Written submission: Consultation on the draft Leaving Certificate Engineering specification

NCCA is redeveloping Leaving Certificate Engineering. The aim of this consultation is to obtain the open and honest views of all stakeholders: students, teachers, parents, and other interested parties. The feedback gained from the consultation will inform the work of the development group in preparing the final specification.

NCCA would greatly appreciate your feedback on the draft specification which can be found here: Leaving Certificate Engineering

When providing feedback, observations or comments, please reference the specific section and / or relevant learning outcomes.

The closing date for this consultation is 2nd May 2025 at 5pm.

Data protection and open data section

NCCA is committed to protecting your privacy and does not collect any personal information about you through this written submission, other than information that you provide by your own consent. Where a respondent selects 'yes' to the question: *Are you consenting to be listed as a respondent to this consultation*, respondents are consenting to having their name / organisation's name published in the final report as respondents to the consultation.

Where a respondent selects 'yes' to the question: *Are you consenting for your submission to be published*, respondents are consenting to having their submission published on ncca.ie.

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NCCA may use the data you provide in the form of quotations. Where this happens, the quote will be anonymised.

Respondent's details

What organisation are you submitting on behalf of?

ASTI

Are you consenting to be listed as a respondent to this consultation?

- Yes √
- No

If yes, please enter the name you wish to have published in the final report.

Moira Leydon, Assistant General Secretary, Education and Research

Are you consenting to have the submission published on ncca.ie?

- Yes √
- No

Rationale, Aim, and Key Competencies [Pages 2,3 and 5]

Rationale: The rationale (P.2) outlines the nature of Engineering and the role and importance of Engineering in realising the purpose and vision of senior cycle.

Aim: The Aim (P.3) outlines the over-arching purpose of the subject and the relevance and expected impact of the subject on student learning.

In your opinion, do the rationale and aim capture the overarching purpose and nature of Engineering; the importance of the subject in realising the vision of senior cycle and the relevance and expected impact of this subject on student learning. Please provide specific feedback / observations / comments.

The aim of the course is to promote an educational knowledge of engineering materials, an understanding of the relevant processes, the ability to safely use tools and skills to achieve objectives through practical work, and initiative in the planning and development of technological projects. The Leaving Certificate Engineering syllabus is designed to provide continuity from the technology subjects offered at Junior Cycle. The assessment of Leaving Certificate Engineering currently involves three components: a Written Examination, a Practical Examination, and a Project. The practical examination and project together account for a significant portion of the overall marks, emphasizing the practical nature of the subject. The current assessment structure, with its substantial practical component, underscores the importance of hands-on skills in Engineering. The proposed redevelopment removes the Practical Skills Test, and any revisions must carefully consider how these practical skills will continue to be developed and assessed effectively, particularly with the increased weighting of the new Design and Manufacture Project. The syllabus content itself, encompassing a wide range of topics from manufacturing techniques and materials science to CAD/CAM and electronics, demonstrates a curriculum that is both broad and demanding. The proposed redevelopment needs to ensure that any revisions maintain breadth of knowledge and skills while remaining manageable for both students and teachers within the allocated time and resources.

Key Competencies: Key competencies is an umbrella term which refers to the knowledge, skills, values and dispositions students develop in an integrated way during senior cycle. These competencies are linked and can be combined; can improve students' overall learning; can help students and teachers to make meaningful connections between and across different areas of learning; and are important across the curriculum.

The draft specification sets out examples of how key competencies can be developed in Leaving Certificate Engineering (P.5 – 8)

In your opinion, does this section effectively capture the development of student key competencies in Leaving Certificate Engineering? Please provide specific feedback / observations / comments.

The removal of the Practical Skills Test from the assessment structure, coupled with the increased weighting of the Design and Manufacture Project, raises a potential concern about the impact on the development and assessment of fundamental practical skills. The current syllabus places a strong emphasis on hands-on workshop processes and manipulative techniques, which are assessed through both a practical examination and project work. The ASTI believes it is crucial that the redeveloped curriculum and its assessment methods continue to prioritize the development and assessment of these core practical skills, and that the increased weighting of the project does not marginalize the importance of fundamental workshop competencies. Engineering is fundamentally a hands-on discipline, and the curriculum and assessment should continue to reflect this reality.

The senior cycle key competencies are embedded in the learning outcomes and will be assessed within the context of these outcomes in the written examination. This significant shift towards a project-based assessment, accounting for 50% of the final grade, marks a major departure from the current assessment structure, which includes a Practical Skills Test. ASTI Engineering teacher members are unequivocally opposed to this proposal.

Strands of study and learning outcomes [ADD PAGE NUMBERS]

Course overview: The course overview sets out the knowledge, skills, values and dispositions for students in four strands. The specification emphasises a non-linear, integrated approach to learning across the strands. The details of the strands are described on pages 8 - 22 of the specification.

The details of the cross-cutting themes are described on pages 8 – 9 of the specification.

In your opinion, does the structure illustrate the connected nature of the strands and the development of student knowledge, skills, values and dispositions in an appropriate way? Please provide specific feedback / observations / comments.

The four thematic strands in the draft specification suggest a potential reorganization of the curriculum content. The ASTI insists that, following the consultation process, these strands encompass the essential knowledge and skills required in the field of Engineering and that learning outcomes are clearly defined and realistically achievable within the constraints of the Senior Cycle.

Strand 1: Engineering Processes (P.12 – 14)

Please provide your views on the learning set out in this strand with reference to

- clarity for planning for teaching and learning
- alignment with the rationale and aims
- opportunities for the development of key competencies and
- access and challenge for all students.

Please provide specific feedback / observations / comments.

The introduction of a substantial Design and Manufacture Project, carrying 50% of the final grade, is likely to lead to a significant increase in teacher workload. Guiding students through all stages of the project, from initial analysis and research to design, manufacturing, testing, and evaluation, and subsequently assessing their project outcomes and portfolios, will demand considerable teacher time and effort. This increased workload comes at a time when the ASTI's research already indicates unsustainable workloads for teachers. The proposed changes to Engineering assessment, particularly the significant weighting of the Design and Manufacture Project, must be carefully evaluated in light of this existing workload.

Strand 2: Automation and Control Systems (P.15-16)

Please provide your views on the learning set out in this strand with reference to

- clarity for planning for teaching and learning
- alignment with the rationale and aims
- opportunities for the development of key competencies and
- access and challenge for all students.

Please provide specific feedback / observations / comments.

The successful implementation of the Design and Manufacture Project will also necessitate access to specialized resources and equipment. Schools will require well-equipped workshops, a range of tools, and sufficient materials to enable students to undertake their projects effectively. The disparity in resources between DEIS and non-DEIS schools, as highlighted in the ASTI's submission on higher education access, underscores the critical need for audits of engineering classrooms to ensure that students are learning in properly resourced spaces.

Strand 3: Design Capability (P.17 – 19)

Please provide your views on the learning set out in this strand with reference to

- clarity for planning for teaching and learning
- alignment with the rationale and aims
- opportunities for the development of key competencies and
- access and challenge for all students.

Please provide specific feedback / observations / comments.

To effectively teach the new curriculum content and guide students through the Design and Manufacture Project, quality CPD is essential. Those providing CPD must have the classroom experience and knowledge to address teachers' needs and questions. The experience with previous curriculum reforms, such as the Junior Cycle, where teachers reported feeling unprepared, highlights the critical importance of providing timely and high-quality professional development well in advance of the implementation of the revised Engineering specification.

Additional Assessment Component (AAC)

The design and manufacture project provides an opportunity for students to display evidence of their learning across all strands of the specification. The senior cycle key competencies of thinking and solving problems, being creative, communicating, working with others, and managing learning and self, developed through working with learning outcomes across the specification, will be applied through the student's engagement with the project.

A Design and Manufacture Project brief will be issued annually by the SEC. The brief will set out the requirements for the Design and Manufacture Project and will:

- set a context for the project
- provide guidance to students in the development of their project work
- allow students to develop their knowledge and understanding in areas related to the brief
- facilitate teachers and students in their planning.

This experience will allow students to demonstrate their creativity, showcase the breadth and depth of their practical and manufacturing ability, and refine their communication techniques as they develop, implement, and document their progress through the design and manufacturing process.

Please provide specific feedback / observations / comments on the AAC in Leaving Certificate Engineering with reference to how the AAC might motivate students, how it aligns to the learning outcomes in the specification and how it facilitates the development of key competencies.

While ASTI acknowledges the potential benefits of incorporating a broader range of assessment methods in redeveloped subjects, including AACs, it does not support the minimum 40% model across all subjects. In the case of Engineering, where practical skills and theoretical knowledge are integrated in the subject, a mandated minimum weighting for a particular type of assessment may not be pedagogically sound or the most effective way to evaluate student learning.

Supports for Successful Enactment

Please provide specific feedback / observations / comments on supports that might be needed for successful enactment of this subject specification.

1. **Reconsider the Implementation Timeline:** The ASTI urges the NCCA to advise the Department of Education and Youth to delay the planned implementation of the redeveloped Senior Cycle Engineering subject beyond September 2026. This delay is essential to allow for more thorough planning, meaningful and ongoing consultation with teachers, the development and provision of adequate resources, and comprehensive teacher training. The current accelerated timeframe poses a

significant risk to the quality and equity of the revised curriculum's implementation.

2. **Ensure Meaningful and Ongoing Consultation with Teachers:** The NCCA must enhance its commitment to collaborative consultation process with Engineering teachers at every stage of the redevelopment. This consultation should not be a mere formality but should actively seek and value the professional expertise and practical experience of teachers who will be responsible for delivering the redeveloped curriculum in their classrooms. Feedback from consultations should be demonstrably incorporated into the final specification and associated guidelines. The ASTI has already communicated its demand that stakeholder submissions are fully shared with the Subject Development Group to ensure transparency and that all voices are heard.

3. **Advise on the Provision of Adequate Resources and Equipment:** The NCCA should incorporate a resource-requirement perspective into all subject redevelopment processes. The absence of this approach is demoralising for teachers and represents a failure to genuinely listen to teachers' voice.

4. **Prioritize the Development of Comprehensive Teacher Training and Professional Development:** The NCCA should work with OIDE to ensure that high-quality, subject-specific professional development is designed and delivered to all Engineering teachers well in advance of the implementation of the revised curriculum. This training should focus on the new curriculum content, effective pedagogical approaches for project-based learning, the implementation and assessment of the Design and Manufacture Project, and strategies for addressing potential challenges such as ensuring assessment integrity.

5. **Review the Weighting and Structure of Assessment Components:** The ASTI view is that the NCCA must reconsider the weighting assigned to the Design and Manufacture Project and the structure and content of the written examination. Specifically, the ASTI wants the reinstatement of the Practical Skills Test as a distinct assessment component, carrying 25% of the overall marks. Furthermore, the weighting of the Design and Manufacture Project should be reduced to 25%, ensuring that the combined weighting of practical-based assessments remains at 50%, reflecting the practical nature of the subject. This review should aim to ensure a balanced and effective assessment of both the practical skills and the theoretical knowledge that are fundamental to Engineering.

6. **Develop Clear Guidelines for Assessment Integrity:** The NCCA should, in cooperation with the SEC, develop robust and clear guidelines, along with appropriate support mechanisms, to be communicated to schools to ensure the authenticity and integrity of the Design and Manufacture Project. These guidelines should address concerns about potential external assistance, including the use of AI, and provide teachers with the tools and strategies necessary to ensure fair and reliable assessment.

7. **Ensure Alignment with Third-Level Engineering Programs:** The NCCA should engage in ongoing dialogue and collaboration with third-level institutions offering engineering programs to ensure that the redeveloped Engineering curriculum adequately prepares students for further study in this discipline and facilitates a smooth transition to higher education.