



BSI Standards Publication

## **Guidelines for developing ICT Professional Curricula as scoped by EN 16234-1 (e-CF)**

---

## National foreword

This Published Document is the UK implementation of CEN/TS 17699:2022.

The UK participation in its preparation was entrusted to Technical Committee IST/43, Information technology for learning, education and training.

A list of organizations represented on this committee can be obtained on request to its committee manager.

### Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

This publication is not to be regarded as a British Standard.

© The British Standards Institution 2022  
Published by BSI Standards Limited 2022

ISBN 978 0 539 16443 5

ICS 03.100.30; 35.020

**Compliance with a Published Document cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 June 2022.

### Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

---

TECHNICAL SPECIFICATION  
SPÉCIFICATION TECHNIQUE  
TECHNISCHE SPEZIFIKATION

**CEN/TS 17699**

March 2022

---

ICS 03.100.30; 35.020

English Version

**Guidelines for developing ICT Professional Curricula as  
scoped by EN 16234-1 (e-CF)**

Richtlinien für die Entwicklung von Lehrplänen für  
IKT-Fachkräften nach EN16234-1 (e-CF)

This Technical Specification (CEN/TS) was approved by CEN on 3 January 2022 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## Contents

Page

European foreword.....	5
Introduction .....	6
1 Scope .....	8
2 Normative references .....	8
3 Terms and definitions.....	9
4 ICT Curriculum guidelines in context of European ICT Professionalism .....	13
5 Education and Training System in Europe .....	15
5.1 Introduction.....	15
5.2 Forms of post-secondary education.....	16
5.2.1 General .....	16
5.2.2 Higher Education .....	16
5.2.3 Vocational Education and Training .....	17
5.2.4 Other forms of education.....	17
5.3 Levels in education.....	17
5.4 Competence-based learning programmes.....	18
6 The Educational profile model .....	19
6.1 Introduction.....	19
6.1.1 General .....	19
6.1.2 The Educational profile as a tool .....	21
6.1.3 Scopes of the Educational profile.....	21
6.2 Elements of the Educational profile .....	22
6.2.1 General .....	22
6.2.2 Description .....	23
6.2.3 A set of programme learning outcomes .....	23
6.2.4 A set of unit learning outcomes.....	23
6.2.5 Assessments .....	24
6.3 Constructing Educational profiles .....	24
6.3.1 General .....	24
6.3.2 Inputs of an Educational profile.....	24
6.3.3 From Professional Role Profile to Educational profile .....	26
6.3.4 From EN 16234-1:2019 (e-CF) e-Competences to Educational profile .....	28
6.3.5 From other starting points to Educational profile .....	30
7 Designing or redesigning an EN 16234-1:2019 (e-CF) based learning programme .....	31
8 Implementation and organization of an EN 16234-1 (e-CF) based learning programme	34

<b>8.1</b>	<b>EN 16234-1 (e-CF) compliancy .....</b>	<b>34</b>
<b>8.1.1</b>	<b>Degrees of alignment.....</b>	<b>34</b>
<b>8.1.2</b>	<b>EN 16234-1:2019 (e-CF) and the T-shaped professional.....</b>	<b>35</b>
<b>8.1.3</b>	<b>How to stay EN 16234-1:2019 (e-CF) compliant.....</b>	<b>35</b>
<b>8.2</b>	<b>Localization .....</b>	<b>35</b>
<b>8.2.1</b>	<b>Local needs.....</b>	<b>35</b>
<b>8.2.2</b>	<b>Linking to professional practice.....</b>	<b>36</b>
<b>8.2.3</b>	<b>Cooperation with other educational institutes.....</b>	<b>36</b>
<b>8.3</b>	<b>Staff training.....</b>	<b>37</b>
<b>8.4</b>	<b>Accreditation and certification.....</b>	<b>37</b>
<b>8.4.1</b>	<b>Accreditation .....</b>	<b>37</b>
<b>8.4.2</b>	<b>Certification .....</b>	<b>37</b>
<b>8.5</b>	<b>Communication and marketing.....</b>	<b>37</b>
<b>8.5.1</b>	<b>External .....</b>	<b>37</b>
<b>8.5.2</b>	<b>Internal.....</b>	<b>37</b>
<b>Annex A (informative) ICT Professionalism for Europe underpinning references and standards</b>		<b>38</b>
<b>A.1</b>	<b>EN 16234-1:2019 (e-Competence Framework).....</b>	<b>38</b>
<b>A.2</b>	<b>CWA 16458-1:2018 European ICT Professional Role Profiles.....</b>	<b>42</b>
<b>A.3</b>	<b>prEN 17748-1, Foundational Body of Knowledge for the ICT Profession (ICT BoK) .....</b>	<b>45</b>
<b>A.4</b>	<b>FprCEN/TS 17834 European Professional Ethics Framework for the ICT Profession.....</b>	<b>49</b>
<b>A.5</b>	<b>FprCEN/TR 17802 e-Competence performance indicators and common metrics.....</b>	<b>50</b>
<b>Annex B (informative) e-Competence levels e-1 to e-5 from EN 16234-1:2019 (e-CF) .....</b>		<b>51</b>
<b>Annex C (informative) EN 16234-1 (e-CF) and European ICT Professional Role Profiles Use Cases – overview.....</b>		<b>53</b>
<b>Annex D (informative) e-CF proficiency levels versus EQF and types of education .....</b>		<b>57</b>
<b>Annex E (normative) The educational profile template.....</b>		<b>58</b>
<b>Annex F (informative) Creating an Educational profile related to ICT Project management based on different market needs and starting points .....</b>		<b>60</b>
<b>F.1</b>	<b>Introduction.....</b>	<b>60</b>
<b>F.2</b>	<b>ICT Project Management course within the existing bachelor programme .....</b>	<b>61</b>
<b>F.3</b>	<b>A single ICT Project Management course as a short separate programme.....</b>	<b>65</b>
<b>F.4</b>	<b>Full master programme for Junior project manager role based on ICT professional profile</b>	<b>68</b>
<b>F.5</b>	<b>MOOC that will provide learners basic theoretical knowledge related to ICT project management .....</b>	<b>72</b>
<b>F.6</b>	<b>Examples of educational profiles .....</b>	<b>74</b>
<b>Annex G (informative) Example: Translating EN 16234-1 (e-CF) competence into Programme Learning Outcome .....</b>		<b>82</b>
<b>Annex H (informative) Example: Translating e-CF-based Programme Learning Outcome into Learning Outcomes .....</b>		<b>89</b>

**Annex I (informative) Questions and answers related to the development of an Educational profile**  
**99**

**Bibliography ..... 147**

## **European foreword**

This document (CEN/TS 17699:2022) has been prepared by Technical Committee CEN/TC 428 “ICT Professionalism and Digital Competences”, the secretariat of which is held by UNI.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## **Introduction**

To underpin the development of a European Professional ICT workforce there is an imperative to provide education and training fit to meet the requirements of the ICT professional community. Enhanced approaches to address the education of new ICT entrants and for existing practitioner continuous professional development needs are required.

EN 16234-1:2019 e-Competence Framework (e-CF) - A common European Framework for ICT Professionals in all sectors - Part 1: Framework incorporates a common language articulating key ICT competences as required and applied in the ICT professional workplace. It offers a multifaceted background of the required essential knowledge, skills and attitudes applicable to ICT professionals across the breadth of ICT disciplines. It therefore follows that applying EN 16234-1 (e-CF) principles to education provision offers a route map to the realization of a genuinely professional ICT community.

This document is designed to address ICT professionalism through education provision. It guides curriculum and learning programme developers through the process of forming ICT practitioner courses and/or programmes, along a pathway to support the development of a competent, professional European ICT workforce.

This document provides guidance on the design/redesign, development and maintenance of a curriculum or learning programme to achieve alignment or compliance with EN 16234-1:2019 (e-CF). A methodology, deploying the application of educational profiles is provided as a step-by-step approach for verifying programme content alignment with EN 16234-1 (e-CF) articulated competences.

The application of EN 16234-1:2019 (e-CF) and its intrinsic links to CWA 16458:2018 series European ICT Professional Role Profiles and prEN 17748-1 - European Foundational Body of the Knowledge for the ICT Profession (ICT BoK), for the purpose of guiding curriculum and learning programme design, has been commissioned as an essential building block to support the vision of a European ICT Professional community.

This document is neutral and directly linked to EN 16234-1:2019 (e-CF) and does not follow the specific interests of a minority of major influencers.

This document is for application by educational institutions, learning programmes and certification providers of all types, public and private, that provide ICT Professional education and training.

This document is informed and framed by the scope of EN 16234-1:2019 (e-CF) and thus covers the entire ICT Professional process lifecycle.

This document provides:

- a methodological approach to linking EN 16234 (e-CF) and related documents with new or existing learning programmes;
- a model relating ICT learning outcomes to EN 16234 (e-CF) related competences;
- an overview of strategic and operational aspects related to the implementation of an e-CF based learning programme;
- a comprehensive overview of ICT professionalism documents and references providing a shared European language for ICT Professional competences, knowledge, skills, attitudes and roles.

This document enhances and complements existing learning programme development and design practice in the following ways:

- It embeds the context of European ICT Professionalism through compatibility with its four cornerstones comprising EN 16234-1 (e-CF), prEN 17748-1 (ICT BoK), FprCEN/TS 17834 (European Professional Ethics Framework for the ICT Profession) and by complementing the guidelines on e-CF performance indicators and common metrics to form the Education and Training cornerstone.

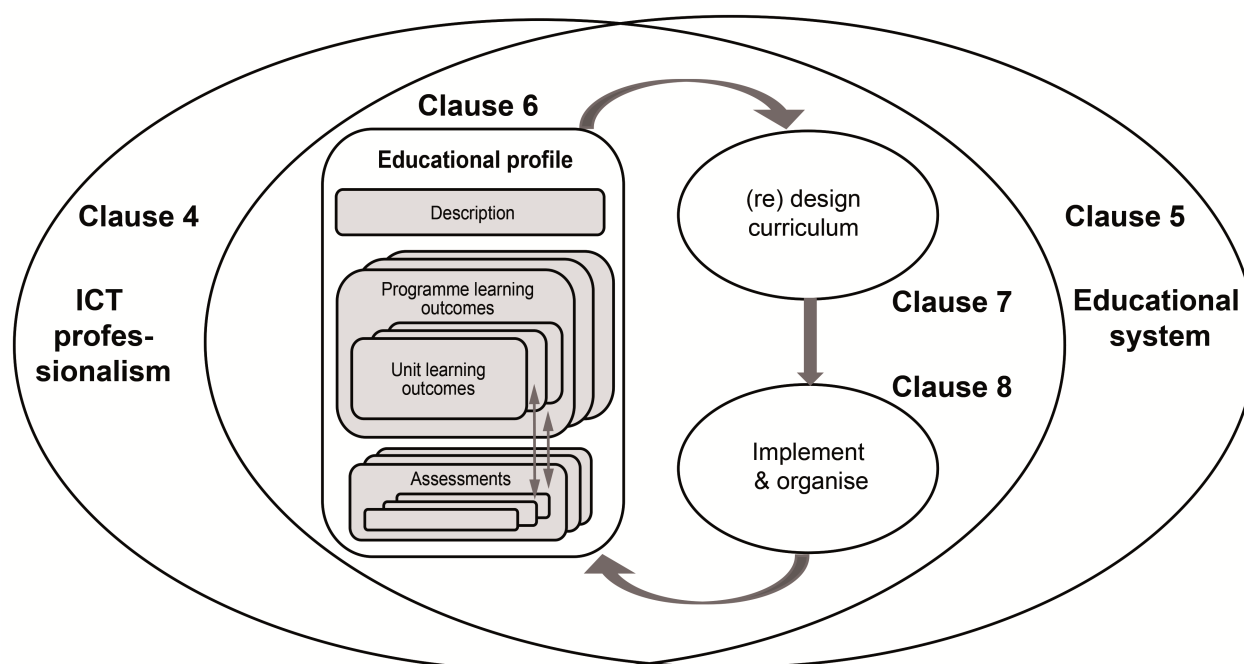
- It facilitates translation of workplace competence needs into an education and learning environment.
- It supports transparency of education and training content through the application of EN 16234-1 (e-CF) common language and therefore influences learning programme currency and quality.

This document is structured by 8 Clauses, as described in Figure 1.

Clauses 1, 2 and 3 describe the scope, the normative references and the relevant terms and definitions used.

Clauses 4 and 5 place the document in its European context. These items are dedicated to ICT professionalism and the education and training system. Clause 4 introduces the European ICT Professionalism Framework with its four building blocks and underlying reference publications. This document is an important contribution for developing ICT Professionalism in Europe and provided as part of a series, all related to this broader ICT Professionalism Framework. Clause 5 highlights the different forms of education to which these ICT curriculum guidelines are relevant. It also relates the European Qualification Framework and the concept of competences to the construct of the e-CF.

Clauses 6, 7 and 8 form the core of the document. They describe the (re)design of a learning programme or curriculum based on EN 16234-1 (e-CF) and related documents. In Clause 6 the concept of educational profiles is introduced, as a structure that enables a competence-oriented learning programme design and development, thus providing a link between competences needed in a professional environment and the learning outcomes of education and training. Clause 7 explains how to use this educational profile in the design or redesign of an ICT curriculum or learning programme. Clause 8 focuses on specific implementation and organization issues, related to the practical realization of an e-CF based ICT-curriculum or learning programme in a concrete context.



**Figure 1 — Navigation aid for Clauses 4 to 8 of this document**

## **1 Scope**

This document provides guidance and inspiration on how to design/redesign, develop, maintain, adjust, and compare ICT Professional curricula and learning programmes as scoped by EN 16234-1:2019 and related documents.

EN 16234-1:2019 (e-CF) is the starting guiding point for this document, for a shared European language for ICT professional development. Other framework sources can be used to apply the methodology outlined in this document.

This document is for application by educational institutions, learning programmes and certification providers of all types (public and private), providing ICT Professional education and training including:

- Higher Education (HE);
- Vocational Education and Training (VET);
- Any other educational or training institution or provider in professional ICT, e.g. Continuous Professional Development (CPD).

This document is focused on guiding education providers on how to align curricula and learning programmes with the structure and principles of EN 16234-1 (e-CF) e-Competences and CWA 16458-1 ICT Professional Role Profiles. It applies to all forms of education, supporting educational providers who plan to use a shared European language on knowledge, skills, competences and roles, as ingredients for the successful provision of ICT Professional education and training.

The guidelines, provided by this document, include formal, non-formal and industry developed education and training through the provision of high-level, consistent recommendations and guidance for ICT curriculum or learning programme design by any education provider.

In this document, a distinction is made between a learning programme and a curriculum. The term “curriculum” is strongly associated with formal educational institutions and degrees, the term “learning programme” indicates a broader, more encompassing concept, also incorporating training and other learning programmes, not restricted to only “curricula”. As the proposed methodology in this document relates to both curricula and learning programmes, the term ‘learning programme’ is used throughout the text. If the term ‘curriculum’ is used, then that narrower meaning is explicitly applicable in that situation.

## **2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 16234-1:2019, *e-Competence Framework (e-CF) - A common European Framework for ICT Professionals in all sectors - Part 1: Framework*

prEN 17748-1, *Foundational Body of Knowledge for the ICT Profession (ICT BoK) - Part 1: Body of Knowledge*

CWA 16458:2018 (all parts), *European ICT professional role profiles*