**Sample Course Outline**

Engineering Studies

General Year 11

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Sample course outline

Engineering Studies – General Year 11

Unit 1 and Unit 2

Semester 1

| **Week** | **Key teaching points** |
| --- | --- |
| **Term 1**  1–2 | Overview of unit and assessment requirements  Introduction to **Engineering design process**  **Investigating**   * interpret a design brief * use research skills to identify and describe existing solutions or similar products   **Task 1:** Design project one |
| 3–5 | **Investigating**   * describe materials and components relevant to the design brief * describe suitable forms of energy   **Materials**  **Classify types**   * metals (pure) * alloys (ferrous) * alloys (non-ferrous) * polymers * composites   **Task 2 Part A:** Investigate materials and components  **Engineering in society**  **Energy**   * definition of energy, power and work * forms of energy as listed in this section of Unit 1 of the syllabus   Learning of specialist theory and specific understandings from either specialist field: Mechanical or Mechatronics  **Mechanical**  **Materials,** **Statics, Dynamics and Mechanisms**  All dots points and sub-dot points in this section of Unit 1 of the syllabus  **Mechatronics**  **Electrical/electronic, Components, Laws and principles, Production, Quantities, Systems and control, Nature of control systems and Interfacing with microcontroller**  All dots points and sub-dot points in this section of Unit 1 of the syllabus  **Task 2 Part B:** Research the definitions of energy, power and work |
| 6–8 | **Engineering design process**  **Devising**   * annotated pictorial drawings of design ideas * annotated orthographic drawings of design ideas * identify and describe the chosen option   **Task 3:** Develop a solution for project one |
| 9–10 | **Fundamental engineering calculations**   * examine dimensioned drawings to calculate:   + overall length, height and width   + direct and indirect dimensions   + linear measurements   + radii and diameters   Use formulae, from the syllabus, for the following  **Perimeter**  **Surface area**  **Quantity estimates**   * estimation of lengths and surface area for:   + geometric shapes and forms   + individual shapes   + simple combinations of shapes and forms   **Engineering design process**  **Producing**   * present specifications for the selected solution   + dimensioned pictorial and orthographic drawings   + orthographic drawings and sketches are 3rd angle projections and include:   + lines – outlines, hidden detail and centrelines   + dimensioning – linear, radii, circles, holes through or partial depth with flat base   + materials selected   + parts lists   + costing of prototype or working model * timelines to construct and test the solution   **Specialist field content and principles**  **Task 4:** Pre-production of proposed project one:detailed orthogonal working drawings with lists of materials, parts and components, and production plan on a timeline |
| Term 2  1–8 | **Engineering design process**  **Producing**   * solution construction by selecting and using appropriate tools and machines, and following safe work practices * solution testing for correct function   **Task 5:** Pre-production skill exercises  **Task 6:** Manufacture of proposed project one: using prepared production plan, materials and available equipment |
| 9–10 | **Engineering design process**  **Evaluating**   * final solution in terms of:   + meeting the requirements of the design brief   + function and finish of the product   **Task 7:** Evaluation of completed project one, with written report and photographs of completed project |

Semester 2

| **Week** | **Key teaching points** |
| --- | --- |
| **Term 3**  1–2 | Overview of unit and reintroduction to Engineering design process  **Engineering design process**  **Investigating**  Develop a design folio   * interpret a design brief |
| 3–5 | **Investigating**   * use research skills to identify and describe existing solutions or similar products * describe materials and components relevant to the design brief * describe suitable forms of energy   **Materials**  **Physical properties of materials**   * definition of density, elasticity, strength – tensile and compressive, malleability,   conductivity – electrical and thermal  **Task 8:** Design project two – design process  Determine a design brief  Investigate materials and components, and energy within specialist field  Learning of specialist theory and specific understandings from either specialist field;  **Mechanical**  **Materials, Statics, Dynamics and Mechanisms**  All dots points and sub-dot points in this section of Unit 2 of the syllabus  **Mechatronics**  **Electrical/electronics, Laws and principles, Systems and control, Interfacing with microcontroller, Mechanics, Types of motion, Mechanical drive systems and Calculations Mechanical** materials, **Mechatronics** components  All dots points and sub-dot points in this section of Unit 2 of the syllabus  **Engineering in society**  **Automation and technical innovation**   * define the terms automation and innovation and give examples of each in the engineering context * describe advantages and disadvantages for society, business and the environment of automation and innovation in the engineering context   **Task 9:** Research and report on automation and technical innovation |
| 6–10 | **Engineering design process**  **Devising**   * annotated pictorial drawings of design ideas * annotated orthographic drawings of design ideas * features of the chosen option   **Task 10:** Develop a solution for project two |
| **Term 4**  1–3 | **Engineering design process**  **Producing**   * specifications for the selected solution   + dimensioned pictorial and orthographic drawings   + orthographic drawings and sketches are 3rd angle projections and include:   + lines – outlines, hidden detail and centrelines   + dimensioning – linear, radii, circles, holes through or partial depth with flat base   + materials selected   + parts lists   + costing of prototype or working model * a timeline to construct and test the solution   **Fundamental engineering calculations**   * volume, density and quantity estimates   **Specialist field content**  **Task 11:** Pre-productionof proposed project two:detailed orthogonal working drawings, with lists of materials, parts and components, and production plan on a timeline |
| 4–7 | **Engineering design process**  **Producing**   * solution construction through selection and use of appropriate tools and machines and following safe work practices * solution testing for correct function   **Task 12:** Manufacture of proposed project two: using prepared production plan, materials and available equipment; recording progress in a design portfolio |
| 8 | **Engineering design process**  **Evaluating**   * final solution evaluation in terms of:   + meeting the requirements of the design brief   + function and finish of the product   **Task 13:** Evaluation of completed project two: written report and photographs of completed product |