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Guideline for education and training on standards and standardisation

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This CEN Workshop Agreement (CWA 18456:2026) has been developed in accordance with the CEN-CENELEC Guide 29 “CEN/CENELEC Workshop Agreements – A rapid way to standardization” and with the relevant provisions of CEN/CENELEC Internal Regulations - Part 2. It was approved by the Workshop CEN “Guideline for Training on Standards and Standardisation.”, the secretariat of which is held by “German Institute for Standardisation (DIN)” consisting of representatives of interested parties on 2025-12-16, the constitution of which was supported by CEN following the public call for participation made on 2025-11-17. However, this CEN Workshop Agreement does not necessarily include all relevant stakeholders.

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Introduction

This CEN/CENELEC Workshop Agreement aims to provide guidance for educators and trainers in the topical area of standards and standardisation, regardless of whether they operate at universities or other institutes of higher education, provide vocational training, professional training (such as in-company or lifelong training) or another type of education or training on this topic. What they have in common is that they help students, professionals and other learners gain competencies (knowledge and skills) in standards and in standardisation, the process by which standards are created.

Standardisation is a consensus-driven process conducted at national, European, and international levels. Within the European Standardisation System (ESS), formal standards are developed by the three recognised European Standardisation Organisations (ESOs)—the European Committee for Standardization (CEN), the European Committee for Electrotechnical Standardization (CENELEC), and the European Telecommunications Standards Institute (ETSI)—in close cooperation with National Standardisation Bodies (NSBs) representing individual member states. This system operates in alignment with the World Trade Organization (WTO) principles for international standardisation, ensuring that standards facilitate open markets, compatibility, product safety, and quality, while directly supporting public regulations and European strategic objectives.

The importance of standards and standardisation for individuals, firms and organisations, and for society

While perhaps not as widely recognised as they deserve, standards are important to individuals, firms and organisations, and society: [11] [12] [13] [14]

a) For individuals, standards can ensure safety and quality. They create better markets with more competition and a wider offer, lower prices, and easier evaluation of offerings, lower switching costs and less risks of supplier dependence or lock-in.

b) For industry and organisations, standards offer significant commercial opportunities. They create new markets, support investments, allowing entry into technological areas, and let developers create the best, often sophisticated solutions, help to secure development costs and optimise component and system costs. They reduce the risk of betting on a losing technology, prevent duplicative efforts and facilitate quality, compliance and meeting legal requirements. From an economic perspective, they create scale and network effects, thereby fostering a growing market. From a business and innovation perspective, standards and R&D are entangled – most obviously if research results in patents that are required to implement standards (Standard Essential Patents - SEPs). Moreover, from their perspective as buyers, firms and organisations enjoy many of the benefits listed above for individuals.

c) For society, standards help create markets without barriers, such as the Single Market. They facilitate international trade and, as tools of conformity assessment, can ensure that products meet essential characteristics, such as safety. From a macroeconomic perspective, they promote productivity throughout a value chain, innovation (especially its scaling) and sustainable development. They can also be valuable in supporting societal interests, such as the green and digital transitions, the resilience of the economy and society, and the strengthening of economic sectors, and eventually industrial competitiveness. Also, standards are found to facilitate SME participation in efficient value chains. From a government perspective, standards can complement more generic regulations by specifying technical details, e.g. in harmonised European standards. From a government perspective, standards also play an important role in ensuring transparent access to public information and processes (e.g., open document formats and IT systems based on open standards), play a role in fair public procurement, and play important roles in important areas such security, air and space, or defence.

Even if the above list is already long, it fails to acknowledge many other qualities and advantages of standards. While it is important to recognise standards may bring disadvantages as well (for instance, the standardisation process and the implementation of standards invoke costs; they may lead to a loss of variety and competition in some circumstances, create bias to certain parties, serve as market entry barrier in itself, or create reluctance towards newer and better standards), there is a broadly shared belief that the benefits of standards greatly outweigh their costs.

The need for education and training skills for standards and standardisation

The application of standards, as well as their creation, is, of course, a matter of work by individuals representing firms, organisations, associations or government. As highlighted by Mario Draghi's report on EU competitiveness, such social capital requires skills, education and institutional capacity [14].

Such a need is clearly recognised by companies and other stakeholders, as evidenced by the European Standardisation Panel Survey, which reveals a quite biased distribution of participants towards quite senior and male experts expected to retire soon involved in standardisation and a small share of them being trained before they entered standardisation. At the same time, the topic of standards and standardisation suffers from a certain lack of awareness across many different audiences (professionals, management, researchers, students), possibly also because of its omnipresent and multi-faceted nature [1].

The need for such social capital specific to the field of standardisation is also increasingly recognised by policymakers. The 2022 European Commission Strategy on Standardisation [4] identified education and skills, and ensuring future standardisation expertise, as one of the five key actions, noting that an upcoming generational change will see many of the experts who worked on standardisation in the last decades retire [13]. Likewise, the High-Level Forum on European Standardisation, which was set up in January 2023 to advise and support the European Commission in this area, and whose mandate, originally scheduled to end in December 2025, has been extended for an additional three years, includes a full work programme on education and skills for standardisation.

Furthermore, in 2023, the European Commission called for proposals that would help to “provide for a strong and sustainable pool of experts for European Standardisation” [26]. In response to this call, the Horizon Europe project “Education for Standardisation in the EU” (EDU4Standards.eu) was launched in 2024, comprising 18 project partners, all focusing on a mission to change the way standardisation is taught in Europe, in line with European values and interests [25]. Among other things, this project included the mapping of existing teaching activities [50], but more importantly the development of new teaching concepts and material, as well as carrying out teaching and education pilots in different institutional contexts, the performing of academic standards days and setting up a European Standards Student Association. The learnings and best practices of EDU4Standards.eu have been integrated into this document.

While this CWA focuses on education on standards and standardisation in Europe, it must be emphasised that Europe does not operate in a vacuum and that a lack of global awareness would weaken the practical utility of the educational competence framework as presented in this CWA. Other regions of the world host important standardisation systems as well, and, together with these systems, Europe is part of the worldwide standardisation system.

The intended audience of this document

As indicated above, this CEN/CENELEC Workshop Agreement is primarily aimed to help and support educators and trainers in the field of standardisation, regardless of the level of their educational efforts, their institutional embedding (or lack thereof), or their specialism, yet it is also of relevance to teaching institutions and to others.

Table 1 — Intended Audience and Utility

Audience Category	Description and Intended Use
Educators and trainers	Provides guidance for educators and trainers at all levels to develop new or enriched standardisation courses and align existing curricula with the latest strategic developments of the EU. This is founded on the EU Standardisation Strategy, validated competences and methods from EDU4Standards.eu, and HLF recommendations. It integrates European core values and interests into standardisation education, enabling learners in recognised courses to obtain pan-European certificates in standardisation expertise.
Institutions active in labelling and certification	Serves teaching institutions of all kinds (universities, higher education institutes, vocational schools, in-company training) to assess course alignment with European values and interests for quality labelling. Accredited certification authorities and Conformity Assessment Bodies (CABs) can use this document as a reference point for European standardisation education and training, including the certification of graduates, educators, trainers, and courses.
Others	Relevant for industry stakeholders, public administration, and policymakers with an interest in standardisation, national and European Standards Development Organisations (SDOs), and all other parties with an interest in standardisation.

Content and materials for education on standards and standardisation

It is beyond the scope of this document to deliver specific content or materials. For this, we refer the reader to EDU4Standards report D2.3, which identifies hundreds of sources, arranged by topic, including recommended sources for topics [39].

For a quick overview, Table 2 provides key sources for teaching, but we emphasise that this short list is, by definition, non-exhaustive.

Table 2 — Selection of useful content and materials

Criterium	Description
Handbooks	ABDELKAFI, N., et al. (2021) [11] HAWKINS, R., et al. (2017) [58]
Videos and MOOCs	DIN "Human Beings Are Not Ants" (Podcast series, 12 episodes) [59] TU/e Interview videos with standardisation experts [60] BSI: Podcast "The Standards Show" [61] BSI: Free online course "The power of standards" [62]
Serious games	Standards games by House of Knowledge [63] SN "SERIOUSLY STANDARD GAME" [63] IEC "Standardization Quest" (escape-room roleplay) [64] DIN game "Take off in the world of standardisation" [65] ETSI "TECH TRIVIA" [67]
Material on teaching standards	GABRIEL, L. et al (2020) [40] VRIES, H. (2002) [41] BEKKERS, R. and BOMBAERTS, G. (2017) [42] SNICKARS, F. H. (2012) [43] ISO. (2014) [44] EGYEDI, T. M. (2017) [45] IDOWU, S. O. (2020) [46]

While Table 2 focuses on English-language resources to ensure pan-European accessibility, materials in local languages remain vital for effective education and training; key examples include the standardisation e-learning modules from DKE (German) [66] and the AFNOR MOOC (French) [9].

Here, it is recommended to academia and policy makers around the world have well recognized the problem established by:

1) abundance of educational materials produced by individual lecturers,

2) the time and effort required to produce educational materials,

3) the fact that most of the produced materials cannot be reused in different programs despite the similarities in educational approaches and content across the globe, because most producers do not explicitly provide licenses that allow this [50].

Therefore, producers of education material can consider Open Educational Resources (OER) initiatives, as one example of a potential solution to the fore-mentioned problems [56].

Structure of this document

After discussing the scope (Clause 1), normative references (Clause 2) and terms, definitions and acronyms (Clause 3), the main substantive clauses of this CWA are about standards and values and interests (Clause 4), the proposed competence framework (Clause 5), and suitable teaching and training methods (Clause 6). A certificate of knowledge in standardisation is currently under development and, for that reason, is discussed in the informative Annex A rather than in a regular clause. Annex B and C provide illustrative examples for the competence framework and criteria and good practices, respectively.

1 Scope

This document provides comprehensive guidelines for an educational competence framework that supports individuals to develop the knowledge, skills, and attributes required for engagement in standards and standardisation. It proposes innovative teaching and training methods, along with specific training content developed through the Horizon Europe EDU4Standards project. The framework is designed to be applicable to all learners - including students, professionals, and personnel across all types of organisations - with the overarching goal of strengthening standardisation competencies while taking European values and interests into account. By providing guidelines, the document supports the strategic need for a sustainable expert base.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and acronyms

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp/

— IEC Electropedia: available at http://www.electropedia.org/

3.1
standardisation
activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context

[SOURCE: EN 45020:2006, 1.1, modified]

3.2
standards development organisation
SDO
organisation devoted to developing standards and that puts in place well-defined procedures to guarantee a fair development process, which is aimed at building consensus among involved contributors and ensuring the quality of the final deliverables

Note 1 to entry: Adapted from ABDELKAFI, N. ET AL. (2021), [11]

3.3
competence
ability to apply learning outcomes adequately in a defined context

Note 1 to entry: Adapted from CEDEFOP (2014), [57], modified

3.4
knowledge
outcome of the assimilation of information through learning

Note 1 to entry: Adapted from EUROPEAN UNION (2017), [52], Annex I

3.5
skills
abilities to apply knowledge and use know-how to complete tasks and solve problems

Note 1 to entry: Adapted from EUROPEAN UNION (2017), [52], Annex I

3.6
learning outcome
statement of what an individual should know, understand and/or be able to do at the end of a learning process, which is defined in terms of knowledge, skills and responsibility and autonomy

Note 1 to entry: Adapted from EUROPEAN UNION (2017), [52], Annex I

3.7
competency framework
structured and comprehensive outline of the knowledge, skills, abilities, behaviours and attributes required for successful performance in a particular role or profession

Note 1 to entry: Adapted from ISO (2023), [47]

3.8
EU core values
values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities

Note 1 to entry: Adapted from EUROPEAN UNION (2016), [53], Article 2

3.9
vocational education and training
VET
education and training which prepares people for work and develops citizens' skills to remain employable and respond to the needs of the economy

Note 1 to entry: Adapted from EUROPEAN COMMISSION, [18]

4 Values and interests

4.1 What are values and interests?

In the context of the European Union and the European standardisation system, the concept of values and interests provides a crucial general framework for understanding why and how education about standardisation should be designed and delivered. Values express what is considered normatively, right or desirable. They are abstract principles that (should) guide behaviour, policies, and institutional practices. Interests express what an actor seeks to achieve concretely in a given context. They are more specific and goal-oriented, and they can be strategic, economic, social, or environmental.

For the European Union, Article 2 of the Treaty on European Union (from here on referred to as Article 2 TEU) defines the core values: “The Union is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law, and respect for human rights, including the rights of persons belonging to minorities” [53].

Standardisation education should not only address fundamental European values but also explicitly integrate key European interests central to current standardisation debates, namely competitiveness, innovation, sustainability, and resilience. These interests, as formulated in the EU Standardisation Strategy [4] for a resilient, green and digital Single Market, have been further clarified through the 2025

"competitiveness compass", based on Mario Draghi's analysis of the future of European competitiveness [14]. This led to a refined understanding of European interests: a resilient Single Market corresponds to Resilience, a green Single Market to Sustainability, and a digital Single Market to Innovation (including fields such as biotechnology, quantum technologies, and space), while Competitiveness is emphasised as a fourth, overarching interest guiding EU standardisation policy and thus also informing education and training.

It is key to acknowledge that standardisation is not value-neutral; standards shape markets, technologies, infrastructures, and ultimately social practices. Therefore, standardisation education must help learners understand how European values inform the processes and objectives of standardisation, how European interests such as innovation, sustainability, competitiveness, and resilience are promoted through and in standards, and how potential tensions between values and interests can be identified, critically reflected upon, and constructively addressed.

4.2 Values as general leading principles

Values can be described as general leading principles that orient decisions and behaviour. They do not prescribe specific technical solutions but rather provide a normative framework within which both technical and organisational choices are made.

Characteristics of values in the European context are (1) normativity, (2) generality and abstraction, and (3) relative stability. Normativity means, in the given context, that values express what ought to be. For example, the value of equality implies that discrimination should be avoided and rectified. In standardisation, this means that standards should, where relevant, support non-discriminatory access to technologies, inclusive design, and fair treatment of different users. Generality and abstraction underline that values are abstract and general. The value of human dignity does not, by itself, determine a particular measurement method or interface specification; however, it requires that standards should not condone or enable degrading, unsafe, or exploitative practices. Relative stability expresses that values tend to be long-term commitments. While interpretations may evolve, the core values listed in Article 2 TEU [53] function as a relatively stable reference point across policy domains, including standardisation education.

Thus, values provide transversal guidance. They apply across sectors (e.g. digital, transport, health, energy) and policy fields (e.g. industrial policy, education, research). As such, they are relevant to any coherent approach to standardisation education.

Values can be seen and used as a compass for both standardisation and broader technology use (e.g., human oversight, ethical supply chains). They guide the objectives of standard-setting, such as safety, accessibility, consumer protection, and environmental protection. They inform the processes (e.g. transparency, participation, and inclusiveness of stakeholders - especially SMEs and civil society). Values also serve as criteria for evaluating and revising existing standards.

4.3 European values

The core values formulated in Article 2 TEU serve as binding reference points for the EU and its member states and are also increasingly relevant to the broader European standardisation ecosystem. More specifically:

a) **Human dignity** requires that every standard, particularly those affecting health, safety, and personal data, should respect the inherent worth of individuals. In practice, this involves standards that promote safe products and services, protect privacy, prevent degrading treatment, and support users' autonomy and well-being.

b) **Freedom** encompasses civil and political liberties, as well as aspects of economic and professional freedoms. For instance, in standardisation, freedom is relevant when standards affect freedom of expression (e.g., content moderation systems), freedom of movement (e.g., transport interoperability), or freedom to conduct business (e.g., technical barriers, fair competition).

c) **Democracy** implies participation, accountability, and public debate. Standardisation processes, while often technical, should be structured to allow meaningful participation of relevant stakeholders, transparency in decision-making, and responsiveness to democratic policy objectives.

d) **Equality** requires that individuals are treated without unjustified discrimination. Human rights and minority rights demand protection of vulnerable groups and respect for diversity. In standardisation, equality also entails ensuring an equality of voices during the drafting process. Furthermore, standards can promote equality by integrating accessibility, universal design, and non-discrimination principles in sectors such as ICT, the built environment, education, and service provision. Examples of areas where equality may be at stake include financial services, such as credit scoring, and employment services that use recommender systems.

e) The **rule of law** includes legal certainty, transparency, and effective reinforcement. Standards interact with legislation (e.g., harmonised standards supporting EU directives and regulations). A rule-of-law perspective requires clarity on the legal status of standards, fair access to standards, and reliable conformity assessment mechanisms.

4.4 Interests as concrete goals

While values provide a general orientation, interests specify more concrete goals that the EU and other actors seek to achieve. Interests are often context-dependent and can change over time while still being framed by relatively stable values. In the context of this document, the focus is on four central European interests closely linked to standardisation and standardisation education: innovation, sustainability, competitiveness, and resilience.

Before addressing them individually in Section 4.5, it is important to clarify the general notion of interests.

a) Interests are goal-oriented: They refer to what is to be achieved or protected (e.g. increased competitiveness, reduced emissions, secure supply chains).

b) Interests are instrumental: They lead to the selection of tools and strategies (e.g. policies, regulations, funding programs, education).

c) Interests can be multiple and sometimes conflicting: Promoting innovation may raise questions about data protection, safety, and privacy, and increasing resilience may require trade-offs in efficiency.

d) Interests can be explicitly incorporated in standards besides technical requirements.

In the standardisation landscape, interests are often visible in the motives of stakeholders participating in technical committees (e.g. companies, consumer organisations, research institutes, public authorities, trade unions, NGOs). They can also be seen in the policy priorities reflected in standardisation requests and work programs, and they inform the educational objectives of programs that prepare learners to participate in or use standardisation effectively.

4.5 European interests

Beyond its foundational values, the EU pursues key strategic interests that are central to its politics and to the role of standardisation. In this document, particular attention is given to competitiveness, innovation, sustainability, and resilience. These four interests are not isolated; they are mutually reinforcing. Should interests conflict, then orientation towards the more abstract values offers guidance.

Innovation refers to the development and diffusion of new products, services, processes and organisational models. The EU seeks to be a leader in innovation to strengthen its competitiveness, strategic autonomy, and capacity to address societal challenges. Standards constitute a key enabling

infrastructure for innovation. They support interoperability, facilitate market access and the scaling up of new solutions, and provide common terminology and reference frameworks. Innovation must be consistent with the values set out in Article 2 TEU. Innovative technologies (such as artificial intelligence, biometric systems or IoT) may affect human dignity (in terms of privacy) and equality. Standardisation education should therefore combine technical and economic aspects with appropriate ethical, legal and societal considerations.

Sustainability refers to the long-term viability of ecological, social and economic systems. In line with the European Green Deal and the UN Sustainable Development Goals, the EU aims to promote sustainable production and consumption, reduce greenhouse gas emissions, protect biodiversity and foster a circular economy. Standards play a key role in supporting sustainability. They specify environmental performance and resource efficiency requirements, they support reusability, reparability, recyclability and energy efficiency, and they provide methods and indicators for life-cycle assessment and sustainability reporting. Sustainability objectives are to be pursued in a manner consistent with the values laid down in Article 2 TEU, including human dignity, equality and respect for human rights. Standardisation education should therefore address how standards contribute to environmental and social sustainability and how potential trade-offs are identified and managed.

Competitiveness refers to the ability of economies, sectors and organisations to compete effectively in internal and global markets, while ensuring productivity, quality, employment and long-term growth. The EU seeks to strengthen its competitiveness to support economic prosperity, strategic autonomy, and the twin green and digital transitions. Standards play a key role in supporting competitiveness. They reduce transaction costs and technical barriers to trade; facilitate market access and international recognition of European products and services. They support quality, safety, and performance, thereby increasing trust among users and consumers, and promote the diffusion of innovations and the development of competitive value chains. Measures to enhance competitiveness are to be pursued in a manner consistent with the values laid down in Article 2 TEU and aligned with other key European interests such as sustainability and resilience. Standardisation education should therefore address how standards contribute to European and global competitiveness, while also equipping learners to recognise and manage potential tensions with social and environmental objectives.

Resilience refers to the capacity of systems, organisations and societies to withstand, adapt to and recover from shocks and disruptions, such as pandemics, cyber-attacks, energy crises, natural disasters or geopolitical tensions. The EU aims to strengthen resilience in critical areas, including health systems, digital and energy infrastructures, supply chains and democratic institutions. Standards contribute to resilience by defining reliability, safety and security requirements, by providing frameworks for risk management and business continuity, and enabling interoperability and redundancy in critical infrastructures. Measures to enhance resilience are to respect the values of Article 2 TEU, in particular human dignity, freedom, democracy and the rule of law. Standardisation education should therefore address how resilience-related standards can be designed and implemented without undermining fundamental rights and democratic principles.

As noted above, it must be emphasised that Europe does not operate in a vacuum; other regions of the world also host important standardisation systems. Understanding values and interests within these other systems is a prerequisite for European strategic autonomy.

More concretely, education and training should help learners incorporate European values and interests, as well as green and social principles, into standardisation, going beyond mere technical requirements.

Standardisation education is an integral component of socio-technical transitions [38][49], as it equips current and future professionals to understand, negotiate, and deliberately shape the value- and interest-laden dimensions of standards. Standards are key instruments for embedding societal values and interests into socio-technical systems and for steering transitions such as digitalisation and sustainability as transformations of entire socio-technical regimes rather than mere technological substitutions. Developed through multi-stakeholder processes, standards express and stabilise normative choices about what is acceptable, safe, ethical, and desirable, thereby translating diverse values and interests into

concrete, implementable specifications. In doing so, they create normative legitimacy for emerging technologies, define boundaries of behaviour and responsibility, and institutionalise trust by offering widely recognised criteria that reduce ambiguity for users, regulators, and market actors [48].

4.6 Integrating European values and interests into Standardisation Education

European values and interests are distinct but interrelated concepts. Values, as set out in Article 2 TEU (respect for human dignity, freedom, democracy, equality, rule of law and human rights), provide the normative framework within which action in the EU should take place. Interests, such as innovation, sustainability, competitiveness and resilience, express concrete goals to be achieved within that framework. In many cases, European values and interests are mutually supportive. Innovation can, for example, contribute to human dignity and equality through inclusive and safe technologies; sustainability supports justice and solidarity, including towards future generations; resilience helps protect life, health and the functioning of democratic institutions.

Conflicts between interests but also between values and interests, may also occur, for example, between rapid innovation and the protection of privacy or equality; between certain resilience measures and individual freedoms; between short-term economic competitiveness and long-term environmental or social sustainability.

Standardisation can help to align values and interests by translating values into technical and procedural requirements (e.g. privacy by design, accessibility, environmental performance), by providing transparent and participatory processes for balancing different interests, or by offering common reference frameworks that enable innovation, sustainability, competitiveness and resilience to be pursued in a manner consistent with Article 2 TEU.

4.7 European values and interests in education and training

Education is the key when it comes to applying and enabling European values and interests both in detail and in general. Standardisation education provides a major opportunity to embed European values and interests into the competences of learners across schools, vocational education and training (VET), higher education, and lifelong learning.

Standardisation education related to European values and interests should enable learners to know and understand the Article 2 TEU values [53] and their relevance for technical and organisational standards, as well as the role of standards for achieving European interests of innovation, sustainability, competitiveness and resilience. Learners should be able to recognise and analyse how specific standards embody or affect these values and interests and where tensions may arise, for example, between innovation and human dignity (e.g., privacy) or between resilience and personal freedoms. They should also evaluate and reflect on whether standardisation processes and outputs are consistent with European values and how they might be improved to better support innovative, sustainable, competitive and resilient solutions.

Finally, learners should be prepared to act and participate as future professionals, users or stakeholders in standardisation activities and to contribute to standardisation debates and processes in a way that combines technical understanding with value-based reasoning. Particularly, in international standardisation settings, graduates from standardisation education should represent and defend European values and interests.

To achieve these aims, Table 3 presents a set of nine standardisation education criteria, developed with the EDU4Standards project to guide educators and trainers. In Annex A, these criteria are discussed in greater detail.

Table 3 — Standardisation education criteria

Criterium	Description
C1	Attractiveness
C2	Multi- and interdisciplinarity
C3	Practical aspects
C4	International dimension
C5	European dimension, values and interests
C6	Teaching methods & materials
C7	Advanced and target-group specific aspects
C8	Completeness and recognisability of the course offer
C9	Impact on learners, industry and organisations

5 A competence framework

5.1 Towards a common core of competences

Building on Clause 4, the current clause specifies the competence framework for teachers and trainers who design, deliver, facilitate, and improve education and training on standardisation in line with European values and European interests (Stand-EUVI). The proposed Stand-EUVI framework focuses on the competences required to translate the Stand-EUVI approach into intended learning outcomes (ILO), content, methods, and assessment that are appropriate to the learner group, qualification level, and context.

The framework can be applied across higher education, vocational education and training, in-company training, and lifelong learning, and is compatible with learning-outcomes-based design and with progression across qualification levels. This is consistent with the Stand-EUVI intended learning outcomes framework, which is based on the European Qualifications Framework (EQF) [17], the International Standard Classification of Education (ISCED), Bloom's taxonomy, and related international references.

The competences of Stand-EUVI teachers and trainers should include the ability to design, deliver, facilitate, and improve standardisation education and training in a way that enables learners to understand, analyse, evaluate, and act in relation to standards and standardisation processes, SDOs and/or NSBs through the lens of European values and European interests.

This framework defines a common core of competences. It does not prescribe a single teacher or trainer profile, disciplinary pathway, or institutional setting. Rather, it identifies the competence areas that should enable teachers and trainers to establish new courses, enrich existing courses, and adapt learning offers to different contexts and target groups.

The framework provides a bridge to the subsequent clauses on methods and content. In this sense, ILOs, content choices, methods, and the nine criteria from Clause 4 (see Table 3) are not the primary subject of this clause, but they are important reference points for how the competences described here are enacted in practice.

5.2 Purpose and scope

The purpose of this framework is to identify the core competences required for persons who teach or train standardisation in line with European values and interests. These competences enable them to

formulate and interpret intended learning outcomes, select and structure content, choose and apply suitable methods, and reflect the relevant Stand-EUVI criteria in teaching and training practice.

This framework can be used by:

a) teachers in higher education institutions (HEIs);

b) trainers in vocational education and training (VET);

c) trainers in in-company learning and development;

d) facilitators in lifelong-learning and professional-development programmes;

e) curriculum developers and interdisciplinary teaching teams;

f) trainers in National Standards Bodies (NSB);

g) trainers in European Standardization Organizations (ESO).

And when used, it can help to:

1) guide the preparation and development of teachers and trainers;

2) support curriculum and programme design;

3) support the establishment of new courses and the enrichment of existing courses;

4) inform self-assessment and quality assurance;

5) support interdisciplinary teaching and training teams;

6) support progression across levels and learning contexts.

5.3 Conceptual basis

5.3.1 General

The competence framework for Stand-EUVI teachers and trainers was based on the following considerations:

a) Competence is understood as the ability to apply knowledge, skills, and attributes to achieve intended results; this is consistent with the general competence logic used in IWA 30-1 [54][55] related to the competence of standards professionals, although the present framework is intentionally less granular and more generic;

b) Standardisation education in the Stand-EUVI approach is not limited to technical or procedural knowledge, but includes engagement with European values and European interests in relation to standards and standardisation processes;

c) Effective teaching and training require not only subject-matter competence but also pedagogical capability, suitable delivery choices, and adaptation to learners and contexts;

d) Teaching and training should be learning-outcomes-based and adapted to the relevant qualification level.

5.3.2 Relationship to the nine criteria

The nine criteria described in Clause 4 (see Table 3) serve as important reference points for implementing the competence framework. They help teachers and trainers assess whether the competences described in this clause are being enacted in a way that makes a learning offer attractive, relevant, coherent, practical, recognisably European, and impactful. These criteria do not replace the competence framework and do not constitute separate competence domains. Rather, they provide practical orientation for how the competences in this clause may be realised in course design and delivery. Depending on context, a given competence domain may contribute more directly to some criteria than to others.

5.3.3 Common core and contextual variation

Stand-EUVI teachers and trainers should possess a common core of competences. The emphasis and manifestation of these competences may vary depending on the educational setting, learner group, disciplinary background, professional context, and relevant qualification level. Different teacher and trainer profiles may therefore contribute different forms of depth while still operating within the same competence framework, provided that each profile possesses the common core required to teach standardisation through the lens of European values and European interests.

5.4 Competence domains

5.4.1 General

The competence of Stand-EUVI teachers and trainers can be described through five interrelated domains: standardisation literacy; values-and-interests competence; pedagogical translation competence; facilitation and deliberation competence; and contextual and reflective professionalism. These domains are mutually reinforcing. They describe the common competences required of teachers and trainers, while also indicating how these competences support the implementation of ILOs, content, methods, and the nine criteria in practice.

Table 4 provides an overview of the competence domains, their core focus, their practical function, and the criteria to which they may contribute most directly.

Table 4 — Summary of competence domains for Stand-EUVI teachers and trainers

Competence domain	Core function in practice	Typical contribution to course design and delivery	Criteria often supported (see Table 3)
Standardisation literacy	How do standards and standardisation work?	Explain what standards are, how they are developed, applied, revised, and used; relate them to regulation, conformity assessment, organisations, markets, technologies, and social practices.	C2, C3, C4, C5, C8
Values-and-interests competence	How are European values and European interests related to standardisation?	Explain the distinction and relationship between values and interests; show how standards can embody, support, undermine, or bring them into tension; make these issues visible in teaching and training.	C5, C2, C4, C7
Pedagogical translation competence	How is the Stand-EUVI approach turned into learning?	Formulate learning outcomes; select and structure content; align outcomes, activities, and assessment; adapt progression to learner level and audience.	C1, C6, C7, C8, C9

Facilitation and deliberation competence	How are tensions, trade-offs, and contested issues explored?	Moderate discussion; support analysis of tensions and trade-offs; encourage reasoned argument and reflection; create an inclusive learning environment; handle disagreement constructively.	C1, C3, C6, C7, C9
Contextual and reflective professionalism	How is teaching or training adapted responsibly to context?	Adapt teaching and training to HEI, VET, in-company, and lifelong-learning settings; collaborate with others; evaluate and improve practice; connect the European dimension meaningfully to context.	C1, C7, C8, C9

5.4.2 Standardisation literacy

Stand-EUVI teachers and trainers should possess sufficient understanding of standards and standardisation to teach or train credibly in context. They can explain what standards are, how they are developed, applied, revised, and used, which actors participate in standardisation, and how standards relate to regulation, conformity assessment, organisational practice, markets, technologies, infrastructures, and social practices.

Teachers and trainers should be able to:

a) make learners understand what standards and standardisation is about;

b) explain the main functions of standards and standardisation in language appropriate to the target group;

c) use examples from European and international standardisation to show institutional structures and processes;

d) connect conceptual explanations with practical cases, guest input, or standard-like documents;

e) show learners how standardisation relates to their own discipline or field of work.

The required depth may vary according to setting and role. However, this competence should always be sufficient to connect teaching and training to actual standards practice.

5.4.3 Values-and-interests competence

Stand-EUVI teachers and trainers should understand the distinction and relationship between European values and European interests and should be able to teach standardisation through this lens. They can show how standards can embody, affect, support, undermine, or bring into tension values and interests in concrete contexts, for example, in accessibility, safety, trustworthy AI, sustainability, or supply chains.

Teachers and trainers should be able to:

a) explain European values as normative guiding principles and European interests as concrete and context-dependent goals;

b) select cases that show how values and interests can reinforce one another or come into tension;

c) make the European dimension visible without reducing it to policy slogans or isolated examples;

d) support learners in identifying which value-relevant aspects of products, services, or processes are reflected in standards or are missing from them.

This competence is central to the Stand-EUVI approach. Values and interests are distinct but interrelated, and education on standardisation should enable learners to recognise, analyse, and address their relationship in practice.

5.4.4 Pedagogical translation competence

Stand-EUVI teachers and trainers should translate the Stand-EUVI approach into meaningful and level-appropriate learning. They should be able to formulate intended learning outcomes, select and structure relevant content, choose suitable methods, align learning outcomes, learning activities, and assessment, and adapt progression to learner level, background, purpose, and context.

Teachers and trainers should be able to:

a) write intended learning outcomes that are clear, observable, and suitable for the level and context of the course;

b) select content that covers the core topic while remaining manageable for the available time and target group;

c) align learning activities and assessment with the intended learning outcomes;

d) adapt the degree of abstraction, autonomy, and complexity to lower, intermediate, or higher qualification levels.

For lower or intermediate qualification levels, teachers and trainers can place greater emphasis on guided understanding, recognition, and application in familiar contexts. For higher qualification levels and professional learners, they can place greater emphasis on critical analysis, evaluation, informed judgement, and responsible participation in complex or unfamiliar situations.

5.4.5 Facilitation and deliberation competence

Stand-EUVI teachers and trainers should facilitate dialogue, reflection, and constructive engagement with contested questions in standardisation. They can support learners in analysing tensions and trade-offs between stakeholders, values, interests, and possible courses of action.

Teachers and trainers should be able to:

a) moderate discussion across disciplinary and professional perspectives;

b) use methods such as teaching cases, scenario work, project-based learning, simulations, or table-top exercises where these support the intended learning outcomes;

c) encourage reasoned argument, collaborative inquiry, and critical reflection;

d) create an inclusive and respectful learning environment and handle disagreement constructively.

The expected degree of learner independence in discussion, deliberation, and judgement can be adapted to the relevant qualification level.

5.4.6 Contextual and reflective professionalism

Stand-EUVI teachers and trainers should adapt their teaching and training to different settings, learner groups, and professional purposes, and reflect critically on their own practice. They enact the framework responsibly across contexts while remaining aware of the need for contextual adaptation and interdisciplinary cooperation.

Teachers and trainers should be able to:

a) adapt examples, pace, depth, and formats to the setting and target group;

b) recognise the limits of their own disciplinary perspective and collaborate with other experts where useful;

c) collect feedback from learners, teachers, trainers, and course developers;

d) evaluate and improve their own teaching and training practice over time.

This competence domain is especially important for implementation and improvement. A course that is sound in principle may still fail if it is not adapted to the actual learner group or if feedback and evidence of impact are not used for revision.

5.5 Generic descriptors

For each competence domain, competences may be described through the following generic descriptor categories:

a) understands (knowledge);

b) is able to (skills);

c) demonstrates (attitudes; i.e. autonomy and responsibility).

These descriptor categories can be used to keep the framework simple, generic, and usable across different contexts. They may be used for curriculum planning, professional development, trainer preparation, self-assessment, and quality assurance.

Examples may be expressed in concrete domain-specific terms. For example, within standardisation literacy, the concept ‘understands’ may include understanding the role of standards organisations and the relation between standards and regulation; ‘is able to’ may include selecting a suitable case or standard-like text for a course; ‘demonstrates’ may include delivering a learning activity in which learners identify omissions, trade-offs, or value-sensitive aspects in a draft standard.

5.6 Use of the framework

This framework can be used as a reference for the preparation, support, and development of Stand-EUVI teachers and trainers. It can support the coherent delivery of standardisation education and training in line with European values and European interests, while allowing for contextual adaptation, disciplinary diversity, and progression across qualification levels.

In practical use, the framework can help teachers, trainers, and course teams ask questions such as:

a) Which intended learning outcomes are needed for this target group and qualification level?

b) Which content makes the European and international dimensions of standardisation visible?

c) Which methods best support the intended learning outcomes and the selected criteria?

d) Which competences are needed in the teaching team?

e) What are the ways to know if the course is attractive, coherent, useful, and impactful?

In this sense, the framework supports practical course development and delivery, but its primary purpose remains to define the common competence areas required of Stand-EUVI teachers and trainers. It can also provide the basis for the selection and design of suitable teaching and training contents and methods in the subsequent clauses.

5.7 Informative examples

Illustrative examples of how these competences may be enacted in different educational and training settings are provided in Annex B. These examples are intended to support the implementation of the competence framework, but do not form part of the framework itself [16].

6 Teaching and training methods

6.1 Different teaching methods for diverse purposes

The aim of teaching and training is to enable learning; it involves efforts to shape understanding of specific content within a given context, and the learning process itself can be long and uncertain [35]. Teaching draws on a range of approaches and methods. How can teachers and trainers support learners in understanding standardisation?

In higher education and lifelong learning training, a wide variety of teaching and learning methods are used to create an effective learning experience. Contemporary approaches typically combine multiple methods within the same educational setting. Some of these are illustrated in Table 5.

Table 5 — Teaching and training methods in higher education [22][28][29]

Teaching methods	Use	Examples
Direct Instruction (Teacher-Centered Methods)	Introducing complex and new concepts to large groups	**Ex cathedra Lectures**: The traditional delivery of content. Modern lectures often incorporate activation and engaging elements (e.g. interactive polls and quizzes). **Demonstrations**: a teacher performs a task while students/professionals/learners observe the process and logic.
Student (and other learners) Centered & Active Learning Methods	These methods activate learners and promote deeper retention	**Flipped Classroom**: Learners study the primary material at home and use precious class time for discussion, problem-solving, and peer collaboration. **Inquiry-Based Learning**: Teachers provide a complex question, instead of giving answers, whereas students/professionals/learners develop their own evidence-based conclusions. **Gamification**: Using game-design elements in education to motivate and engage through competitive or objective-based tasks.
Collaborative & Cooperative Learning	Focuses on the social nature of learning, preparing for the teamwork required in the modern workforce	**Problem-Based Learning**: Working in small groups to solve open-ended, real-world problems. The teacher acts as a facilitator rather than a source of truth. **Peer-to-peer Teaching**: Explaining concepts to one another. This reinforces the "learning by teaching effect". **Seminar-Style Discussions**: Small group sessions where the learning is driven by dialogue and the critique of diverse perspectives.
Experiential & Practical Training	Usually, to bring practice into classroom to bridge the gap between academic theory and professional practice	**Case Studies**: Analysing real-life scenarios to identify issues and propose solutions. **Simulations and VR**: Practicing skills in a safe, controlled setting of usually high-tech environments. **Service Learning**: Combines learning objectives with community (or other environment) service, allowing to apply their skills to real societal or other's needs.

The purpose of this clause is to provide guidance for the selection of teaching methods in standardisation classes. It presents selected experiences of the EDU4standards.eu project partners, with the aim of helping other teachers to initiate or enhance their standardisation classes or courses.

6.2 Choice of teaching and training methods

Choosing the appropriate teaching method depends on many factors, such as the target group of students, professionals or other learners, time available, the intended learning outcomes, the content, the level of interaction, and the teaching and learning environment. Teaching methods can be systematised and linked to levels of cognitive complexity and abstraction.

According to the revised Bloom's Taxonomy [19][30][37], the cognitive process dimensions include Remember, Understand, Apply, Analyse, Evaluate, and Create, reflecting increasing levels of cognitive complexity. Within this framework, understanding is more complex than remembering. The knowledge dimension, comprising factual, conceptual, procedural, and metacognitive knowledge, relates to levels of concreteness and abstraction: factual knowledge is the most concrete, while the higher levels are more abstract.

Furthermore, the type and level of interaction among students/professionals/other learners (or trainees), the teachers (trainers), and the learning content also influence the choice of teaching methods. With these considerations in mind, examples of teaching methods are presented in Table 6. It should be noted that teaching methods can be combined and applied in various ways.

Table 6 — Knowledge dimensions, standardisation competence and examples of teaching methods [15] [16] [19] [20] [24] [39]

Knowledge dimensions	Standardisation competences (examples)	Examples of teaching methods
Factual Knowledge (Foundation) The basic knowledge learners must know to be acquainted with the discipline or to solve problems in it.	To know the basics of standardisation (e.g. what are standards and standardisation, who, where and how standards are developed) and basic terminology. To know the history of standardisation	Direct instructions (lecturing, demonstration, direct instruction on standardisation) with engaging elements (e.g. quizzes, Q&A sessions) and interaction with teaching and learning content (e.g., reading assignments, supplementary material in different formats e.g., text, audio, video)
Conceptual Knowledge – focuses on interrelationships, principles, and theories.	To be able to understand the interactions between standards and the regulatory framework. To be able to understand standardisation in the context of the national quality infrastructure and the macroeconomic environment. To be able to understand the impact of implementing standards and of standardisation processes. To be able to understand the role of standards in implementing European values and interests.	Direct instruction Student-Centred (Inquiry-Based, e.g. research-based task on how standards are interrelated with science and research), Project-Based (e.g. group project on quality infrastructure in specific sector or specific service or product)
Procedural Knowledge This is knowledge of "how to" do something. It includes skills, techniques, and	To be able to search for and select appropriate standardisation organization.	Direct instruction Student-Centred (Inquiry-Based, Case-Based, Project-Based, Gamification)

methods specifically applied to the standardisation.	To be able to search for and select appropriate standards. To be able to implement standards in product or process development. To be able to identify the need for standards. To be able to identify the need for getting involved in standardisation. To be able to propose new work items in standardisation. To be able to strategically influence the agenda in standardisation processes. To be able to be passively involved in standardisation processes (observer). To be able to be actively involved in standardisation processes considering European values and interests (participant).	Collaborative and cooperative learning Experiential (Role-Playing, Field Work (e.g., participation in standardisation meetings or simulation of meetings) Lab Sessions)
Metacognitive Knowledge Metacognitive knowledge involves awareness of own cognition. Knowledge of cognition in general, as well as awareness and knowledge of one's own cognition.	To be able to judge which form of standardisation (formal vs. consortia) is appropriate. Reflecting on when to use formal vs. consortium standardisation. Evaluating personal biases in consensus processes. Assessing how effectively proposed solutions in standards would bridge engineering, economic and social requirements, including European values and interests.	Teaching methods based on reflection Journaling (e.g. Encouraging students to analyse experiences of participating in standardisation with self-reflection what is in there for me), Socratic Seminars (e.g. discussion to examine aspects of value and interest in specific standard)

6.3 Gamification and serious games in education and training on standardisation

The popularity of training based on gamification elements and serious games is growing. Gamification can be defined as a "social scientific, post-positivist subdiscipline of game science that explores the various design techniques, and related concerns, that can be used to add game elements to existing real-world processes" [31]. In education, gamification refers to the application of game design elements, such as points, badges, leaderboards, and challenges, to non-game learning environments to enhance students/professionals/ learners engagement and motivation [23][36].

Research indicates that gamification can have positive effects on learning outcomes, although its effectiveness is highly context-dependent [32][34]. At the same time, the literature presents mixed findings and raises ethical concerns. Excessive reliance on external rewards may undermine intrinsic motivation, increase students/professionals/learners anxiety, and encourage behaviours in which learners focus more on obtaining rewards than on developing genuine conceptual understanding [27][36]. Therefore, while gamification can be a powerful supplementary approach, it needs to be applied carefully in educational contexts.

In the field of standardisation, there are several good examples of serious games - games designed with educational purposes rather than purely for entertainment. Many of these have been developed by Standards Development Organisations (SDOs), such as ETSI, DIN, DS, NEN, UNE, ISO, and IEEE, as well as by EU-funded projects, like HSbooster.eu and EDU4standards.eu. Serious games can be used in teaching to support different levels of knowledge acquisition: they can reinforce factual knowledge on standardisation (e.g. ETSI or ISO games), support conceptual understanding (e.g. innovation contexts in DIN's games or the role of researchers in standardisation processes in the HSbooster.eu game), and develop procedural knowledge (e.g. role-playing serious games based on participation in standardisation meetings and consensus-building simulations). As such, serious games can be a valuable complement to other teaching methods.

6.4 Access to standardisation documents for students, professionals and other learners

The possibility to consult the text of standards itself is, without doubt, a key aspect for those that want to learn in this field. Recent development, including legal challenges, have already led to improved accessibility of European harmonised standards, for instance via online document consultation at NSBs. But a lot of other standards may be difficult to access, especially for those that study them outside a company environment or within Higher Education Institutions having not the required resources. To further promote education about standards and standardisation, it is important that access of documents to students, professionals and other learners is facilitated as best as possible. This can be done, for instance, by reading rooms at universities, other educational institutes, libraries, or at NSBs themselves.

Annex A
(informative)

Introduction of a certificate of knowledge in standardisation

A.1 The value of having a certificate

Once students, professionals and other learners have obtained knowledge of standards and standardisation, it is also important that they can communicate this to (future) employers, collaborators, colleagues, customers and others as a valuable career asset. This clause discusses the origin and introduction of a Pan-European Certificate on Standardisation, developed by CEN, CENELEC and ETSI, and which will be publicly launched in 2027 and is expected to be operational until at least early 2031.

A well-designed certificate offers benefits to various stakeholders, reducing information asymmetries in the labour market for standardisation experts.

Having obtained a certificate, students, professionals and other learners can demonstrate their expertise in standards and standardisation. It communicates a qualification that sets them apart in competitive job markets, showcasing knowledge beyond their core disciplines, and thus making it a valuable career asset. The certificate can be used alongside a CV when applying for standardisation-related jobs, to demonstrate knowledge and skills, but it can also be used more broadly, such as on platforms for professional networking and career development such as LinkedIn. For those already employed, the certificate can also help advance their roles within their organisation promoting standardisation.

Prospective employers benefit from the certificate system by being able to identify candidates with an attractive knowledge and skills set that matches job requirements, not only for jobs that might involve direct engagement in standardisation, but also for those for which a deeper understanding of the strategic/managerial, societal, and technological implications of standardisation is important. Existing employers can ensure that their staff's training (in-company or otherwise) results in an objective level of qualification, and a certificate is also an incentive for professional self-development.

In fact, a certification system can increase efficiency in the job market by improving effective information exchange between supply (educated individuals) and demand (employers).

A certificate system can also help educators and trainers (in universities, other educational institutes, NSBs, in-house, or otherwise) to attract more participants and make their courses more attractive and recognised (Criterium C1 and C8 of Table 3). It can also help new educators and trainers set up a course, define the learning objectives, and locate suitable teaching materials. Finally, SDOs, at both national and regional levels, can benefit from greater awareness of standardisation and from access to a broader pool of qualified experts, both as potential participants in standardisation and as prospective staff.

The certification system can raise awareness and recognition at all levels (participants, employers, educators and trainers, SDOs, and others). It is also a means to increase acceptance of the standards profession, and it is expected that certificate recipients will be more likely to engage with standardisation.

Ultimately, a certificate system can help to scale up to ensure the availability of a sufficiently large pool of future standardisation experts to serve Europe’s society, economy, and industry (Criterium C9 of Table 3).

A.2 Existing national certificates and their experiences

Certificates are a common way to validate skills, demonstrate professional competence, and enhance career marketability, and are used in many different fields. In fact, certificates (or micro-credential courses) on standards and standardisation have already been introduced by several parties, including (but not limited to):

a) DIN, the German NSB, has been awarding a certificate called “DIN Standardization Expert - Principles of Standardization" to university students who successfully followed specific standardisation courses offered at four German teaching institutes: Technical University Berlin, Clausthal University of Technology, University of Duisburg-Esse, and Pforzheim University of Applied Science. [2]

b) UNE, the Spanish NSB, offers a micro-credential training programme, jointly with UNED, the main Spanish online public university. The activity is fully online, with an estimated commitment of 1 ECTS (corresponding to 25 hours of workload). Upon completion and assessment via tests and activities, participants receive a certificate. [7]

c) ASRO, the Romanian NSB, together with Burgas Free University, developed micro-credential courses within its B-Green-ED project, offering flexible, accessible, and inclusive learning focused on industry- and sector-related environmental, management, and green standards that support the transition to a green and digital economy. [10]

d) ILNAS, the Luxembourg NSB, together with the University of Luxembourg, experimented between 2015 and 2019 with a university certificate program, which led to the creation of the Master MTECH, and they have the objective of introducing several new certificate small-scale programs in the near future on topics closely linked to standardisation, notably a first one concerning the “Sustainable Development” domain. In this context, ILNAS is also developing a new certificate program in the field of “Economy of trust”. [8]

e) AFNOR, the French NSB, offers an achievement badge, a standardisation awareness certificate, to students and professionals who successfully complete the final quiz of the AFNOR Massive Open Online Course (MOOC) on standardisation and conformity assessment. This 4-hour module is freely available on the FUN platform (France Université Numérique). [9]

f) The Society for Standardization Professionals (SES) in the US offers a certification program aimed at standardisation professionals. It is awarded after obtaining 75 points, for example, by completing a professional development course (15 points), attending a standards-related event (10 points), following a webinar (3 points), and attending the SES Annual Conference (25 points). [3]

A.3 The EC HLF Recommendation on a Pan-European certificate

The High-Level Forum on European standardisation (HLF) of the European Commission was established in January 2023, as requested by the EU Strategy on Standardisation. Its purpose is to identify standardisation priorities in support of EU policies and legislation, and to discuss horizontal issues such as international leadership and education and skills in a multi-stakeholder setting. The HLF members are high-level representatives from EU/EEA countries, European standardisation organisations, industry, civil society, and academia. In December 2025, as part of its education and skills activities, the HLF published a *Recommendation on the Introduction of a Pan-European Certificate of Knowledge in Standardisation*. [4][5]

Compared to national initiatives, a European system for certification would have several benefits over the existing national system: it would be available to participants from any European country and harmonised across countries, ensuring that all successful candidates meet the same objective level. Such harmonisation is also helpful in supporting the European single market.

In terms of main characteristics, the certification scheme recommended by the HLF:

a) addresses a broad audience: students (at various educational levels), professionals (including those participants in lifelong learning programmes), as well as other learners;

b) is open to any citizen of an EU or EEA country, or any other individual officially enrolled at a European educational institute;

c) can include certificates at different levels;

d) is broad enough to be used in a variety of disciplinary contexts, including engineering, management/economics, and legal studies;

e) allows any European teacher of standardisation classes, or any standardisation expert, or any NSB representative, to prepare candidates for the certificate;

f) allows candidates to obtain the certificate by successfully passing an online exam at an ESO or a participating NSB;

g) also allows candidates who are enrolled in what the HLF defines as a 'recognised course' at an educational institute to automatically obtain the certificate by successfully passing the exam for that course. [5]

A.4 The planned CEN/CENELEC/ETSI certificate

In response to the HLF "Pledge on Education and Skills on standards" and the specific recommendations regarding the development of a Pan-European certificate for standardisation skills and knowledge as discussed in the previous section, DG GROW launched a call for a project under the single market programme intended to reinforce the European Standardisation System through education. This project started in January 2026 with a consortium consisting of the 3 ESOs: CEN, CENELEC and ETSI. This project starts with developing and piloting the system in close cooperation with various stakeholders, with the public launch expected in the second half of 2027.

While the project includes 4 actions, two of them are specifically relevant for educators and trainers in the field of standardisation, which are (1) "Pan-European Certificate on Standardisation" and (2) the development of a multipart, modular textbook on European Standardisation, complemented by teaching materials and a teachers' handbook. That textbook can be used to prepare for the certificate.

By involving also the NSBs, representatives of the European Commission and the High-Level Forum on European standardisation (HLF), as well as experts from academia and industrial associations, it is ensured that the certificate will be relevant, complete, and of high quality.

The certification scheme as in preparation by the ESOs will initially focus on three target groups:

a) beginners who seek to gain a general understanding of the European standardisation system, global landscape, standards development principles, interplay between regulations and standardisation, etc.,

b) advanced users who seek understanding of specific areas of use of standards, their correct selection, understanding their mutual interconnection and application in a real work environment,

c) Experts who are active in the development of hENs, (such as convenors, rapporteurs, TC chairpersons, and representatives of NSBs. [6]

A.5 Recommendations regarding the certificate system

As argued in Section 7.1 above, certificates offer significant value to all stakeholders.

Educators in the field of standards and standardisation, who are the primary audience of this document, are strongly recommended to consider the pan-European certification system once it becomes available, either by directing their learners to this possibility or by engaging in a 'recognised course' in which successful students/professionals/learners automatically obtain the certificate.

Those educators and their institutes that are already involved in national certificate initiatives are strongly recommended to adopt the pan-European certification system once it becomes available. TU Berlin, which arguably has had the largest national certification system to date, has already indicated that it strongly supports a common European approach to the creation of a comparable cross-European student certificate on standardisation."[1]

Furthermore, National Standards Organisations (NSOs) of EU member states are recommended to engage in the certificate scheme as well, by issuing certificates to candidates in their own country (under the auspices of the ESOs). They may also become active by offering assessments (again under the auspices of the ESOs), which they may draft in their own national language(s), which may be beneficial in some countries.

Companies are recommended to recognise the value of the certificates and use them when recruiting and selecting new talent, whereas learners, of course, are recommended to enrol in courses and training programs that prepare for the certificate, and to obtain the certificate so they can demonstrate their knowledge and skills in the field of standards and standardisation.

[1] Statement of Christian Schröder, Vice president for Education, Teacher Training and Continuing Education at TU Berlin, in "A cross-European student certificate on standardisation", presented on the Education on standardisation in Europe – Delft (NL) – 17th/18th June 2024.

Annex B
(informative)

Illustrative examples for the competence framework

B.1 Equality, inclusion, and the “norm person”

A teaching case may invite learners to examine the implicit assumptions behind a supposedly standard user profile and to ask who is excluded or disadvantaged by such assumptions. For example, a product standard might implicitly assume an average adult user, without considering disability, age, gender, language, or different patterns of use. This kind of case can be used to address equality, inclusion, accessibility, and bias in standard-setting and to explore how European values may be translated into technical or procedural requirements. Criteria mainly supported: C5, C2, C3, C7.

B.2 Drafting a standard and identifying omissions

Learners may be asked to draft a standard or standard-like text and then to identify what may be missing. This can reveal hidden assumptions, neglected stakeholders, missing accessibility requirements, or insufficient attention to sustainability, safety, or protection. The exercise combines standardisation literacy with reflective critique. Criteria mainly supported: C3, C5, C6, C9.

B.3 “Red lines” and total surveillance

A teaching or training case may use an intentionally provocative example in standardisation, such as a standard for a technology enabling total surveillance of citizens, to explore limits set by dignity, freedom, democracy, privacy, and the rule of law. Such a case can help learners identify when technical possibilities or resilience claims may conflict with fundamental rights and democratic principles. Criteria mainly supported: C5, C6, C7.

B.4 Standardisation as a strategic issue in-company

In-company training may use a case that treats standardisation in line with European values and European interests as a strategic organisational issue rather than only a compliance task. Such a case can connect standards to competitiveness, resilience, sustainability, and responsible innovation, while also addressing trade-offs and organisational responsibility. Criteria mainly supported: C3, C5, C7, C9.

B.5 Philosophy or ethics input linked to standards practice

A guest lecture, short video sequence, or structured discussion from a philosophy or ethics perspective may be used to introduce or deepen reflection on values and interests. Its function is to provide a focused conceptual or normative input within a broader course. Such input can be explicitly linked to concrete standardisation processes or standards and should not remain purely abstract. Criteria mainly supported: C2, C5, C6.

B.6 Scenario work and table-top exercises

Where the intended learning outcomes concern analysis, application, or balancing of competing considerations, scenario-based discussion or table-top exercises may be used. In this context, a table-top exercise means a structured, discussion-based exercise in which learners work through a realistic

situation step by step, compare e.g. value options, justify decisions, and reflect on consequences without needing a full-scale simulation environment. Criteria mainly supported: C3, C6, C7, C9.

B.7 Philosopher or ethics lecturer in higher education, including Stand-EUVI

A philosopher or ethics lecturer may focus particularly on conceptual clarification, ethical reasoning, and the analysis of tensions between values and interests. Unlike A.5, which describes a specific teaching input or method element, this example describes a teacher profile that may take broader responsibility for a course component or module. Such teaching may be especially suitable for exploring human dignity, freedom, equality, democracy, and the rule of law in relation to standardisation. Criteria mainly supported: C2, C5, C7.

B.8 Neuropsychologist or human-factors specialist

A neuropsychologist or human-factors specialist may focus particularly on cognition, perception, behaviour, usability, accessibility, and inclusion. Such teaching may be used to examine how standards affect real users, how implicit assumptions shape design, and how safety, trust, and protection can be translated into requirements. This perspective can be especially useful where standardisation relates to digital systems, human-machine interaction, or the design of services and environments. Criteria mainly supported: C2, C3, C5.

B.9 Lawyer or legal scholar

A lawyer or legal scholar may focus particularly on the relationship between standards and legislation, the rule of law, legal certainty, access, conformity assessment, and rights-based constraints. Such teaching may be used to clarify how standards, especially harmonised European standards, interact with EU law and policy, how legal and procedural safeguards shape standardisation, and how values such as democracy, equality, and human rights can be addressed in governance. Criteria mainly supported: C4, C5, C8.

B.10 Engineer or technical specialist in in-company training

An engineer or technical specialist delivering in-company training may focus particularly on implementation, interoperability, product development, compliance, certification, and strategic standardisation. To remain within the Stand-EUVI approach, the training should not be limited to efficiency or compliance alone, but should also make visible the relevant value implications and trade-offs. Criteria mainly supported: C3, C5, C7, C9.

B.11 Economist, management scholar, or innovation specialist

An economist, management scholar, or innovation specialist may focus particularly on the relevance of standards for market access, competitiveness, innovation diffusion, organisational strategy, and value creation. Such teaching may be used to show how standardisation supports industrial development and strategic autonomy, while also requiring reflection on tensions with environmental, social, and rights-based objectives. Criteria mainly supported: C2, C4, C5, C9.

Annex C
(informative)

Criteria and good practices

C.1 Attractiveness

Standardisation is often perceived as a boring subject. This criterion concerns how to make standardisation attractive to students, professionals and other learners, encouraging them to enrol and engage actively during the course. Furthermore, the teacher faces the challenge of making the course attractive to the university or faculty management, which may decide whether a course will be part of a study programme or whether an existing course includes a module related to standardisation.

C.2 Multi- and interdisciplinarity

Standardisation isn't just for technical fields — it also impacts law, economics, political science, philosophy, and sociology. Academic programs in these areas must include standardisation, helping students/professionals/learners understand its role in their field of study and engage in cross-disciplinary discussions. Courses are advised to cover both technical and societal aspects.

C.3 Practical aspects

Understanding the practical side of standardisation prepares student/professionals/learners for real-world careers and enhances its applicability in their own field of work. Courses can bridge theory with practical application and provide learners with insight and hands-on knowledge into real-world problems and how they have been tackled.

C.4 International dimension

This criterion concerns the international dimension of standardisation and the provisions a teacher or trainer can take to address it. It is essential to understand standardisation as carried out by the international bodies ISO, IEC, and ITU. This can also include updates to international standardisation by fora and consortia. It also prepares the learners for discussion and negotiations with value systems and interests from outside Europe. It also relates to global goals such as the United Nations' Sustainable Development Goals (SDGs) and their European manifestation, as well as to their relation to EU core values.

C.5 European dimension, values and interests

Knowledge about the European dimension is key for future standardisers. Students/professionals/learners will understand the European standardisation process, led by CEN, CENELEC, and ETSI, and learn how standards incorporate the EU core values stipulated in Article 2 TEU (respect for human dignity, freedom, democracy, equality, and the rule of law). Courses should not only cover technical specifications but also highlight human-centric approaches, digital transformation, and green skills through standardisation. Learners must understand the European interests i.e. the policy context of their field and how standards act as key instruments for EU single market policies and competitiveness. This knowledge equips them to defend European values and interests in global standardisation discussions.

C.6 Teaching methods & materials

Teaching methods and materials are essential for addressing the aspects of European values and interests. Apart from direct teaching courses, standardisation education can also include distant teaching modules. The teaching material should reflect the new approach to standardisation education in line with European values and interests, including all aspects which define this approach (high-level criteria and indicators, stated in bold in this paragraph). It should also help educators locate suitable teaching materials aligned with the learning objectives, with a particular focus on Open Educational Resources (OER).

C.7 Advanced and target-group-specific aspects

Courses and modules differ depending on target groups, teaching formats and educational level. On the one hand, these aspects address specific differences, and on the other, they provide space for specialised modules that enhance a course and extend learners' competencies.

C.8 Completeness and recognisability of the course offering

This criterion determines whether a course meets the minimum requirements for a specific level and target group. These minimum requirements are expressed in specific sub-criteria and measured with indicators – the so-called High-Level-Indicators. A complete course must address all these requirements to be complete and recognisable, as follows:

1. Technical and societal aspects fostering perspectives of multiple disciplines on the same subject of standardisation.

2. Standardisation under the lead of ISO, IEC and ITU.

3. Updates to global standardisation fora and consortia.

4. European standardisation process and the ESOs (CEN/CENELEC/ETSI).

5. European interests, policy objectives, priorities in the context of standards as key instruments for the Single Market have to be addressed.

6. Green and digital skills through standardisation.

7. Gender-responsive standardisation.

8. Aspects of human-centric standardisation, European core-values in standards.

C.9 Impact on learners and organisations

This criterion describes provisions that enhance the course's impact on graduates and future employers, as well as its alignment with the objectives of standardisation education as stated in the EU Standardisation Strategy. The criterion also refers to the knowledge learners have gained from the course. Graduates strengthen the pool of qualified experts, both as potential participants in standardisation and as prospective staff.

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