EMBEDDING TRANSVERSAL AND SOCIETAL SKILLS IN AEROSPACE ENGINEERING PROGRAMME: BACHELOR CURRICULUM REVISION

Mariana Leandro Cruz, Daniël Peeters, Angelo Cervone, Rene van Passen, Joris Melkert

Aerospace Engineering Faculty, Delft University of Technology

Éva Kalmár

Industrial Design Engineering Faculty, Delft University of Technology

ABSTRACT

The Faculty of Aerospace Engineering at TU Delft is currently reviewing its Bachelor curriculum in response to several interrelated developments. These include changes in the educational landscape, such as the growing impact of artificial intelligence (AI) and sustainability, the shifting balance between content knowledge and skills, evolving assessment practices, and an increased emphasis on student-centred learning. At the same time, the aerospace sector itself is undergoing rapid transformation, driven by the need for sustainable innovation and the growing importance of software, data, AI and sustainability. In addition, changes in the demand and capacity landscape, including skills-based educational needs, accessibility and inclusion, diversity, and rising student numbers, call for a re-evaluation of the curriculum. This paper focuses on strengthening the transversal and societal skill set of Bachelor Aerospace Engineering graduates by making these skills explicit, visible, and coherently embedded throughout the curriculum. A learning-line approach was adopted to structure the development of skills such as teamwork, ethical reasoning, learning from failure, and diversity and inclusion alongside technical content. The paper compares how these skills are addressed in the current and revised curricula and presents a concrete implementation example from the first week of the programme, called Aerospace Ground School. The paper concludes with reflections and recommendations for engineering programmes seeking to systematically embed transversal and societal skills without overloading the curriculum.

KEYWORDS

Transversal and societal skills, Bachelor Curriculum Revision, Aerospace Engineering, Standards: 2 (learning outcomes), 3 (integrated curriculum), and 5 (design-implement experiences).

INTRODUCTION

Engineering education is undergoing a significant transformation, driven by rapid technological advances, evolving societal expectations, and changes in student population. Graduates are increasingly expected to combine strong disciplinary knowledge with transversal and societal skills that enable them to work effectively in multidisciplinary teams, navigate ethical dilemmas, and contribute to sustainable innovation (Beagon et al., 2023; Fleming et al., 2024; Kimpton & Maynard, 2025; Leandro Cruz & Saunders-Smits, 2022; Passow & Passow, 2017). As a result, universities are challenged to rethink how engineering curricula are designed, taught, and assessed because the available time for the programme does not increase.

Within this context, the Faculty of Aerospace Engineering (AE) at TU Delft has initiated a comprehensive revision of its Bachelor of Science programme. Although the curriculum has been continuously adjusted through numerous small changes in response to a changing landscape, a coherent, large-scale revision has not occurred since 2009. While it has produced successful graduates and is consistently ranked among the top AE faculties in the world—13th globally in Mechanical, Aeronautical and Manufacturing Engineering (QS 2023) and 10th worldwide, 1st in Europe, in Aerospace Engineering (ShanghaiRanking, 2025)—developments in both the educational landscape and the aerospace sector necessitate a re-evaluation. These developments include the growing impact of AI and sustainability, a shifting balance between content knowledge and skills development, evolving assessment practices, and an increased emphasis on student-centred learning.

A central challenge in the curriculum revision is how to strengthen the development of transversal and societal skills without further increasing student workload or staff burden. Rather than adding standalone skills courses, the revised curriculum adopts a structured learning-line approach in which skills are explicitly articulated, aligned with programme learning objectives, and developed progressively throughout the programme.

The aim of this paper is threefold: to describe the rationale for revising the AE Bachelor curriculum, to present the learning-line framework used to embed transversal and societal skills, and to illustrate this approach through a concrete implementation example from the first week of the programme. This work builds on earlier CDIO initiatives that emphasise the development and assessment of personal and professional skills within engineering programmes (e.g., Hermon & McCartan, 2010) and extends them by applying CDIO Standards 2, 3, and 5 at faculty scale.

RATIONALE FOR CURRICULUM REVISION

Evolving educational landscape

Higher education has experienced significant changes over the past decade. Blended and online learning have become integral to many programmes (OECD, 2023), while the emergence of generative AI raises new questions about learning objectives, assessment, and academic integrity. At the same time, there is an increasing emphasis on student-centred learning, multidisciplinary teamwork, and authentic assessment (Kimpton & Maynard, 2025, Van den Broeck et al. 2024).

In the existing AE bachelor curriculum, the number and frequency of assessments place considerable pressure on both students and staff, generating high workload. Moreover, skills development is often implicit rather than explicitly addressed in course learning outcomes and assessments. An additional challenge is the sheer size of the programme. The programme has a yearly intake of 440 freshmen students and runs with a student-to-staff-ration of roughly 22:1.

Evolving aerospace landscape

The aerospace sector itself is undergoing rapid transformation. Sustainable innovation, the integration of software, data-driven approaches, and AI (Beagon et al. 2023), and the growing importance of space-related applications are reshaping the professional profile of aerospace engineers (Gouveia et al. 2022). New topics such as sustainability, ethics, digital skills, and systems thinking need to be addressed, yet the curriculum is already densely packed. This creates a need for smarter integration rather than additional content.

Evolving demand and capacity landscape

A significant growth in student numbers since 2009, combined with increasing societal demand, growing attention to diversity and inclusion, and rising demands on facilities and staff, further challenges curriculum design. Many academic staff experience a tension between teaching and research responsibilities, making it essential to design a curriculum that is coherent, efficient, and sustainable to deliver.

These combined developments motivated a curriculum revision with several key goals: increasing programme cohesion, reducing student workload, redesigning assessment to reduce staff load, strengthening digital and sustainability-related skills, and making transversal and societal skills an explicit part of the curriculum.

TRANSVERSAL AND SOCIETAL SKILLS IN ENGINEERING EDUCATION

A substantial body of literature highlights the importance of transversal skills for engineering graduates. Systematic reviews (Passow & Passow, 2017) and empirical studies (Tuyaerts et al. 2025, Leandro Cruz & Saunders-Smits, 2022) consistently identify problem solving, communication, and teamwork as core competencies, followed by ethics and lifelong learning. Studies of engineering job advertisements (Fleming et al. 2024) similarly show a strong demand for professional skills alongside technical expertise, with digital skills such as programming increasingly valued.

Despite this recognition, research shows that these skills are often insufficiently reflected in course learning outcomes and assessments. Educators may support skills development in principle, but without explicit articulation and alignment, skills risk remaining invisible to students and staff or becoming the victim of “more important” content-driven topics. These findings underline the need for curriculum-level approaches that make skills development explicit, coherent, and assessable, rather than leaving this to individual courses or informal learning experiences.

TRANSVERSAL AND SOCIETAL SKILLS IN CURRENT AE BSC CURRCIULUM

Methodology

An analysis of the learning objectives of all BSc Aerospace Engineering courses (n = 53) in the academic year 2024–2025 was conducted to examine the explicit inclusion of transversal and societal skills. Course descriptions for the academic year 2024–2025 were collected from TU Delft's Coursebase and analysed using Atlas.ti with AI-supported coding. Identified skills were reviewed, merged where necessary, and grouped into competency categories aligned with the IDEE Future-Ready Engineering Competencies framework (TU Delft Teaching Academy, 2024).

Results

The analysis shows that most learning objectives emphasise core engineering competencies, reflecting the technically oriented nature of the programme (Figure 1). Design-related competencies—such as design thinking, problem-solving, and concept development—are particularly prominent, appearing in 23 courses across all three years. Analytical thinking is addressed in 14 courses, while critical thinking is mentioned in eight courses and is more evenly distributed. Digital literacy, including programming and software skills, appears in six courses, whereas explicit references to AI literacy are limited to a single second-year course. Systems thinking and modelling are mainly concentrated in the first year, while research-related skills, such as data analysis and knowledge acquisition, are primarily addressed in the first and second years. Project management competencies are mentioned in only three courses.

Communication and collaboration competencies are present but unevenly articulated. Collaboration is explicitly mentioned in ten courses across all programme years. Interpersonal communication skills, such as peer feedback and perspective-taking, appear in nine courses, while technical communication skills—including reporting, presenting, and visualisation—are addressed in seven courses. Although teamwork and communication are present, they do not form a clearly articulated or progressive learning trajectory.

Personal and professional competencies are less frequently represented. Seven courses include learning objectives related to self-direction and self-management, mainly in the first year. Integrity-related competencies appear in five courses, while adaptability, proactivity, and reflective practice are only sporadically mentioned.

Impact-related competencies are least represented. Environmental awareness appears in two courses and social responsibility in one first-year course. Ethical responsibility, stakeholder awareness, entrepreneurship, and business-related competencies are not explicitly addressed. Overall, the findings reveal a fragmented and largely implicit approach to transversal and societal skills development, motivating the introduction of structured learning lines in the revised curriculum (Figure 1).

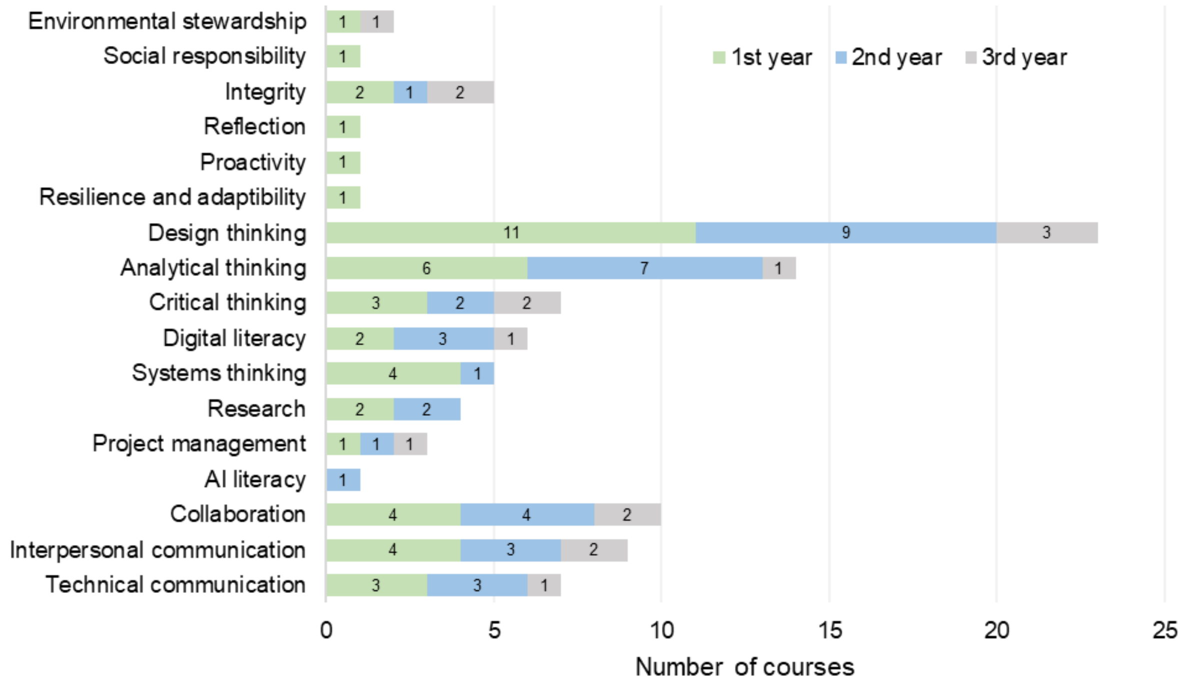

Figure 1. Distribution of transversal and societal skills across BSc courses per year.

CURRICULUM DESIGN: THE LEARNING-LINE APPROACH

To increase the visibility and coherence of skills development in the revised curriculum, four learning lines will be introduced. A learning line is defined as the progressive development of students' knowledge, skills, and attitudes in a specific area across the programme. Each learning line has clearly defined descriptors and is linked to programme-level learning objectives (APPENDIX A). The four learning lines are:

1. **Ethics and Societal Context**, focusing on ethical responsibility, sustainability, scientific integrity, and the societal impact of engineering solutions.
2. **Engineering Approach**, addressing research, design cycles, system thinking, analytical and problem solving, experimentation, and interdisciplinarity.
3. **Knowledge and Its Interconnection**, focusing on modelling, simulation, data analysis, control, and digital skills.
4. **Transversal Skills, Knowledge and Attitudes**, including teamwork, communication, continuous learning, reflective thinking, and learning how to learn.

Each learning line developed its learning objectives (APPENDIX B) through an iterative process involving faculty bodies, academic staff, and educational support staff. Concrete educational units were then aligned with these objectives, resulting in a curriculum overview (curriculum card) that visualises how skills and knowledge are distributed throughout the programme (Figure 2).

Dedicated learning-line teams with faculty-wide representation have been appointed to monitor content, alignment, and progression within each learning line in close collaboration with course teams, ensuring coherence and preventing fragmentation. Established at the outset of the curriculum development, these teams will evaluate the outcomes of the Bachelor programme implementation and remain active for at least five years after implementation to oversee ongoing adjustments and explicitly safeguard the integrity of each learning line.

Transversal and societal skills

This paper focuses on the learning lines **Ethics and Societal Context** and **Transversal Skills**, and their implementation at the start of the programme. These learning lines were selected because they address competencies that are essential for contemporary engineering practice, yet are often implicitly addressed and insufficiently visible in engineering curricula. By explicitly structuring these learning lines, the programme aims to create coherent learning paths for transversal and societal skills, enabling the design of targeted learning activities and the development of appropriate assessment approaches.

Rather than being implemented as stand-alone courses, topics from the Ethics and Societal Context and Transversal Skills learning lines are embedded within existing technical and engineering courses. The allocation of learning-line topics to specific courses is guided by a clear educational rationale: alignment with the technical content of the course, opportunities for application in projects and practicals, and the intended progression of skills across the Bachelor programme. This approach ensures that skills development is meaningfully intertwined with disciplinary learning and that students encounter these skills in increasingly complex and authentic engineering contexts over time.

Project and practical activities

In the revised curriculum, a clear distinction is made between projects (star symbol in Figure 2) and practicals (target icon in Figure 2). Projects are defined as team-based learning activities in which students work on open-ended engineering challenges with an unknown outcome, requiring integration of knowledge, collaboration, and decision-making under uncertainty. Practicals, in contrast, are also team-based activities but focus on applying specific concepts or methods to tasks with a known or expected outcome, supporting the development of technical proficiency and experimental skills.

Both projects and practicals will no longer be offered as stand-alone courses as in the current curriculum but are integrated within broader learning units. This approach preserves the hands-on character of the curriculum while strengthening the connection between theoretical content and practical application. Lectures are positioned to support labs, practicals, and projects, which are aligned with both technical content and transversal and societal skills.

IMPLEMENTATION EXAMPLE: AEROSPACE GROUND SCHOOL

To emphasise the importance of transversal and societal skills from the outset, the revised curriculum introduces the *Aerospace Ground School* in the first week of the BSc programme. This week is designed to confront students with both their incoming knowledge and the transversal and societal skills required of an engineer in training and make them excited in the program.

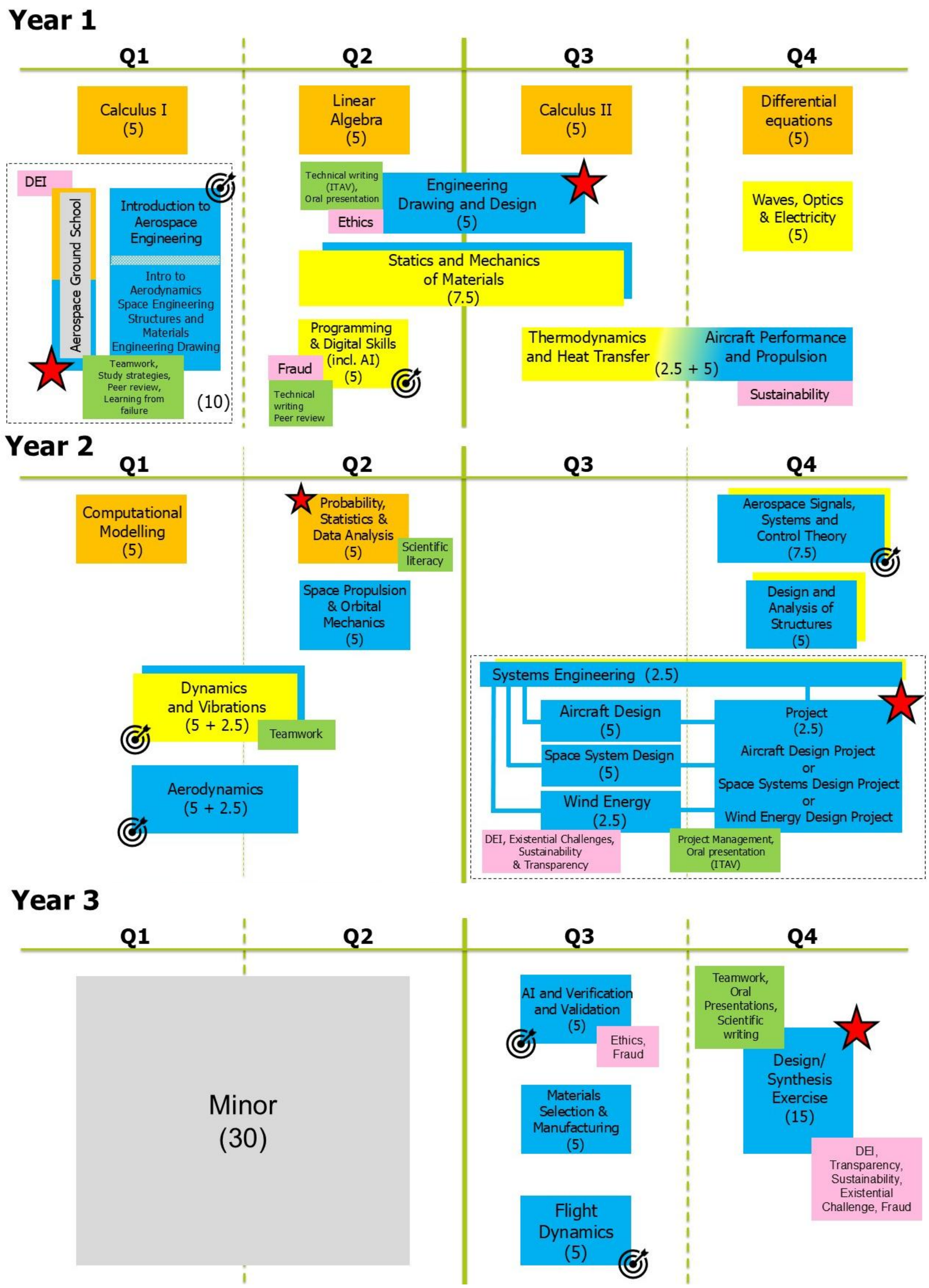

Figure 2. Overview of the curriculum card per year, showing the color-coded learning lines for each course (green: transversal skills, knowledge and attitudes; yellow: knowledge and its interconnection including mathematics in orange; blue: engineering approach; pink: ethics and societal context). Project activities are indicated with a star (teamwork with an unknown outcome), and practical activities with a target icon (teamwork with a known outcome).

The week consists of two complementary components (Figure 3):

- **Disciplinary practical sessions ("orange blocks"):** In daily practical sessions across different aerospace disciplines—such as aerodynamics and wind energy, flight performance and propulsion, space engineering, and aerospace structures and materials—in groups, students work on engineering problems that require the application of basic mathematical knowledge (e.g. integrals, derivatives) and the initial development of engineering skills. These sessions address skills such as problem formulation, basic modelling, estimation, dealing with uncertainty, and making engineering decisions.

- **Professional development sessions ("blue, green and pink blocks"):** Parallel lecture and discussion sessions focus explicitly on transversal and societal skills development. Topics include the role of the engineer, learning from failure, ethical dilemmas in engineering practice, the TU Delft code of conduct, and diversity, equity, and inclusion. These sessions also support social integration by helping students get to know each other and the faculty.

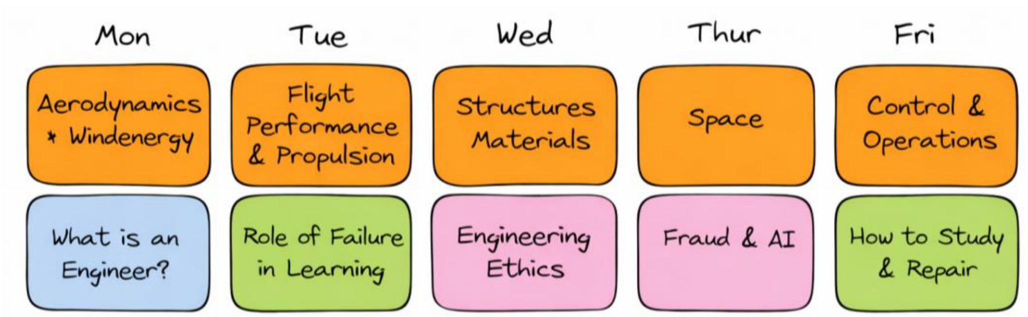

Figure 3. Components of the Aerospace Ground School per day.

The structure of the week enables large student cohorts to be divided into manageable groups of approximately 40 students within a cohort of 440 first-year Bachelor students. This group organisation combines scalability with opportunities for active and interactive learning. Although the assessment approach is still under development, the intention is to implement Aerospace Ground School as a pass–fail course. Students will be required to actively participate in all components of the week and demonstrate engagement by completing a set of required activities, which are recorded through check marks rather than graded assessments. This approach aims to emphasise participation, reflection, collaboration and skill development, while avoiding additional assessment pressure at the start of the programme.

Visibility of Transversal and Societal Skills

To enhance the visibility of transversal and societal skills, these skills are explicitly described on the course pages. This transparency allows (future) students to understand what skills they are expected to develop in each course and how these relate to the overall programme learning objectives. Making skills explicit on course pages also supports alignment across courses and provides clarity for staff and external stakeholders, such as accreditation and visitation committees.

DISCUSSION

The learning-line approach provides a structured way to embed transversal and societal skills without adding separate courses or increasing workload. By making learning objectives explicit and aligning them across courses, skills development becomes more visible to students and staff. Introducing these skills from the first week of the programme reinforces their importance and positions them as integral to engineering practice rather than as add-ons.

In the revised curriculum, transversal and societal skills are assessed within the technical and project-based courses where they are taught, using short reflections, peer feedback, and group evaluations supported by shared rubrics. These rubrics promote consistency and calibration across teaching teams while keeping assessment load manageable. To help staff integrate these skills effectively and sustainably, the faculty provides a structured implementation plan with workshops, design sessions, and feedback cycles. Learning-line team members guide these efforts to support alignment and reduce the burden on course coordinators.

Challenges remain in refining assessment methods and ensuring long-term curriculum alignment. Dedicated learning-line teams will therefore evaluate programme implementation and monitor alignment over the subsequent five years. This monitoring process will track indicators such as student progression, workload, project quality, satisfaction, and learning-objective alignment, using data from surveys, evaluations, artefact reviews, and structured reflections to provide longitudinal insight into the development of transversal and societal competencies.

CONCLUSION AND RECOMMENDATIONS

This paper set out to address the challenges facing contemporary AE education, including increasing student numbers, rapid technological developments, and growing expectations regarding transversal and societal skills. The curriculum revision presented responds to these challenges by embedding skills development in a coherent and scalable way, without further overloading the programme.

Embedding transversal and societal skills through dedicated learning lines increases their visibility, coherence, and systematic integration alongside technical knowledge. By explicitly defining learning objectives and aligning them across courses, these skills become an integral part of the overall educational design rather than implicit or fragmented elements of individual courses.

The experience gained in this work highlights the importance of establishing dedicated groups to define, monitor, and align transversal and societal skills across the curriculum. To support coherence and transparency, these skills should be explicitly articulated in learning objectives, course descriptions, and assessments, with educational advisors assisting course teams in integrating them meaningfully with disciplinary content. Ensuring that these competencies develop progressively throughout the programme is essential, as is the continuous monitoring of their implementation and impact in the years that follow. These recommendations may support other engineering programmes seeking to prepare graduates for the complex technical and societal challenges of contemporary engineering practice.

ACKNOWLEDGEMENTS

The authors thank Calvin Rans, Wouter van der Wal, Anke Schols, and all academic and learning-line team members for their contributions to the development of the learning lines and curriculum card.

REFERENCES

Beagon, U., Kövesi, K., Tabas, B., Nørgaard, B., Lehtinen, R., Bowe, B., … Spliid, C. M. (2023). Preparing engineering students for the challenges of the SDGs: what competences are required? *European Journal of Engineering Education*, *48*(1), 1–23.

Fleming, G. C., Klopfer, M., Katz, A., & Knight, D. (2024). What engineering employers want: An analysis of technical and professional skills in engineering job advertisements. *Journal of Engineering Education*, *113*(2), 251-279.

Gouveia, F. J. A., Filho, J. C. M. d. A., & Preiss, D. D. (2022). Development of a competence ecosystem for the future space workforce: strategies, practices and recommendations from international master programs in northern Sweden. Acta Astronautica, **197**, 46–52.

Kimpton, C., & Maynard, N. (2025). Factors shaping teamwork skills development in tertiary engineering education: a systematic literature review. *European Journal of Engineering Education*, *50*(2), 253–280.

Leandro Cruz, M., & Saunders-Smits, G. N. (2022). Using an industry instrument to trigger the improvement of the transversal competency learning outcomes of engineering graduates. *European Journal of Engineering Education*, *47*(1), 30–49.

OECD (2023), *OECD Digital Education Outlook 2023: Towards an Effective Digital Education Ecosystem*, OECD Publishing, Paris.

Passow, H. J., & Passow, C. H. (2017). What competencies should undergraduate engineering programs emphasize? A systematic review. *Journal of engineering education*, *106*(3), 475-526.

ShanghaiRanking Consultancy. (2023). *Global Ranking of Academic Subjects 2023: Aerospace Engineering* [Data set]. ShanghaiRanking. Retrieved from https://www.shanghairanking.com/rankings/gras/2025/AS0221 on 8 January 2026

TU Delft Teaching Academy, IDEE. (2024). *Future engineering skills.* Delft University of Technology. https://www.tudelft.nl/en/tu-delft-teaching-academy/idee/1/theme-3-future-engineering-skills

Tuyaerts, S., De Laet, T., Van den Broeck, L., & Langie, G. (2025). Lifelong learning competencies for engineers: a delphi study with an industry panel. *European Journal of Engineering Education*, *50*(5), 1010–1032.

Van den Broeck, L., Beagon, U., Craps, S., Coppens, K., Hanssens, J., & Langie, G. (2024). Learn to learn for life – how can faculty staff support the development of students' lifelong learning competencies? A systematic literature review. *European Journal of Engineering Education*, *49*(6), 1488–1508.

Hermon, J. P., & McCartan, C. D. (2010). Assessing the development of personal and professional skills in group projects. In Proceedings of the 6th International CDIO Conference, École Polytechnique, Montréal, Canada.

BIOGRAPHICAL INFORMATION

Mariana Leandro Cruz holds a Master's degree in Biomedical Engineering from Instituto Superior Técnico, University of Lisbon, and completed a PhD in Engineering Education in 2021 from TU Delft. Her research focuses on the development and assessment of transversal skills in engineering curricula. She currently works at TU Delft as Coordinator of Online Education at the Faculty of Aerospace Engineering and is the project leader of the Bachelor curriculum revision.

Daniël Peeters is an assistant professor in Aerospace Structures and Materials at TU Delft. He obtained his MSc and PhD degrees in Aerospace Engineering from TU Delft, focusing on the modelling and optimisation of variable stiffness composite structures with manufacturing constraints. After postdoctoral research at the University of Limerick, he returned to the Faculty of Aerospace Engineering, where his work integrates research and education. He teaches a BSc course, BSc project and an MSc course and is a member of the project team for the Bachelor curriculum revision.

Angelo Cervone holds a PhD in Space Propulsion from the University of Pisa and conducted postdoctoral research at the University of Osaka. Before joining TU Delft in 2012, he worked as a project manager in the space propulsion industry, leading multiple European research and development projects. At TU Delft, he is responsible for several Bachelor-level courses and is a member of the project team for the Bachelor curriculum revision.

René van Passen is an associate professor in Control and Simulation at TU Delft. He obtained his MSc and PhD degrees in Aerospace Engineering from TU Delft and conducted postdoctoral research at the University of Kassel and the Technical University of Denmark. His work focuses on modelling, simulation, and human-centred system design, and he has been actively involved in both research and the Bachelor curriculum revision at TU Delft.

Éva Kalmár is an assistant professor in Communication Design for Innovation at TU Delft. She conducts research in transdisciplinary collaborations and translates her knowledge in setting up transdisciplinary education, focusing on teamwork. She is actively engaged in the IDEE Future-ready Engineering Competencies research project, focusing on investigating current methodologies and designing innovative educational approaches for teaching transdisciplinary skills at TU Delft.

Joris Melkert is an associate professor in Flight Performance and Propulsion at TU Delft and serves as Director of Education at the Faculty of Aerospace Engineering. He holds degrees in Aerospace Engineering and Business Administration and has extensive experience in engineering education across a wide range of aerospace-related and foundational courses. He is a member of the project team for the Bachelor curriculum revision.

Corresponding author
Mariana Leandro Cruz
Delft University of Technology
Aerospace Engineering Faculty
Building 62, Kluyverweg 1, 2629 HS Delft,
The Netherlands
m.leandrocruz@tudelft.nl

APPENDIX A

Programme Learning Objectives

Students should be able to…

1. Synthesise fundamental theories from mathematics, physics, and engineering to analyse aerospace problems and design aerospace systems.

2. Prototype and test aerospace software, hardware and systems.

3. Critically reflect on and assess their own work and the work of others using insights from fundamental theories.

4. Identify and reflect on the needs and feedback from different stakeholders to translate these into design constraints.

5. Propose and advocate for responsible engineering solutions that meet the needs of the society, safety, social acceptance, viability and environmental impact.

6. Develop effective learning strategies both individually and collectively.

7. Demonstrate skills in communication, collaboration and team work to effectively work together in diverse teams and address different audiences.

8. Conduct research in aerospace-related sciences and technology to draw conclusions towards a research question while acknowledging their limitations.

APPENDIX B

Learning Objectives of LL: Ethics and Societal Context

Students should be able to…

LO1: Apply the principles of diversity, equity and inclusion in aerospace engineering practice and research.

LO2: Use algorithms (including AI), data and information that comply with ethical standards.

LO3: Apply principles of professional and personal ethics to aerospace engineering practice and research (including transparency).

LO4: Ensure transparency in aerospace engineering practice for inclusiveness decision making.

LO5: Evaluate the role and responsibility of aerospace engineering to tackle existential societal challenges.

LO6: Integrate the UN Sustainable Development Goals in aerospace engineering practice and research.

Learning Objectives of LL: Engineering Approach

Students should be able to…

LO1 Identify and categorize systems and subsystems in complex aerospace products.

LO2 Analyse and evaluate stakeholder requirements to enable engineering decisions.

LO3 Integrate knowledge from multiple disciplines into a coherent design framework.

LO4 Select and apply suitable theoretical, numerical and experimental models.

LO5 Generate, interpret, and use experimental data to support aerospace engineering decisions.

LO6 Verify and validate engineering models against requirements and reference data.

LO7 Compare and evaluate design alternatives using trade-offs and performance indicators.

LO8 Understand and apply system engineering principles.

LO9 Analyse a problem/system at different levels of abstraction.

LO10 Reflect on how system boundaries shape problem analysis and system interconnections.

Learning Objectives of LL: Knowledge and its Interconnection

Students should be able to…

LO1: Analyse the behaviour of aerospace systems using mathematical models (in the context of aerodynamics, thermodynamics, structural and space/flight dynamics)

LO2: Simulate the static and dynamic behaviour of aerospace systems using numerical methods.

LO3: Evaluate the strengths, limitations, and suitability of mathematical models for simulation, analysis, and design.

LO4: Implement algorithms/procedures to solve aerospace problems effectively.

LO5: Develop software and/or hardware prototypes to simulate, analyse, or optimize the behaviour of aerospace systems

LO6: Verify and validate aerospace models using data, statistical methods, and quantitative analysis.

LO7: Interpret experimental data and signals in the time and frequency domain using filtering and sampling methods.

LO8: Interact critically with AI models by relating their outputs to fundamental aerospace knowledge.

LO9: Design aerospace systems and sub-systems under various loading and environmental conditions, with analytical and numerical methods

Learning Objectives of LL: Transversal Skills

Students should be able to…

LO1: Assess and reflect on the quality of their own work and that of others.

LO2: Execute a continuous and proactive approach to learning.

LO3: Implement techniques for effective collaboration in diverse teams.

LO4: Reflect on their learning journey.

LO5: Reflect on roles and contributions (within a team).

LO6: Write clear and structured reports that communicate key findings to peers.

LO7: Deliver an effective oral presentation with visual support to diverse audiences.