assurance. Please visit the [TASC website](#) for more information.

Context statement

This sample scope and sequence provides a generic outline that requires customisation based on the engineering contexts chosen for delivery and the resourcing available. It has been developed with the following assumptions:

- a class size of 20-25 learners in a single campus senior secondary environment
- 3 x 90-minute lessons per week
- learners have their own web-enabled device.

Course specific advice

This document is part of a set of baseline resources to support teachers to implement Engineering Design, EDN215122. Teachers are encouraged to view the accredited [Course Document](#) and [Course Implementation Guide](#) to assist them in developing their own scope and sequence for their specific context. A Community of Practice exists for this course, please visit our [website](#) for more information.

Time / Module	Mapping to course content (Subtopic / learning activity)	Assessment Task	Relative Weighting	Work Requirement	Criterion	Criterion Elements
Term I - Week I (short week) Module I - Understanding the Engineering Design Process	<p>Introduction to Engineering Design course</p> <ul style="list-style-type: none"> • ice breaker(s) • class norms • overview of course • unpack the course requirements, standards, modules <p>What is an engineer and what does an engineer do?</p> <p>Thinking like a designer - Introduction to Design Thinking</p> <ul style="list-style-type: none"> • mini design challenge <ul style="list-style-type: none"> – unpacking a brief or problem statement – introduction to collaborative teams – reflection on iterative design process – managing the impacts and understanding the value of failure in successful design 					

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Term 1 - Week 2 Module 1 - Understanding the Engineering Design Process	<p>Designing processes</p> <p><i>Induction to Engineering workspace</i></p> <ul style="list-style-type: none"> tools and equipment, basic skills and safety <p><i>Focus on required prototyping and production skills 1</i></p> <p>For example, introduction to freehand sketching, introduction to engineering drawing, introduction to CAD</p> <p><i>What is good design?</i></p> <ul style="list-style-type: none"> elements and principles of design design strategies <ul style="list-style-type: none"> linear design iterative design user-centred design ergonomics and function design sustainable design inclusive design 		Minor		C2	E2, E3
Term 1 - Week 3 Module 1 - Understanding the Engineering Design Process	<p>Stages of the iterative design process</p> <p><i>Design Challenge - designing to a brief</i></p> <ul style="list-style-type: none"> introduction and design brief analysis of the design brief introduction to success criteria <ul style="list-style-type: none"> difference between needs and wants design specifications (aesthetics, Cost, Customer, Environment, Size, Safety, Function, Material, Manufacturing) team roles and responsibilities timelines and project management introduction communication requirements <ul style="list-style-type: none"> production journal/design folios 	Design Challenge - Engineering design journal	Minor		C1 C3	All All
Term 1 - Week 4 Module 1 - Understanding the Engineering Design Process	<p><i>Design Challenge (continued) – investigate and plan</i></p> <ul style="list-style-type: none"> identify the need – design requirements research the problem <ul style="list-style-type: none"> academic integrity qualitative and quantitative data 				C1 C5	All All

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Term I - Week 5 Module I - Understanding the Engineering Design Process	<i>Design Challenge (continued) – investigate and plan</i> <ul style="list-style-type: none"> ideate – resource (graphic organisers for brainstorming) visual communication -communicating design outcomes - techniques for recording and reflecting on decision making (eg sketching, engineering drawing, digital drawing and modelling, annotations, symbolic) imagine possible solutions – modelling design ideas (quick prototyping) <ul style="list-style-type: none"> small-scale models 				C1 C5	All All
Term I - Week 6 Module I - Understanding the Engineering Design Process	<i>Design Challenge (continued) – create and evaluate</i> <ul style="list-style-type: none"> select a promising solution build a scale prototype test and refine (peer critique) reflection (self-assessment) final analysis of effectiveness final documentation and presentation Introduction to evaluation techniques i.e. SWOT analysis, PMI, P-C-Q chart, T chart (advantages/disadvantages)				C2 C3 C4 C5	All All All All
Term I - Week 7 Module I - Understanding the Engineering Design Process	Existing, new, and emerging technologies and engineering design Evolution of existing technology – phones, vacuum cleaners, cars <ul style="list-style-type: none"> Role of innovation New and emerging technologies i.e. modern materials, smart materials, artificial intelligence, additive manufacturing, robotic manufacturing and assembly, mechatronics, cloud computing technologies, design/production technologies	Research task – existing, new, and emerging technologies <i>(Work Requirement 1 of 2)</i>	Major	YES	C3 C5 C6	E1 E1, E4, E5 All
Term I - Week 8 Module I - Understanding the Engineering Design Process	Understanding the Design Cycle – Report <ul style="list-style-type: none"> Checkpoint for understanding <i>Focus on required prototyping and production skills 2</i> i.e. CAM – 3D printing, laser cutter, Manual production techniques: marking out, cutting, drilling, Use of programmable microcontrollers	Report	Minor	<i>Note: Although not focus criteria for this module, elements of C7 and C8 could also be addressed depending on the task design</i>	C2 C3 C4 C5 C6	E1 E1 E1, E5 E1, E3, E4, E5 All
Term I - Week 9 Module I - Understanding the Engineering Design Process	<i>Design Challenge - designing to a brief</i> Collaborative rapid prototyping <ul style="list-style-type: none"> Define the problem Research the problem/collect data Collect, analyse communicate (interview, survey, observation, etc.) Primary/secondary Qualitative/quantitative Understanding end user/client (user map/empathy map) 	Project presentation and production diary – design process and engineering challenge solution. <i>(Work Requirement 2 of 2)</i> <i>Note: Feedback should be provided to learners and recorded weekly with a focus on the criteria and standard elements specified. Summative assessment of the</i>	minor	YES	C1 C3 C5	All All All

Time / Module	Mapping to course content (Subtopic / learning activity)	Assessment Task	Relative Weighting	Work Requirement	Criterion	Criterion Elements
Term 1 - Week 10 Module 1 - Understanding the Engineering Design Process	<i>Design Challenge (continued) – investigate and plan</i> Collaborative rapid prototyping (continued) <ul style="list-style-type: none"> Imagine possible solutions (ideate/brainstorm/rapid prototype) Use materials, techniques and processes to create engineered solutions 	Work Requirement should occur at the end of the design challenge.	Minor	YES	C1 C2 C3 C5	All All All All
Term 2 – Week 1 Module 1 - Understanding the Engineering Design Process	<i>Design Challenge (continued) – create and evaluate</i> Collaborative rapid prototyping (continued) <ul style="list-style-type: none"> Use prototypes to assess the effectiveness of proposed solutions <ul style="list-style-type: none"> testing, data collection and analysis final report 		Major	YES	C1 C2 C3 C4 C5	All All All All All
Term 2 – Week 2 Module 2 – Engineering Solutions	Roles and Responsibilities of engineers <ul style="list-style-type: none"> Identify the diverse roles of engineers and the impact of engineering on society Relevant professional standards (i.e. fundamental principles of intellectual property rights and protection, ethical conduct, safe work practices) Enterprise 	Poster/Infographic - Identify the key characteristics of engineers, describe how these characteristics apply to the engineer's role in a particular engineering context i.e. <ul style="list-style-type: none"> civil engineering software engineering Space engineering (Work Requirement 1 of 2)	Major	This Module includes the following work requirements: <ul style="list-style-type: none"> a poster / infographic a design process and solution 	C3 C5 C7	E 1 E1, E4, E5 All
Term 2 – Week 3 Module 2 – Engineering Solutions	Focus on required prototyping and production skills 3 i.e. robot programming software packages, soldering, CNC machine		Minor		C2	E2, E3

Time / Module	Mapping to course content (Subtopic / learning activity)	Assessment Task	Relative Weighting	Work Requirement	Criterion	Criterion Elements
Term 2 – Week 4 Module 2 – Engineering Solutions	<p>Extended design project(s) – personal, local or global problem within a given engineering context</p> <p><i>Design Challenge – determine design brief</i></p> <ul style="list-style-type: none"> From a problem statement identify a need/opportunity requiring an engineered solution Define and empathise - identify gaps, future users, needs and constraints Background research – what has been done before? Collect data Exploring available resources Identifying science, math and technology concepts Identify required prototyping and productions skills <p>Ongoing documentation of iterative engineering design process</p> <ul style="list-style-type: none"> Identify design thinking strategies Problem analysis Identification and engagement with stakeholders Assessment of existing solutions Data analysis 	<p>Learner selected engineering design Project and accompanying design journal (Work Requirement 2 of 2)</p> <p><i>Note: Feedback should be provided to learners and recorded weekly with a focus on the criteria and standard elements specified. Summative assessment of the work Requirement should occur at the end of the design challenge.</i></p>	Major	YES	C1 C3 C5 C7	All All All E1, E3
Term 2 – Week 5 Module 2 – Engineering Solutions	<p><i>Design Challenge (continued) – investigate and plan</i></p> <ul style="list-style-type: none"> Select or modify design brief – identify criteria for success Ideate/brainstorm possible solutions Consider alternatives and select a design Develop production proposal Project management - develop timeline, define roles (if working in a group) <p><i>Ongoing documentation of iterative engineering design process</i></p> <ul style="list-style-type: none"> record and reflect on decision making visual communication of design ideas (concept board, sketches, storyboards, mind map, annotations, etc.) 		Minor		C1 C3 C5 C7	All All All E1, E3
Term 2 – Week 6 Module 2 – Engineering Solutions	<p><i>Design Challenge (continued) – create and evaluate</i></p> <ul style="list-style-type: none"> prototype, test, refine <p><i>Ongoing documentation of iterative engineering design process</i></p> <ul style="list-style-type: none"> record of design process and decisions taken use and record familiar technological, scientific, and mathematical concepts related to observations and theories processes for production and maintaining a safe workspace project management techniques 		Minor		C2 C3 C5 C7	All All All E1, E3

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Term 2 – Week 7 Module 2 – Engineering Solutions	<i>Design Challenge (continued) – create and evaluate</i> <ul style="list-style-type: none"> prototype, test, refine <i>Ongoing documentation of iterative engineering design process</i> <ul style="list-style-type: none"> strategies for testing and data collection data display and analysis decisions and actions taken in response to data and feedback 		Minor		C2 C3 C4 C5 C7	All All All All E1, E3
Term 2 – Week 8 Module 2 – Engineering Solutions	<i>Design Challenge (continued) – create and evaluate</i> <ul style="list-style-type: none"> prototype, test, refine evaluate <i>Ongoing documentation of iterative engineering design process</i> <ul style="list-style-type: none"> record of adjustments and modifications appraisal of the suitability and appropriateness of the solution using success criteria 		Minor		C2 C3 C4 C5 C7	All All All All E1, E3
Term 2 – Week 9 Module 2 – Engineering Solutions	<i>Design Challenge (continued) – communication and reflection</i> <ul style="list-style-type: none"> finalisation of documentation appraisal of data collection identification of flaws improvements in ideal situations reflection on learning and performance including planning and time management 		Major	YES	C1 C2 C3 C4 C5 C7	All All All All All E1, E3
Term 2 – Week 10 Module 2 – Engineering Solutions	<i>Design Challenge (continued) – communication and reflection</i> <ul style="list-style-type: none"> Presentations (live or virtual) i.e. poster walk (virtual include a short video presentation), solution pitch 					
Term 3 – Week 1 Module 3 – Negotiated Project(s)	Engineering – Impact on Society <ul style="list-style-type: none"> creating preferred futures ethical, cultural and economic considerations sustainable engineering impact of technology supporting communities and improving people’s lives 	Folio – design and production (Work Requirement 1 of 1) <i>Note: Feedback should be provided to learners and recorded weekly with a focus on the criteria and standard elements specified. Summative assessment of the</i>	minor		C8	All

Time / Module	Mapping to course content (Subtopic / learning activity)	Assessment Task	Relative Weighting	Work Requirement	Criterion	Criterion Elements
Term 3 – Week 2 Module 3 – Negotiated Project(s)	Engineering Design Project and Folio <i>Design Challenge – determine design brief</i> <ul style="list-style-type: none"> Inspiration/discovery Identify a problem/need/opportunity empathise background research Design Folio <ul style="list-style-type: none"> requirements formats revisit academic integrity 	<i>Work Requirement should occur at the end of the design challenge.</i>	minor		C1 C3 C5 C8	All All All All
Term 3 – Week 3 Module 3 – Negotiated Project(s)	<i>Design Challenge (continued) – determine design brief</i> developing a design brief <ul style="list-style-type: none"> clear statement defining the problem in depth analysis of the problem including identification of stakeholders identification of existing solutions and limitations develop criteria for success considering key design factors i.e. efficiency, function, manufacturing processes, sustainability, aesthetics, social impact, cost, safety 		minor		C1 C3 C5 C8	All All All All
Term 3 – Week 4 Module 3 – Negotiated Project(s)	<i>Design Challenge (continued) – investigate and plan</i> <ul style="list-style-type: none"> Ideation Research, collect and analyse data Select viable concept to develop 		minor		C1 C3 C5 C8	All All All All
Term 3 – Week 5 Module 3 – Negotiated Project(s)	<i>Design Challenge (continued) – investigate and plan</i> <ul style="list-style-type: none"> Production proposal Project management plan 		minor		C1 C3 C5 C8	All All All All
Term 3 – Week 6 Module 3 – Negotiated Project(s)	<i>Design Challenge (continued) – create and evaluate</i> <ul style="list-style-type: none"> Prototyping 		minor		C2 C3 C4 C5 C8	All All All All All
Term 3 – Week 7 Module 3 – Negotiated Project(s)						
Term 3 – Week 8 Module 3 – Negotiated Project(s)	<i>Design Challenge (continued) – create and evaluate</i> <ul style="list-style-type: none"> Iterative testing and refinement 		minor		C2 C3	All All

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Term 3 – Week 9 Module 3 – Negotiated Project(s)					C4 C5 C8	All All All
Term 3 – Week 10 Module 3 – Negotiated Project(s)						
Term 4 – Week 1 Module 3 – Negotiated Project(s)	<i>Design Challenge (continued) – communication and reflection</i> <ul style="list-style-type: none"> Finalise documentation and presentation material 		minor		C1 C2 C3 C4 C5 C8	All All All All All All
Term 4 – Week 2 Module 3 – Negotiated Project(s)	<i>Design Challenge (continued) – communication and reflection</i> <ul style="list-style-type: none"> Public presentation (Multimodal) 		minor		C3 C5 C8	All All All
Term 4 – Week 3 Module 3 – Negotiated Project(s)	<ul style="list-style-type: none"> Folio completion/submission Feedback and celebrate 		Major	YES	C1 C2 C3 C4 C5 C8	All All All All All All
Exams						

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