T Level Foundation Programmes



T Level Foundation Course in Engineering and Manufacturing

Version V1

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Summary of changes

The following table provides a summary of the changes that have been made to the course specification since the publication of the previous version.

Version number	Summary of changes

Welcome to VQA

Our commitment to you

At VQA (VQA), we believe learning should be meaningful, flexible, and of an exceptional quality, whether it's a regulated qualification or part of our non-regulated course provision.

VQA is a recognised Awarding Organisation regulated by Ofqual in England and CCEA Regulation in Northern Ireland. We apply the same high-quality standards to our non-regulated courses, ensuring they are well-designed, purposeful, and aligned with the skills, behaviours, and knowledge to support students on their learning journey.

This endorsed, unregulated **T Level Foundation Course in Engineering and Manufacturing** is part of that commitment. It provides a supportive, structured route for students who would benefit from a preparatory year before progressing to a full T Level qualification.

What you need before you can deliver a T Level Foundation Course

To deliver a T Level Foundation course, your organisation must be recognised by VQA.

Our **endorsed course requirements** check that your policies, systems, and staffing are in place to deliver high-quality learning. Centres must show they have:

- appropriate resources
- qualified and occupationally competent staff
- clear systems in place to deliver and assess the course.

Approval must be confirmed by VQA before any teaching takes place.

Full guidance on centre recognition and approval is available in the VQA Endorsed Course Customer Requirements accessible from the VQA website.

About this specification

This course specification sets out everything centres need to plan, deliver, and assess the T Level Foundation Course in Engineering and Manufacturing. Inside you will find:

- a clear statement of the course purpose
- the three outcomes with the underpinning knowledge and skills
- practical guidance for delivery.

Reproduction of this document:

Centres may reproduce this specification for internal use only. The content must not be altered, edited, or adapted in any way.

Using the VQA name and logo

We're proud of the VQA brand, and we know our centres are too. That's why we allow recognised centres to use the VQA logo and name to promote approved courses, with a few simple rules:

- logos must not be altered in colour, shape, size, or design

- use only on approved materials: e.g., course brochures, web pages, or promotional flyers relating to VQA courses
- centres must monitor how the logo is used — both by themselves and any third parties they work with.

If your centre is no longer recognised, or if your marketing relationships change, you must inform VQA and remove any use of the logo or name.

More details about logo use and brand guidelines can be found in our full brand policy on the VQA website.

Advertising rules

As an Awarding Organisation, VQA and its registered centres are subject to the Conditions of Recognition defined by the regulator, Ofqual. Two of these conditions (B5.1 and B5.2) stipulate that VQA and its centres must take steps to ensure that non-regulated products are not advertised or promoted to students as regulated qualifications.

To guarantee these conditions are met, we have provided the following requirements that all centres must follow when marketing this course:

- marketing materials should not mislead a student into believing they will gain a regulated qualification
- all marketing materials must not describe this course as “regulated” or “nationally recognised”
- all marketing materials must not describe this course as equivalent to a regulated qualification
- all marketing must not state that this course meets industry standards for employment.

Accessibility

As an Awarding Organisation, VQA is committed to ensuring that all our products are accessible, inclusive, and non-discriminatory. We ensure that no aspect of this course disadvantages any group of students who share a protected characteristic or introduces unjustifiable barriers to entry, other than those essential to the course’s intended purpose. Where such features are necessary, they will be clearly stated and justified.

VQA monitors and reviews the nine protected characteristics (age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, and sexual orientation) throughout qualification development to maintain accessibility and inclusivity. This approach promotes positive attitudes and fosters good relations among all students.

More information can be found in our Equality and Diversity Policy.

T Level Foundation Year

Overview

A T Level Foundation Year is a preparatory study programme designed to support students who have the potential to progress to a T Level.

The programme comprises 5 key components:

- industry-relevant technical knowledge and skills
- skills for successful study
- English, maths, and digital skills
- knowledge and skills for the workplace
- positive attitudes and behaviours.

The primary purpose of this T Level Foundation Course in Engineering and Manufacturing is to provide the foundational technical knowledge and skills relevant to the student's preferred T Level route.

The course is designed for students who would benefit from additional preparation and study time before starting a T Level. It supports progression to their chosen subject route by developing the knowledge, skills, and behaviours needed for level 3 study.

A Foundation Year should support students in making informed decisions about their next steps. This may include progressing to a T Level or pursuing an alternative pathway, with guidance provided to ensure each student chooses the route that is right for them.

It is designed to meet the requirements outlined by the Department for Education (DfE) in its T Level Foundation Year: framework for delivery guidance.

The VQA T Level Foundation Course in Engineering and Manufacturing is a non-regulated, accredited course.

How will a T Level Foundation Course benefit your students?

This T Level Foundation Course provides a tailored year of learning to help students prepare for the demands of level 3 study. It focuses on developing the core knowledge, skills, and behaviours needed to succeed on a T Level, providing a clear and supportive transition into level 3 study. It helps students build confidence and independence while gaining a clear understanding of what is expected within their chosen T Level route.

Students will have opportunities to engage with employers and make meaningful links between their learning and the world of work. The course also supports personal development by encouraging students to take ownership of their progress, with time built in to meet individual learning needs and provide appropriate pastoral support.

By the end of the course, students should have a clear understanding of what is required to succeed on their chosen T Level, or feel confident in making an informed decision about an alternative progression route or career path.

The course is intended for students identified through diagnostic assessment as not yet ready to meet the demands of a T Level. It provides targeted preparation and structured study to support progression to level 3 study.

Diagnostic assessment

Centres must ensure that all students complete an initial diagnostic assessment before the start of a foundation year. This may take different forms depending on centre practice but should be used to identify each student's learning, development, and pastoral support needs.

The findings should inform how a foundation year is tailored, including any support for students with SEND. It will also assist in determining whether a T Level Foundation Course or direct entry to a T Level is the most appropriate route for each student. Diagnostic activities may include taster sessions, one-to-one discussions, self-assessments, assignments or reflective tasks, and may be supported by knowledge, skills and behaviour matrices.

This stage should help students make informed decisions about their next steps. Students who have identified a preferred T Level route should be supported to confirm that it is the most suitable option for them, while those who are undecided should be given opportunities to explore alternative options.

The Foundation Year

A T Level Foundation Year is designed to support students in building a strong basis for further study. It is structured around 5 areas that provide students with the essential academic, practical, and personal skills needed to successfully progress to a T Level qualification. The 5 areas that make up a foundation year are listed below:

Technical knowledge	Skills for successful study	English, maths, and digital skills development	Knowledge and skills for the workplace	Positive attitude and behaviours
Students are introduced to key concepts and practical skills relevant to their intended T Level. This builds early technical understanding and prepares them for level 3 learning.	This area focuses on essential study skills development to include time management and independent learning. Students will also develop techniques in formal writing, research, referencing, and critical thinking.	Students who have not yet attained a GCSE grade 4 in English and/or maths (or equivalent qualification) are required to continue working towards this achievement through GCSE resits, or by completing a Functional Skills qualification.	This component introduces students to professional workplace behaviours and the expectations of a T Level industry placement. It covers key areas such as professionalism, communication, teamwork, understanding organisational policies, and effective travel planning.	This component helps students build confidence, manage stress, and cultivate a positive mindset. It focuses on goal-setting, self-reflection, and using feedback to support their personal growth and enhance their wellbeing.

Entry requirements

There are no specific entry requirements for this VQA T Level Foundation Course.

The course is primarily aimed at students aged 16-19 years, but may be suitable for students up to the age of 24 who have an Education, Health, and Care (EHC) plan.

NOTE: The T Level Foundation Year is designed to support students who may not yet have achieved a GCSE grade 4 or equivalent qualification in English and maths by providing targeted teaching and additional time to build their confidence and ability. Students who have not achieved the minimum requirement in English and maths will be expected to work towards achieving a GCSE grade 4 or a level 2 Functional Skills qualification during the course to meet the entry requirements for their chosen T Level route.

Key areas of learning

This T Level Foundation Course offers a balanced programme that helps students develop the essential technical knowledge, skills, and behaviours needed to progress onto a T Level within the Engineering routes.

This includes an introduction to the core principles and industry-relevant practices drawn from the National Technical Outcome (NTO) for the T Level route.

Students will explore areas such as:

- engineering principles and processes
- engineering materials, tools, and equipment
- use of Computer Aided Design (CAD) and the production of technical drawings
- produce a sustainable engineered product
- approaches to problem-solving.

These topics are designed to give students a strong foundation for the more advanced technical learning they will encounter on the T Level and will support their understanding of how technical knowledge is applied in real workplace settings.

English, maths, and digital skills, relevant to engineering and manufacturing, and transferable skills, such as communication, problem-solving, and teamwork, will also be developed during the course.

There are opportunities for employer engagement, personal development, and work experience linked to engineering and manufacturing, helping students build confidence, gain industry insight, and prepare for the expectations of the workplace.

Course structure

Students must complete the 3 Outcomes to achieve this T Level Foundation Course.

We have devised a simple, clear structure to showcase the knowledge and skills that students must be able to evidence to ensure they can successfully demonstrate each of the 3 outcomes. The layout comprises:

- technical knowledge and skills
- blended delivery (through a combination of theoretical and engaging, practical learning)
- supplementary delivery information for student stretch and challenge
- positive behaviours that may be demonstrated (such as professionalism, resilience).

The course provides the knowledge students must develop and the skills they are expected to demonstrate to fulfil the expectations of each outcome.

Each topic includes the essential knowledge, and the skills section details what students must be able to do in practice, ensuring that learning is applied and demonstrable within relevant contexts.

To support effective teaching and learning, each topic includes some suggestions on how the content can be taught.

Supplementary information is also provided to extend learning and encourage stretch and challenge for those who are ready to progress beyond the core requirements.

Outcome title	Guided learning hours (GLH)
01: Develop ideas for engineering products to meet specifications	50
02: Produce sustainable engineered products	50

03: Solve sustainability problems with innovative engineering ideas	50
Total (GLH) **Contact time, guidance, and supervision of a student for this course**	150*

*** The Guided Learning Hours (GLH)** for this course are set at 150 hours to ensure appropriate provision for students with varying needs and to accommodate opportunities for stretch and challenge in each of the 3 outcomes.

English, maths, and digital skills in the T Level Foundation Course

English (communication), maths (numeracy), and digital skills are essential components of the T Level Foundation Course. Details of where these skills are embedded and developed are set out in the National Technical Outcome (NTO), linked in the website section of this specification, which outline the specific opportunities for teaching and application. Some skills will be explicitly taught, while others will be embedded through the delivery of the wider course content.

- **English (Communication)**: Communication skills will be developed through tasks that require students to articulate their ideas and present information clearly. These skills will be embedded within the context of the course, ensuring they are relevant to industry and student learning.
- **Maths (Numeracy)**: Numeracy skills are integrated into the qualification, particularly when students need to apply mathematical principles in real-world contexts. This includes tasks involving measurement, calculations, and data interpretation.
- **Digital Skills**: Digital skills will be embedded through the use of relevant software and tools that students will need in engineering and manufacturing. These skills will be developed and applied in context, ensuring students understand their practical applications.

Assessment

Assessment approach

All students must be assessed in English.

Centres are expected to create their own assessments that reflect the aims of this T Level Foundation Course, ensuring alignment with the National Technical Outcome (NTO) for the subject area. When designing them, tutors must consider the depth and breadth of knowledge allowed by each task.

The assessments may be carried out on an individual outcome basis or designed holistically for the whole course across all 3 outcomes. Whichever approach is used, assessments should also reflect and align with the embedded English, maths, and digital skills.

Assessment might include a mix of:

- examinations
- assignments
- case studies
- projects
- observations.

Assessment activities should enable students to demonstrate the knowledge, skills, and behaviours outlined across all outcomes, showing how these can be applied in realistic, work-related contexts to support progression to T Level study or employment.

The specification does not prescribe a fixed approach, as this allows centres the flexibility to adapt delivery to their own context and to respond to the individual needs of students. Tutors should use their professional judgement to select methods that provide students with meaningful opportunities to apply and develop the required skills, whether in classroom, simulated, or workplace settings.

All assessments should be supported by appropriate internal quality assurance activities to make sure they are consistent, purposeful and support each student's progression, particularly when holistic assessment is used.

All assessments must be designed to ensure that students are appropriately prepared for the demands of the T Level route and reflect real-world applications.

Establishing consistency in assessment writing

Centres must implement appropriate and consistent assessment approaches to ensure student work is marked fairly and in line with VQA expectations.

All delivery staff must be familiar with the mandatory teaching content and assessment expectations and apply the same interpretation of knowledge and skill topics when designing and marking their assessments.

Assessments should follow a standardised format to ensure consistency in language, structure, and level of demand.

Tutors must use clear marking criteria and participate in regular standardisation activities to agree on the pass standard. Processes must be in place to confirm the authenticity of student work, and centres should ensure a transparent, accessible procedure is available for students to appeal a fail decision.

Achievement and progression

This is an unregulated course, and assessment will take place throughout the academic year. The assessment model is based on a pass/fail outcome, with no grading.

To pass the course, tutors must be satisfied that the students have met the 3 outcomes.

It is essential that tutors actively monitor student progress and provide timely and constructive feedback, highlighting areas for improvement and reinforcing their achievements. This ongoing feedback will ensure that students are given every opportunity to address any challenges and stay on track to successfully demonstrate the outcomes by the end of the course.

Centres should ensure that the Student Certification Form, available in the T Level Foundation Course resources section on the website, is completed when claiming learner certificates. Certificates will not be issued without the submission of the completed form. Centres are required to submit the form via email to operations@vqa.org.

Health and safety considerations

Centres must ensure that all activities and tasks undertaken as part of this T Level Foundation Course are carried out with due regard to health and safety.

Students should only engage in activities within a supervised environment, or where appropriate, in a suitably controlled simulated setting. Centres are responsible for ensuring that all delivery and assessment activities comply with relevant health and safety requirements and safeguarding considerations.

Course Delivery

Monitoring student progress

Centres are expected to monitor students' progress throughout the course through regular tutor and student review points. Ongoing reviews should be used to identify each student's strengths and development needs, track progress in English, maths and digital skills, and monitor competency in employability skills and behaviours.

A range of methods should be used to review their progress, including regular feedback, formative assessments, and observations, with all activities documented to inform decisions about any additional support or interventions.

Students should be supported to take ownership of their learning and development by having a clear understanding of their goals and working with their tutors to agree on an individual development plan that sets out key objectives and milestones.

VQA has devised a number of templates to support the administration and delivery of this course. These can be accessed here on the VQA website.

Adapted learning

Centres should take reasonable steps to ensure that all students are given fair access to learning and assessment opportunities. This includes anticipating potential barriers, adapting delivery methods where appropriate, and offering flexible arrangements that enable participation. Centres are encouraged to adopt a student-centred approach that reflects best practice in supporting diverse needs.

For more information, please refer to VQA's Reasonable Adjustments and Special Considerations Policy on our website.

Resources

All teaching materials and additional resources used to support the delivery of this foundation course must be age-appropriate. Centres should carefully consider student safeguarding and wellbeing when developing or sourcing materials in line with the centre's policies and procedures.

VQA has produced a Centre Resources Pack that includes a range of useful templates to support the assessment, ongoing monitoring, and pastoral support of your students.

This is a free, optional resource to support the administration of the T Level Foundation Course and may be accessed via the VQA website.

Personal development opportunities

Centres should include meaningful personal development and enrichment opportunities that help students to build the study skills, behaviours, and transferable skills needed for success on a T Level and in the workplace.

Additional enrichment opportunities, ideally aligned with students' intended T Level route or career goals, might include trips or volunteering activities, or participation in programmes such as The King's Trust.

Student pastoral support

Pastoral support is a vital part of any T Level Foundation Year and plays a key role in preparing students for progression to the demands of a T Level. Many students who register on a foundation year need encouragement, structure, and clear guidance to help them move forward.

A T Level Foundation Year should offer students tailored support to help them build confidence, resilience, and independence as they make the transition from GCSEs to level 3 study. This includes helping students to develop personal skills and support their wellbeing.

Centres should provide regular mentoring sessions as part of the pastoral support offer. These meetings will allow students to reflect on their progress, set goals, and address any issues at an early stage. Pastoral support should also monitor engagement, attendance, and personal development.

Safeguarding and mental health support are essential. Centres must have clear procedures in place to identify and respond to any wellbeing concerns, and students should have access to mental health services or signposting where needed. This is particularly important for students who are unsure of their next steps.

Support for students with special educational needs or disabilities (SEND) must be personalised, with appropriate adjustments made both in the classroom and during work experience activities. Centres should work closely with employers to ensure that any specific needs are understood and met. Overall, pastoral support should help ensure that every student feels supported, understood, and ready to progress confidently to their T Level.

Work preparation

Work experience is a key element of a T Level Foundation Year, supporting students to prepare for their T Level industry placement. Wherever possible, placements should align with the student's intended T Level route; however, alternative opportunities may be offered where employer availability is limited. All students should participate in meaningful, work-related activities and tailored workplace preparation, informed by an assessment of their individual work readiness.

Where a formal work placement is not possible, centres are encouraged to provide alternative forms of industry engagement to ensure students gain relevant and practical exposure to the workplace.

Preparation activities may cover core workplace knowledge and skills and may include:

- employer-led talks
- presenting projects to employers
- industry visits
- pre-placement site visits

- site visits
- mock interviews
- industry mentoring
- travel planning.

Centres must work closely with employers to ensure support and accessibility, safeguarding and health and safety considerations, including reasonable adjustments under the Equality Act 2010.

Student registration

Once approved to offer this T Level Foundation Course, centres must follow VQA's procedures for registering students. Student registration is at the centre's discretion, in line with equality legislation and health and safety requirements.

Centres must register students before any assessment can take place.

Progression after this course

This T Level Foundation Course aims to prepare students to progress onto a T Level. Successful students can progress to:

- T Level Technical Qualification in Design and Development for Engineering and Manufacturing
- T Level Technical Qualification in Maintenance, Installation, and Repair for Engineering and Manufacturing
- T Level Technical Qualification in Engineering, Manufacturing, Processing, and Control.

Students will need to apply for entry to the T Level via a centre's standard enrolment processes.

Where progression to a T Level is not appropriate for a student, centres will need to provide students with advice and guidance to support them in determining their next steps, which may include:

- a level 2 or level 3 study programme
- an apprenticeship
- employment.

Centres must provide appropriate careers guidance to help students plan their next steps and ensure the completion of any qualifications, including English and maths.

Staffing and Quality Assurance

All members of staff involved with the delivery of this T Level Foundation Course (tutors or internal quality assurance staff) will need to be occupationally competent in the subject area. This could be evidenced by a combination of:

- a higher-level qualification in the same subject area
- experience in the delivery/assessment/IQA of the course
- work experience in the subject area.

Staff members will also be expected to have a working knowledge of the requirements of the foundation course and a thorough knowledge and understanding of the role of tutors/assessors and internal quality assurance. They are also expected to undertake continuous professional development (CPD) to ensure they remain up to date with work practices and developments associated with the courses they assess or quality assure.

Tutor Requirements

Tutors who deliver this foundation course must possess a teaching qualification appropriate for the level. This can include:

- Further and Adult Education Teacher's Certificate
- Cert Ed/PGCE/Bed/MEd
- PTLLS/CTLLS/DTLLS
- Level 3 Award/Level 4 Certificate/Level 5 Diploma in Education and Training.

Assessors

Staff who assess this foundation course must possess an assessing qualification appropriate for the level or be working towards a relevant qualification and have their assessment decisions countersigned by a qualified assessor. This can include:

- Level 3 Award in Assessing Competence in the Work Environment.
- Level 3 Award in Assessing Vocationally Related Achievement.
- Level 3 Award in Understanding the Principles and Practices of Assessment.
- Level 3 Certificate in Assessing Vocational Achievement.
- A1 or D32/D33.

Quality Assurance

Quality assurance for this VQA T Level Foundation course should be carried out by experienced professionals within the centre to ensure it meets learning standards.

Centres should implement regular checks on student progress, provide constructive feedback, and maintain a supportive environment. Centres should also ensure that staff delivering the course are suitably qualified and experienced.

Additionally, centres will receive an annual request to provide samples of student work and confirmation of the qualifications of those involved in delivery.

Useful Websites

- Department for Education
- T Levels

T Level Foundation Year Framework for Delivery

The Skills Builder

Barclays Life Skills

Skills England

You may also find the following website useful:

- National Technical Outcome Engineering and Manufacturing

Teaching Content

Course structure

The structure of the T Level Foundation Course is informed by the National Technical Outcome (NTO) to ensure a comprehensive and cohesive learning experience for the students.

Each outcome is underpinned by a clear rationale, providing context for its relevance to support progression to a T Level.

The content is divided into **knowledge** and **skills** to support a focused and progressive approach to learning.

We provide **supplementary information** to deepen understanding and offer opportunities for stretch and challenge, ensuring students are encouraged to reach their full potential and support progression to level 3 study.

Additionally, English, maths, and digital skills are embedded throughout the course, with guidance on how these competencies may be integrated into learning activities.

The course also includes a strong emphasis on **transferable skills** and **behaviours**, preparing students for successful progression in both their further studies to a T Level and to future employment.

Outcome 1 (O1): Develop ideas for engineering products to meet specifications

This outcome focuses on developing ideas for engineering products in order to meet the requirements of given specifications, emphasising the need to fulfil client requirements. Students will gain technical knowledge in engineering principles, processes, and materials, which will inform design decisions. This knowledge, drawn from core content in all three Engineering and Manufacturing T Levels, will be applied to the design process to enable students to create functional products that meet specifications, such as cost and aesthetics. This outcome provides an opportunity to develop the transferable skills of analysing and creativity when considering design.

Knowledge Topic 1: Engineering principles	
The student must understand:	
K1	Energy: forms, difference between potential and kinetic and conversion
K2	Mechanical: power, work and efficiency, velocity and acceleration, units and measurement

Tutor guidance:
K1 Energy: The tutor should introduce students to the **forms of energy**, including kinetic energy (energy of motion) and potential energy (stored energy). Explore how energy can be converted from one form to another. The tutor could use relevant Physics formulas for conversion. **K2 Mechanical:** Students should explore the concepts of **power, work**, and **efficiency**. Introduce the concepts of **velocity** (speed in a specific direction) and **acceleration** (change in velocity over time). Explore the **units of measurement** for each.

Knowledge Topic 2: Engineering processes	
The student must understand:	
K3	Processes: characteristics, applications, benefits, and limitations
Tutor guidance:	
K3 Processes: The tutor should introduce students to basic engineering **processes**, for example, cutting, welding, forming, and 3d printing may be explored. Expose students to the **characteristics, applications, benefits** and **limitations** of each process.	

Knowledge Topic 3: Materials	
The student must understand:	
K4	Materials used in engineering: types, mechanical, electrical and chemical properties and suitability for different processes and applications
K5	Factors affecting choice of materials: cost, availability and form

Tutor guidance:
K4 Materials used in engineering: The tutor should introduce students to different types of materials, **ferrous metals, non-ferrous metals**, and **polymers**. Explore the properties of materials: **mechanical** (tensile strength, shear strength, compressive strength, malleability/ductility, and hardness**), electrical** (conductivity and electrical resistance) and **chemical** (resistance to corrosion). Discuss with students the **suitability** of these materials for **different processes** and **applications**. **K5 Factors affecting choice of materials**: Students should be aware of the factors affecting the choice of materials, including **cost, availability**, and **form**. The tutor could also explore manufacturing capability, compliance with regulations, including environmental, such as ISO 14001 and industry regulations.
Supplementary information to support stretch and challenge:
The tutor could introduce: • how the properties of materials contribute to product performance and suitability when designing engineering solutions • incorporate the principles of the 6R's (Rethink, Refuse, Reduce, Reuse, Recycle, and Repair) when designing engineering solutions • incorporating planned obsolescence when designing engineering solutions.

Knowledge Topic 4: Information and Data	
The student must understand:	
K6	Sources of data and information used to produce design solutions: purpose, typical content, format, terminology, and differences between sources of data and information
K7	Types of information and data created and recorded when designing engineered products
K8	Factors to consider when using information and data: confidentiality, privacy, intellectual property, and security

Tutor guidance:
K6 Sources of data and information used to produce design solutions: The tutor should introduce students to sources of data and information used to produce design solutions (**client requirements** in **relation to function, performance, cost** and **aesthetics**). Students should explore the **purpose, typical content, format, terminology** and **differences** between sources of **data** and **information.** **K7 Types of information and data created and recorded**: Students should be aware of the **types** of information and data **created** and **recorded** when designing engineered products. The tutor could explore GANT charts, CAD drawings, and risk assessments. **K8 Factors to consider when using information and data:** Students should explore **confidentiality** (ensuring sensitive data is protected), **privacy** (respecting individuals' rights to control their personal data), **intellectual property** (protecting creative works and inventions), and **security** (safeguarding data from unauthorised access or theft) and how to consider these factors when using information and data during the development of engineered products.

Knowledge Topic 5: Communication	
The student must understand:	
K9	Sketching techniques: different types, their purpose, and application for presenting design ideas to others
K10	Engineering technical drawings: types, principles, terminology and conventions
K11	Principles of effective communication: two-way process (send and receive messages), methods (verbal, non-verbal), styles (formal, informal), conventions of different types of written communication and suitability for different purposes and audiences
K12	Reading: principles, reading for comprehension, identifying salient points, summarising key points and synthesising information from different sources
K13	Spelling, punctuation and grammar (SPAG): punctuation markers, grammatical conventions and spelling of key technical and non-technical terminology
K14	Vocabulary: technical and non-technical and use to achieve particular effects and for different purposes

Tutor guidance:
K9 Sketching techniques: The tutor should introduce students to **different types** of sketching techniques. Explore their **purpose** and **application** for **presenting design ideas to others** during the development of ideas for engineered products to meet specifications. **K10 Engineering technical drawings:** Students should consider the **types** of engineering technical drawings (**Isometric, orthographic, schematic diagrams** and **working drawings)**. Explore the **principles, terminology** and **conventions** of each. **K11 Principles of effective communication**: Students should explore the principles of effective communication. Consider **a two-way process**, involving **sending** and **receiving** messages**, methods** of **verbal** and **non-verbal** communication, and the use of different **styles, formal** and **informal**. Discuss the **conventions** of different types of **written** communication and the **suitability** for **different purposes** and **audiences** during the development of ideas for engineered products. **K12 Reading:** Students should be aware of the principles for reading for **comprehension**, focusing on **identifying salient points**, **summarising key points** and **synthesising information** from different sources. The tutor could explore with the students how these skills are essential for understanding technical documents and specifications when developing ideas for engineered products. **K13 Spelling, punctuation and grammar (SPAG)**: Students should be aware of the importance of spelling, punctuation, and grammar (SPAG) for accurate communication of ideas during the development of engineered products to meet specifications. Explain how **punctuation markers** are used to structure sentences clearly, ensuring ideas are easily understood. Discuss **grammatical conventions**. Emphasise the importance of correct **spelling** for both key **technical** terminology (e.g., "tensile strength") and **non-technical** terminology (e.g., "design brief"). **K14 Vocabulary:** Students should be aware of how to use both **technical** and **non-technical** vocabulary, exploring how this is used to **achieve** particular effects and for different **purposes** when developing ideas for engineered products to meet specifications.

Knowledge Topic 6: Numeracy	
The student must understand:	
K15	Trigonometry: principles, trigonometric functions and use of trigonometry to determine dimensions in 2D and 3D

K16	Geometry: principles, properties of geometric points, lines and angels, Pythagoras' theorem, and scale factors

Tutor guidance:

K15 Trigonometry:

The tutor should introduce students to the **principles** of trigonometry. Explore trigonometric **functions** and how they are used to calculate unknown dimensions in both **2D** and **3D.**

K16 Geometry:

Students should explore the **principles** of geometry, focusing on the **properties** of **geometric points, lines**, and **angles**. Explore key concepts of **Pythagoras' theorem** and **scale factors**.

Knowledge Topic 7: Digital	
The student must understand:	
K17	Computer-aided design (CAD): principles, features, conventions and applications
K18	Software: features, functions and applications to create computer aided designs
K19	Management of digital information and data: classification and organisation, naming conventions, storage systems and protection methods, accessibility and formats
K20	Protection of personal/organisational/client data: legal framework, risks, software and procedures

Tutor guidance:
K17 Computer-aided design (CAD): The tutor should introduce students to Computer-aided design (CAD). Explore the **principles, features, conventions** and a**pplications** of CAD to ensure accuracy and avoid errors. **K18 Software:** Students should explore the **principles of CAD software**, focusing on **annotations** and **symbols.** Consider the **features, functions** and **applications** used to create computer aided designs. **K19 Management of digital information and data:** Introduce students to the management of digital information and data, exploring **classification** and **organisation**, **naming conventions**, **storage systems, protection methods, accessibility**, and **formats**. **K20 Protection of personal/organisational/client data**: Students should be aware of the protection of **personal, organisational** and **client data**. Explore the **legal framework, risks, software** and **procedures** associated with the management of digital data during the development of ideas for engineered products to meet specifications.
Supplementary information to support stretch and challenge:
The tutor could introduce: • Range of features incorporated into computer aided designs when designing engineering solutions

Outcome 1 (O1): Develop ideas for engineered products to meet specifications

Students will develop transferable skills in analysis and creativity when considering design, supporting progression onto level 3 study. They will develop ideas for a product and produce technical drawings to communicate their design ideas, using computer-aided design (CAD), and apply communication and digital skills. Numeracy skills will also be required to develop and accurately produce technical drawings during this outcome.

Skill Topic 1: Analysing	
Students must be able to:	
S1	Identify common features in information
S2	Organise common features into types
S3	Discern patterns in information

S4	Deconstruct information

Skill Topic 2: Creativity skills	
Students must be able to:	
S5	Lateral thinking to consider opportunities from different perspectives
S6	Make novel connections between ideas
S7	Recognise ideas, alternatives, and possibilities
S8	Form ideas iteratively

Skill Topic 3: Communicating	
Students must be able to:	
S9	Synthesise information and data from different sources
S10	Summarise information and data
S11	Apply technical language in relevant contexts
S12	Apply written communication techniques to produce formal reports following standard conventions
S13	Apply written communication skills to clearly articulate a message
S14	Create documents appropriate to purpose and audience
S15	Sketch 2D and 3D designs
S16	Interpret information and data presented in different formats

Skill Topic 4: Numeracy skills	
Students must be able to:	
S17	Substitute numerical values into formulae and expressions
S18	Apply scale factors and scale diagrams to engineering designs
S19	Use trigonometry and geometry to create 2D and 3D representations

S20	Apply the properties of angles at a point

Skill Topic 5: Digital skills	
Students must be able to:	
S21	Organise digital information
S22	Store digital information securely
S23	Retrieve digital information
S24	Apply software functions to produce computer aided designs
Behaviours	
B1 Empathetic	**B2** Integrity

Outcome 2 (O2): Produce sustainable engineered products

This outcome focuses on developing practical engineering skills to produce sustainable engineered products. Students will apply technical knowledge of engineering processes through practical application. It also provides an opportunity for students to learn about concepts related to engineering processes, health and safety, tools and equipment and use of materials in contexts that relate directly to the practical tasks.

The outcome also allows for the development of transferable planning skills, which can be useful not just when working on practical activities, but also when students are planning their own work and studies. These skills will support progression to T Level qualifications and enhance students' ability to manage both practical tasks and their own work planning.

Knowledge Topic 1: Engineering processes	
The student must understand:	
K1	Marking out: principles, conventions, processes and tools
K2	Processes: procedures, tools, and equipment required

Tutor guidance:
K1 Marking out: The tutor should introduce students to the **principles** (e.g. accuracy, consistency, measurements), **conventions** (e.g. standard symbols, markings**), processes** (e.g. preparation, measuring, transfer) and **tools** (e.g. set squares, engineer's rule, vernier calliper**)** of marking out to produce sustainable engineered products. **K2 Processes:** Students should be aware of the processes for **material removal** (cutting, turning, milling, and drilling)**, shaping** and **manipulation** (bending, folding, press forming, punching, and stamping), and **joining** and **assembling** (rivets, threaded fastening, soldering, brazing, and welding). Explore the **tools and equipment** required, **heat** and **chemical treatment** and **surface finishing** techniques used to produce engineered products**.**
Supplementary information to support stretch and challenge:
The tutor could introduce: • factors that can impact on successful completion and quality of an engineered product, quality of drawings provided for the production process, including those with missing information and data • type of products produced: more complex and multi-step processes required for the type of products produced.

Knowledge Topic 2: Health and safety	
The student must understand:	
K3	Typical health and safety hazards that individuals can create and encounter when producing engineered products
K4	Likelihood and severity of health and safety risks associated with typical hazards
K5	Risk assessment: purpose, use and content
K6	Controls used to minimise risks
K7	Techniques used to support healthy and safe working practices, including manual handling

Tutor guidance:
K3 Typical health and safety hazards that individuals can create and encounter: The tutor should explain typical health and safety hazards (**sharp objects, broken tools** and **equipment).** Explore health and safety hazards that **individuals** can **create** and **encounter** when producing sustainable engineered products. **K4 Likelihood and severity**: Students should be aware of the concept of **likelihood** (how likely it is that something will happen) and **severity** (how serious the harm would be if it did happen) in relation to different health and safety **risks (slips, trips,** and **falls**) that are associated with **typical hazards**. **K5 Risk assessment:** Students should understand the **purpose, use**, and **content** of risk assessments. Explore how risk assessments are conducted to identify potential hazards, evaluate risks, and implement control measures to ensure safety. The tutor could consider introducing students to the concept of quantitative risk assessment and how a risk matrix can be used to quantify the risk based on likelihood and severity. **K6 Controls**: The tutor could explain the hierarchy of controls (elimination, substitution, engineering controls, administrative control and finally PE) to students. Students should then explore controls used to minimise risks through **inspection of equipment, housekeeping practices**, and **Personal Protective Equipment PPE** which is the last resort in the hierarchy of controls. **K7 Techniques**: Students should be aware of **techniques** used to support healthy and safe working practices, including **manual handling** (e.g. safe working at heights, fatigue management). Explore how these practices reduce the risk of injury and contribute to a safer, more efficient work environment in the production of sustainable engineered products.

Knowledge Topic 3: Tools and equipment	
The student must understand:	
K8	Tools: characteristics, purpose, safety, security, storage, maintenance, operation of hand-held and power tools used to produce engineered products
K9	Equipment: characteristics, purpose, safety, security, storage, and maintenance and operation of different types of equipment used to apply practical skills to produce engineered products

Tutor guidance:
K8 Tools: The tutor should introduce students to the **characteristics, purpose, safety, security, storage, maintenance**, and **operation** of **hand-held** (e.g. no power source, worked by hand) and **power tools** (e.g. need electricity, batteries, compressed air, or another power source) used to produce engineered products. **K9 Equipment**: Students should explore the **characteristics, purpose, safety, security, storage, maintenance**, and **operation** of equipment used (e.g. pillar drill, lathe, milling machine) to apply practical skills in the production of sustainable engineered products.

Knowledge Topic 4: Materials, products, and consumables	
The student must understand:	
K10	Materials, products and consumables: characteristics, purpose, applications and quantities of different types used when producing engineered products
K11	Material quantities required to ensure minimum wastage
K12	Factors affecting choice of materials: sustainability, cost, availability, durability, form, and suitability for purpose
Tutor guidance:	
K10 Materials, products and consumables: The tutor should introduce students to different types of **materials, products** and c**onsumables** and their **characteristics, purpose, applications,** and **quantities** used when producing engineered products. **K11 Material quantities**: Students should explore the concept of calculating material quantities required to ensure minimum wastage. The tutor could make links to the lean manufacturing concept, which aims to reduce waste. **K12 Factors affecting choice of materials:** Students should be aware of factors affecting the choice of materials (**sustainability, cost, availability, durability**, **form,** and **suitability for purpose**) when producing sustainable engineered products.	

Knowledge Topic 5: Quality	
The student must understand:	
K13	Quality: concept of quality, principles, difference between quality control and quality assurance, standards and application to the production of engineered products
Tutor guidance:	
K13 Quality: The tutor should introduce students to the concept of **quality,** including its **principles** and the difference between **quality control** and **quality assurance** (e.g. six sigma and total quality management). Explore how **standards** (e.g British Standards, ISO standards and The Welding Institute) are **applied** in the production of sustainable engineered products.	
Supplementary information to support stretch and challenge:	
The tutor could introduce: • factors that can impact on successful completion and quality of an engineered product, quality of drawings provided for the production process, including those with missing information and data.	

Knowledge Topic 6: Sustainability	
The student must understand:	
K14	Sustainability implications for use of different materials in construction projects
K15	Waste management: principles, techniques (refuse, reduce, reuse, repurpose, recycle) and procedures in place within the sector to manage waste
Tutor guidance:	
K14 Sustainability implications: The tutor should introduce students to the **sustainability implications** for use of **different materials** in construction projects (e.g. lower carbon footprint and lower energy demand). **K15 Waste management:** Students should explore the principles and techniques of waste management (**refuse, reduce, reuse, repurpose**, and **recycle**). Explore the **procedures** in place within the sector to manage the waste from the production of engineered products. The tutor could additionally explain the 8 types of waste (defects, overproduction, waiting, non-utilised talent, transport, inventory, motion, extra processing) and practices to manage waste (just in time JIT).	

Knowledge Topic 7: People	
The student must understand:	
K16	Professional behaviours: definitions and how behaviours are demonstrated in a practical engineering environment
Tutor guidance:	
K16 Professional behaviours: The tutor should introduce students to professional behaviours. Explore **definitions** of **professional behaviours** and how these are **demonstrated** in a practical engineering environment (e.g. teamwork, attention to detail, health and safety awareness, etc).	

Knowledge Topic 8: Information and data	
The student must understand:	
K17	Technical drawings: different types and their purpose and conventions
K18	Sources of information required to produce engineered products: purpose, format, terminology and typical content
Tutor guidance:	
K17 Technical drawings: The tutor should introduce students to different **types** of technical drawings (e.g. assembly drawings, orthographic drawings, welding drawings) and their **purpose** and **conventions.** **K18 Sources of information required to produce engineered products**: Students must be aware of different sources of information required to produce engineered products. Explore the **purpose, format, terminology**, and **typical content** form of each source.	
Supplementary information to support stretch and challenge:	
The tutor could introduce: • factors that can impact on successful completion and quality of an engineered product, quality of drawings provided for the production process, including those with missing information and data.	

Knowledge Topic 9: Numeracy	
The student must understand:	
K19	Numbers and the number system: techniques for the application of the four operations (addition, division, multiplication, subtraction)
Tutor guidance:	
K19 Numbers and the number system: The tutor must introduce students to numbers and the number system. Explore the techniques for the application of the four operations (**addition, subtraction, multiplication**, and **division**) when producing sustainable engineered products.	

Knowledge Topic 10: Communication	
The student must understand	
K20	Reading: principles, reading for comprehension, identifying salient points, summarising key points and synthesising information from different sources
Tutor guidance:	
K20 Reading: The students must be aware of reading **principles**, reading for **comprehension, identifying salient points, summarising key points** and **synthesising information** from different sources. Explore how reading is applied to understand technical documents, instructions, and specifications when producing sustainable engineered products.	

Outcome 2 (O2): Produce sustainable engineered products

Students will develop transferable skills in planning, which can be useful not just when working on practical activities, but also when students are planning their own work and studies. They will need to read and interpret technical information, including technical drawings, and apply communication skills. Numeracy knowledge and skills will also be required to calculate these requirements to produce sustainable engineered products.

Skills Topic 1: Technical engineering skills	
Students must be able to:	
S1	Prepare environments
S2	Mark out required measurements
S3	Remove materials

S4	Shape and manipulate materials
S5	Join and assemble materials
S6	Apply chemical and heat treatments to materials
S7	Surface finish materials
S8	Minimise waste

Skills Topic 2: Health and safety skills	
Students must be able to:	
S9	Assess a situation for potential adverse effects
S10	Assess an area for potential health and safety risks
S11	Establish a safe working area
S12	Apply Personal Protective Equipment (PPE) appropriately following agreed procedures
S13	Apply manual handling techniques when lifting, carrying, handling and moving materials, equipment and tools as appropriate

Skills Topic 3: Use of tools and equipment	
Students must be able to:	
S14	Apply techniques to effectively use tools to meet requirements of a task and situation
S15	Apply techniques to effectively use equipment to meet requirements of a task and situation

Skills Topic 4: Sustainability skills	
	Students must be able to:
S16	Use materials sustainably when producing an engineered product
S17	Dispose of waste sustainably

S18	Minimise waste

Skills Topic 5: Planning	
Students must be able to:	
S19	Identify discrete steps required to achieve an outcome, with attention to detail
S20	Estimate time and resources required to achieve an outcome
S21	Prioritise activities required to achieve an outcome
S22	Sequence activities required to achieve an outcome
Skills Topic 6: Physical dexterity skills	
Students must be able to:	
S23	Apply precise and controlled movements when using tools, equipment and materials to produce engineered products

Skills Topic 7: Self-managing	
Students must be able to:	
S24	Monitor own performance against objectives
S25	Manage own time in achieving objectives
S26	Move within an environment demonstrating situational awareness

Skills Topic 8: Self-reflecting	
Students must be able to:	
S27	Identify success criteria for a task
S28	Consider process and evidence available for review
S29	Situational awareness
S30	Make judgements based on evidence available

Skills Topic 9: Communicating	
Students must be able to:	
S31	Interpret information and data presented in different formats

Skills Topic 10: Numeracy skills	
Students must be able to:	
S32	Calculate resource requirements to produce engineered products
Behaviours	
B3 Resilience	**B4** Self-confidence

Outcome 3 (O3): Solve sustainability problems with innovative engineering ideas

This outcome focuses on developing problem-solving skills through investigation, with a strong emphasis on sustainability, a key concept within the engineering sector. Students will explore the application of high-performance and smart materials in engineering technologies and processes, examining how these materials can address sustainability problems.

In order to solve problems, students will need to develop transferable skills of investigating and creativity and critical thinking skills. This will help them evaluate information and then view solutions from different perspectives, considering alternatives to be able to propose innovative ideas.

Knowledge Topic 1: Materials used to solve sustainability problems	
The student must understand:	
K1	High-performance materials, characteristics, properties, and applications
K2	Smart materials: characteristics, properties, and applications

Tutor guidance:
K1 High-performance materials: The tutor should introduce students to **high-performance materials** (e.g. Thermoplastics, Piezoelectric Crystals and Thermosetting Polymers), focusing on the **characteristics, properties**, and **applications** in engineering. Explore how these materials contribute to solving sustainability problems**.** **K2 Smart materials:** Students should explore **smart materials** (e.g. shape memory alloys, quantum tunnelling composite, thermochromic material and photochromic materials), highlighting the **characteristics, properties**, and **applications.** Explore their potential to address sustainability challenges.

Knowledge Topic 2: Technologies and processes used to solve sustainability problems	
The student must understand:	
K3	Technology: characteristics and applications
K4	Processes: characteristics and applications
Tutor guidance:	
K3 Technology: The tutor should explore with students the **characteristics** and **applications** of technology such as **3D printing, surface nanotechnology, optical fibres**, **robotics**, and **automation.** **K4 Processes**: Students should consider the **characteristics** and **applications** of processes such as **powder metallurgy, powder mixing/blending, pressing, compacting,** and **sintering**.	

Knowledge Topic 3: Sustainability	
The student must understand:	
K5	The concept of climate change and scientific views on causes and impacts
K6	Technological developments and their contribution to sustainability and business contexts
K7	Waste management: principles, techniques (refuse, reduce, reuse, repurpose, recycle), procedures and impact on engineering solutions

K8	Sustainability targets and related actions, restrictions and permission
K9	Sustainable materials: characteristics, purpose, applications and impact on engineering solutions

Tutor guidance:

K5 Climate change and scientific views:

The tutor should explore with students the concept of **climate change** and **scientific views** on its **causes** and **impacts**.

K6 Technological developments:

Students should investigate **technological developments** and their **contribution to sustainability** and business contexts.

K7 Waste management:

Students should consider the **principles** and **techniques** (**refuse, reduce, reuse, repurpose**, and **recycle**) of waste management. Explore the **procedures** and **impact** on **engineering solutions**.

K8 Sustainability targets:

Students should explore **sustainability targets** and **the related actions, restrictions and permissions** required to meet the targets. The tutor could explore and consider the Environmental Protection (Duty of Care) Act 1990, Hazardous Waste (England and Wales) Regulations 2005 or Waste Management (England and Wales) Regulations 2006.

K9 Sustainable materials:

Students should be aware of **sustainable materials**, their **characteristics, purpose**, **applications** and **impact** on engineering solutions. Examples of materials could be ferrous/non-ferrous, having characteristics of recyclability, long life and corrosion resistance. Thermoplastics/thermosetting are recyclable and lightweight.

Supplementary information to support stretch and challenge

The tutor could introduce:

- the impact that factors such as relevance, validity, reliability, bias and currency have on information and data used to solve sustainability problems.

Knowledge Topic 4: Investigation

The student must understand:

K10	Data collection: methods, purpose, suitability and types of data

K11	Validity of information and data: accuracy, reliability, currency and bias
K12	Referencing of sources: techniques used to reference sources directly, paraphrasing and different types of sources

Tutor guidance:

K10 Data collection:

The tutor should introduce students to data collection **methods** (e.g. oscilloscope, emissions testers, mustimeters). Explore the **purpose**, **type**s and **suitability** of data for different engineering applications.

K11 Validity of information and data:

Students should explore the concepts of validity of information (**accuracy, reliability, currency**, and **bias)**. Explore how these factors impact the quality and usefulness of **data** in engineering decision-making, particularly when addressing sustainability challenges.

K12 Referencing of sources:

Students should consider referencing of sources and the **techniques** used to **reference sources directly**, **paraphrasing** and **different types of sources** when solving sustainability problems with innovative ideas**.**

Supplementary information to support stretch and challenge

The tutor could introduce:

- complexity of the information and data that is used from different sources to solve sustainability issues
- the impact that factors such as relevance, validity, reliability, bias and currency have on information and data used to solve sustainability problems.

Knowledge Topic 5: Problem solving

The student must understand:

K13	Techniques, processes and strategies used to solve problems

Tutor guidance:

K13 Techniques, processes and strategies:

The tutor should introduce students to the **techniques, processes**, and **strategies** used to solve engineering problems (e.g. fault detection, diagnosis, resolution and isolation methods).

Supplementary information to support stretch and challenge
The tutor could introduce: • using teamwork in a virtual environment to solve sustainability problems • complexity of sustainability problems.

Knowledge Topic 6: Communication	
The student must understand	
K14	Principles of effective oral communication: two-way process (send and receive messages), methods (verbal, non-verbal) and styles (formal, informal)
K15	Reading: principles, reading for comprehension, identifying salient points, summarising key points and synthesising information from different sources
K16	Spelling, punctuation and grammar (SPAG): punctuation markers, grammatical conventions and spelling of key technical and non-technical terminology
K17	Vocabulary: technical and non-technical and use to achieve particular effects and for different purposes
K18	Listening techniques: active and deep
K19	Non-verbal communication: meaning of different types of body language, types and value of images and support materials as visual aids and impact of non-verbal communication to support comprehension of key messages
K20	Oral communication: pitch, tone and intonation and their impact on how a message is received
K21	Positive communication: techniques and their application to presenting ideas
K22	Engaging with an audience: techniques for establishing rapport, in conversation, in discussion, in debate, obtaining and clarifying information and presenting ideas
Tutor guidance:	
K14 Principles of effective oral communication: Revisit the principles of effective oral communication as a **two-way process**(send and receive messages) and the **methods** (verbal and non-verbal), and the use of **styles** (formal and informal), emphasising how these contribute to clear and effective communication when solving sustainability problems with innovative engineering ideas. **K15 Reading:**	

Review the **principles** of reading for comprehension, focusing on **identifying salient points**, s**ummarising key points** and **synthesising information** from **different sources** when solving sustainability problems with innovative engineering ideas.

K16 Spelling, punctuation and grammar (SPAG):

Revisit the importance of spelling, punctuation, and grammar (SPAG).. Explore **punctuation markers, grammatical conventions**, and the correct spelling of in key technical and non-technical terminology in documentation when solving sustainability problems with innovative engineering ideas.

K17 Vocabulary:

Review the use of both **technical** and **non-technical vocabulary** in engineering. Explore how each type of vocabulary is applied to **achieve particular effects** and for **different purposes**, depending on the audience and context.

K18 Listening techniques:

The tutor should introduce students to **active** and **deep** listening techniques. Explore how these techniques enhance understanding, promote effective communication, and contribute to problem-solving and collaboration in engineering environments.

K19 Non-verbal communication:

Introduce students to different **types** of **body language**, its **meaning** and **impact** on communication. Explore the **value of images** and **support materials** as **visual aids**, and the impact non-verbal communication has on supporting the comprehension of key messages in engineering and manufacturing contexts (e.g. Lean Visual Management Method).

K20 Oral communication:

Students should be introduced to the concepts of **pitch, tone**, and **intonation** in oral communication. Explore how these elements can **impact** how a message is received, particularly where clear communication is essential when solving sustainability problems with innovative engineering ideas.

K21 Positive communication:

Students should explore techniques for positive communication (e.g. concise language, active listening, and clarifying). Explore how techniques can be applied when **presenting ideas,** ensuring effective and engaging communication in engineering projects.

K22 Engaging with an audience:

Students should be introduced to engaging with an audience. Explore techniques for **establishing rapport** in **conversation, discussion**, and **debate**. Explore techniques for **obtaining** and **clarifying** information and **presenting** ideas in a way that is engaging and clear, ensuring effective communication in engineering contexts.

Knowledge Topic 7: Digital	
The student must understand:	
K23	Software: feature, functions and applications to present ideas
K24	Management of digital information and data: classification and organisation, naming conventions, storage systems, protection methods, accessibility and formats
K25	Online/Internet searches: techniques used to carry out and refine searches, Search Engine Optimisation (SEO) and its implication for search results
K26	Protection of personal data: risks, software and procedures
Tutor guidance:	
K23 Software: The tutor should introduce the students to the software and the **features, functions**, and **applications** to **present ideas** (e.g. CAD, circuit and programming simulation software). **K24 Management of digital information and data:** Revisit the management of digital information and data (**classification and organisation, naming conventions, storage systems, protection methods, accessibility** and **formats**) when solving sustainability problems with innovative engineering ideas. **K25 Online/Internet searches:** Revisit **techniques** for **carrying out** and **refining online/internet searches** and the use of **Search Engine Optimisation (SEO)** and its **implications** for search results. **K26 Protection of personal data:** Revisit **risks** associated with the protection of personal data explore the **software** and **procedures** used to safeguard personal data when solving sustainability problems with innovative engineering ideas. The tutor could use examples of complex data from multiple resources and teamwork in a virtual environment.	

Outcome 3 (O3): Solve sustainability problems with innovative engineering ideas

Students will develop transferable skills in investigating, creativity and critical thinking skills in order to solve problems. They will carry out investigations where they will encounter written information to read and interpret. The development of written communication skills

will therefore be through note taking and synthesis of information obtained. This is further developed through the production of clear and coherent documentation of their ideas in a written format making use of digital technology.

It is envisaged that students will interact with 'clients' or 'stakeholders' to present their innovative engineering ideas. This could be by presenting their ideas to employer representatives or non-familiar individuals who are role playing a group of employers. This is reflected in the communication skills included in the content, which include oral communication (speaking and listening).

Skills Topic 1: Investigating	
	Students must be able to:
S1	Develop search criteria and queries to support an investigation
S2	Identify sources of information and data required for an investigation
S3	Reference sources of information
S4	Interrogate information and data for validity

Skills Topic 2: Critical thinking	
	Students must be able to:
S5	Effective questioning to elicit information
S6	Evaluating pros and cons of information provided
S7	Review information from different perspectives
S8	Apply logic and reasoned argument to information presented
S9	Synthesise information from different sources
S10	Draw evidence-based conclusions

Skills Topic 3: Creativity skills	
	Students must be able to:
S11	Lateral thinking to consider opportunities from different perspectives
S12	Make novel connections between ideas
S13	Recognise ideas, alternatives and possibilities

S14	Form ideas iteratively

Skills Topic 4: Communicating	
	Students must be able to:
S15	Synthesise information and data from different sources
S16	Engage an audience
S17	Summarise information and data with attention to detail
S18	Apply technical language in relevant contexts
S19	Apply active listening techniques when presenting ideas
S20	Apply oral communication skills to clearly articulate a message with attention to detail
S21	Apply written communication skills to clearly articulate a message
S22	Apply non-verbal communication techniques to support communication
S23	Create documents appropriate to purpose and audience
S24	Write for impact
S25	Engage in discussion, debate and conversation, listening to and responding to questions and feedback
S26	Show respect for others' views and opinions
S27	Apply communication techniques to secure audience understanding
S28	Interpret information and data presented in different formats
S29	Apply appropriate vocabulary, grammar, form, structural and organisational features to reflect audience, purpose and context

Skills Topic 5: Digital skills	
	Students must be able to:
S30	Organise digital information
S31	Store digital information securely

S32	Retrieve digital information
S33	Apply software functions to present ideas
Behaviours	
B5 Perceptive	**B6** Focussed

Appendix 1

Level 2 Command Verbs

These command verbs require students to demonstrate their understanding of facts, ideas, or concepts.

Command word	Definition
Apply	Use knowledge or understanding in a familiar situation to complete a task
Assess	Make a judgement about the value or importance of something using simple reasoning
Calculate	Work out the value of something, showing relevant working out
Choose	Select the most appropriate option from a limited range
Classify	Group items based on shared features or characteristics
Compare	Examine in detail and identify similarities and differences between them
Define	Give a definition or specify the meaning of an idea or concept
Demonstrate	Show understanding of a process or concept through simple examples, actions, or explanations
Describe	Give a detailed account of a subject or set out its characteristics or features
Discuss	Present key points about different ideas or strengths and weaknesses of an idea
Estimate	Make an approximate judgement or calculation based on known information
Explain (why)	Set out purposes or reasons, or make something clear in relation to a particular situation
Explain how	Provide a detailed account of a process or way of doing something
Give examples	Provide specific cases or instances that support or illustrate a point
Identify	Select from a list of options, point something out or give a list of main features

Command word	Definition
Illustrate	Explain or clarify something using examples, diagrams, or comparisons
Interpret	Explain the meaning of information or data
List	Provide a series of items or points without explaining or describing in detail
Outline	Set out the main characteristics or features
Plan	Outline basic steps or actions needed to achieve a goal, showing understanding of the order or purpose of each step
Record	Accurately document information, actions, observations, or results
Select	Choose the most appropriate option from a limited range, showing understanding of why it fits the given purpose or situation
Show	Present or demonstrate understanding through action, response, or simple explanation in a familiar setting
State	Express in clear, brief terms
Suggest	Apply knowledge to a new situation to provide a reasoned explanation
Summarise	Give a brief account of the main points or ideas
Use	Apply a tool, technique or method correctly and safely in a familiar context, following set procedures or instructions

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