



## Engineering Studies ATAR – Summary of syllabus changes

As a result of the review, the main differences between the current Years 11 and 12 ATAR course syllabuses and the proposed Years 11 and 12 ATAR syllabuses are summarised below.

### Content changes

#### Overall

- The Rationale has undergone minor edits to better reflect the core content of the syllabus.
- The course outcomes have been removed and replaced with the course aims.
- The section titled *Organisation of content* has had a detailed description of the study of fundamental mechanisms common to both specialist fields, now placed into the core content, with the unit content titles revised.
- The information related to the *Representation of the general capabilities and cross-curriculum priorities* has been retained.
- The Unit descriptions have had few minor updates to better reflect the revised content for each unit.
- Content within the core sections of each unit required minor revisions to make the content more relevant to the study of the Engineering principles.
- Clarification of the study of the practical application energy and energy transference in the core content.
- Clarification of the defined differences between the type and classifications of materials, renewable and non-renewable, and sustainable forms of energy sources.
- Removal of duplicated content in each of the specialist fields and placed into the core content within each unit.
- New content in Mechatronics to deliver content that will keep up with new technology in programming and control.
- Formulas reviewed in each specialist field of both Year 11 and 12 content to accurately reflect the contents of the Data Book.
- Content, particularly in Year 11, advances the content and progresses logically the Engineering context of Design and Technology in the Year 7–10 Technologies Learning area.

#### Year 11 specific

##### Unit 1 has been modified in the following ways:

- **Core Content**
  - Revised list of the types of materials, including defining and classification of materials.
  - Minor edits to formula, with the inclusion of tables of units of measurement, and prefixes for quantities
  - Study of Mechanisms content introduced
  - Additional dot points given for Engineering in society, with each content description to aid teachers in the depth and breadth expected when teaching the practical application of energy and energy transference in the core content.
- **Specialist field of Mechanical**
  - Minor changes to testing the characteristics of materials, with the inclusion of tables of units of measurement
  - Mechanisms content moved to core.

- **Specialist field of Mechatronics**

- Repositioning of mechatronics content, in Unit 1 to better align the teaching of components and equipment, removing redundant terminology, and rearrangement of processes into a more sequential list for teaching
- New formula included – Charge -  $Q = It$
- Production section removed
- Clarified content for the study of voltage dividers
- Clarified content for flowcharting and introducing programming
- Removal of logic gates

**Unit 2 has been modified in the following ways:**

- **Core Content**

- Minor edits to Engineering design process, with rewording of evaluating dot points
- Volume calculations moved to Unit 1 core content
- Energy calculations moved to Unit 1 core content
- Table of units of measurement included for Fundamental Engineering calculations of density, and efficiency
- Formulas for study of Mechanisms moved, and calculating forces within mechanisms, including table of units of measurements moved to core to save duplication
- Formulas for calculation Energy, Work and Power moved to core to save duplication

- **Specialist field of Mechanical**

- Clarification of the methods of testing materials, with more detailed content of tests and outcomes
- Table of units of measurement included
- Mechanisms content moved to Unit 2 core content

- **Specialist field of Mechatronics**

- Re-arranged and expanded dot point contents to Mechatronics
- Mechanisms content moved to Unit 2 core content
- Clarified content into a more sequential way of teaching the continued methods of flowcharting and introducing programming

**Year 12 specific –**

**Unit 3 has been modified in the following ways:**

- **Core content**

- Minor changes to the dot points in Investigating, and producing
- Elements of production management and production tasks and evaluation of the finished project have been moved to Unit four
- Clarification, and better detail, in the form of added dot points have been included in the materials, types, definitions and classifications of materials
- Estimating quantities and volume calculations moved to Core content from Unit 4
- Simple machines and mechanisms, their application of formulas to prove functional design ideas has been added to the Core content
- Understanding and selecting energy sources suited to a designed propose and the transfer of energy through a designed project is added to the core content

- Dot points included to define differences between renewable and non-renewable, and sustainable forms of energy sources.
- **Specialist field of Mechanical**
  - Moved to Unit 4 – the processes of manufacturing steel alloys, in its different forms in materials in the mechanical specialist field
  - Moved to Unit 4 – more detailed descriptions of defining and calculating toughness and resilience in materials
  - Include statements to clarify the use of formula to calculate the second moment of area for material cross sections
  - Clarification of the formulas to calculate the method of sections in simply supported pin-jointed, parallel chord trusses
  - Inclusion of new tables of units of measurement
- **Specialist field of Mechatronics**
  - Repositioning of some content from unit 4 to Unit 3 to better align the teaching of Systems and control, and Interfacing with microcontroller; placed between components and equipment, and electrical laws and principles for clarity
  - New formula included that of Charge –  $Q = It$
  - Removal of duplicated mechatronics components and equipment – digital input
  - Content moved to Unit 4 – Programming and flowcharts.

**Unit 4 has been modified in the following ways:**

- **Core content section**
  - Removed duplication of sections of the Engineering design process dot points in Investigating and Devising as they are in Unit 3
  - Moved to Unit 3 – calculations of volume and energy
  - Included applications to the design processes of fundamental engineering calculations and mechanisms to prove a functional solution/project
- **Specialist field of Mechanical**
  - Clarification of properties of materials represented in a stress-strain graph – more detailed descriptions of defining and calculating toughness and resilience in materials
  - Inclusion of use of unfamiliar formula, to determine unknown factor in unfamiliar formula given sufficient data, with descriptions, to complete the calculation
  - Inclusion of requirements related to data extraction - extract and use data from charts, graphs, tables and diagrams
- **Specialist field of Mechatronics**
  - Duplicated content in Unit 3 removed – electrical Laws and Principles
  - Content moved to Unit 4 – Programming and flowcharts
  - Content moved to Unit 4 core content – types of motion, drive systems and calculation for design solutions.

## School-based assessment changes

### Overall

- A section titled *Assessment* has been added.

### Assessment table – Year 11

- The school-based assessment section has been revised and now includes:  
Summative assessments in this course must:
  - be limited in number to no more than eight tasks
  - allow for the assessment of each assessment type at least once for each unit in the unit pair
  - have a minimum value of 5 per cent of the total school assessment mark
  - provide a representative sampling of the syllabus content.

### Assessment table – Year 12

- The school-based assessment section has been revised and now includes:  
Summative assessments in this course must:
  - be limited in number to no more than eight tasks
  - allow for the assessment of each assessment type at least once for each unit in the unit pair
  - have a minimum value of 5 per cent of the total school assessment mark
  - provide a representative sampling of the syllabus content.
- The assessment types are unchanged

### Assessment type weightings – Year 11

- Unchanged.
- Assessment types not changed
- Assessment weightings not changed
- Descriptions changed to remove superseded content.
- Added specificity for Project and Practical assessment types to clarify expectations of these assessment types.

### Assessment type weightings – Year 12

- Weightings of each assessment type are unchanged.

## Reporting section changes – Overall

- This section title has been revised and is now called *Reporting* (it was previously *Grading*).
- Some text has been removed as this information can be located in the *WACE Manual*.

## Examination design brief changes

### Section one and two

- Core content and Specialist fields, supporting information – wording simplified, examples of stimulus materials reduced.

### Section/s format or weighting

Section 1, Core Content has been modified, previously 40%, now 50%

- Part A: Multiple choice has been replaced, with 5–8 short answer questions without parts, for 10%
- Part B: short and extended answer, change in percentage from 30% to 40%, with an increase in the number of questions from 3-4 to 4-6 questions, each with parts
- Suggested working time changed from 70 minutes to 90 minutes.

Section 2, Specialist fields, Mechanical or Mechatronics has been modified previously 60%, now 50%; student still select one specialist field only:

- Part A: Multiple choice, been replaced, with 5-8 short answer questions without parts for 10%
- Part B: short and extended answer, change in percentage from 30% to 40%, with a decrease in the number of questions from 6-8 to 4-6 questions, each with parts
- Suggested working time changed from 110 minutes to 90 minutes.

#### Sections removed

- Nil

#### Sections added

- Nil

#### Other changes

##### Supporting information

The candidate is required to answer all Part A and Part B questions in in the Core section, and a section from their chosen specialist engineering field.

The questions may require the candidate to refer to stimulus materials, scenarios, concepts and/or engineering design problems.

The Part A questions can require answers in the form of short responses, simple calculations and/or diagrams.

The Part B questions can require answers comprising paragraphs, calculations and/or diagrams.

The questions can have parts that typically will increase in complexity.

Wherever appropriate, the candidate should use examples and fully labelled sketches and/or diagrams to illustrate and support their responses.

#### Grade Descriptions

No changes to Appendixes – Grade descriptions Year 11 and Year 12