Tuning
CALOHEE

Tuning Educational Structures in Europe

Assessment Reference Frameworks

Civil Engineering
Teacher Education
History
Nursing
Physics

CALOHEE - Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe

Co-funded by the Erasmus+ Programme of the European Union

Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe (CALOHEE)

Tuning-CALOHEE
Assessment Reference Frameworks

for

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Robert Wagenaar, ed.

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University of Groningen
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Tuning Educational Structures in Europe

TUNING reflects the idea that universities do not look for uniformity in their degree programmes or any sort of unified, prescriptive or definitive European curricula, but rather for points of reference, convergence and common understanding. The protection of the rich diversity of European education has been paramount in TUNING from the very start and it in no way seeks to restrict the independence of academic and subject specific specialists, or undermine local and national academic authority.

The Tuning-CALOHEE Assessment Reference Frameworks for Civil Engineering, Teacher Education, History, Nursing and Physics are published as an integral part and outcome of the project *Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe (CALOHEE)* 2016-2018 (Agreement number: 562148-EPP-1-2015-1-NL-EPPKA3-PI-FORWARD)

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Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe (CALOHEE)

Tuning-CALOHEE Assessment Reference Frameworks

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0. Introductory remarks

This publication offers key outcomes of the feasibility study *Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe (CALOHEE)*. CALOHEE builds on the experience of the Tuning Educational Structures in Europe initiative, which was launched in 2000 to give academics a voice and provide the instruments for implementing the action points outlined in the Bologna Declaration (1999). The aim of Tuning was (and is) twofold: (a) to define an approach / a methodology to reform higher education degree programmes on the basis of the student-centred approach to better meet the needs of society, respecting at the same time academic standards and (b) to offer internationally agreed reference points to allow for comparison of degree programmes at (inter)national level. These reference points are essential for student mobility, in terms of both credit mobility and recognition of periods of studies and full degrees.

The CALOHEE initiative launched in 2016 was initiated with the following objectives in mind:

1. enhance the work done in the setting of Tuning by offering updated descriptors / indicators to define the quality of Higher Education Programmes, based on a merger of the two European qualifications frameworks, the Bologna Process Qualifications Framework for the European Higher Education Area (QF for the EHEA) and the European Qualifications Framework for Lifelong Learning (EQF for LLL);
2. offer frameworks / instruments that make possible / facilitate transnational comparison and measurement of the outcomes of a learning process, and thus contribute to the notion of evidence-based education.

Therefore, the focus in CALOHEE is both on degree programme enhancement and on quality assurance.

Present quality instruments are perceived by many academics and their higher education institutions as very bureaucratic and they partly reflect a lack of trust by civic society in the performance of higher education institutions. Existing instruments are thought to have serious weaknesses, because they are based on analysing educational processes in quality terms using the instrument of peer review. This offers doubtful evidence about the performance of higher education institutions and their (academic) staff and students. There is a lack of up-to-date internationally agreed qualifications reference frameworks / assessment reference frameworks at subject area level to judge what are (high) quality programmes, which take into account the mission and profiles of individual higher education institutions and their degree programmes. The existing instruments do not allow for transnational comparison, let alone measurement of the learning achieved. In this context, at present, student surveys are the main, if not the only, indicator to obtain information on the 'perceived quality' of the outcome of an educational experience. Because students/graduates are not able to compare / are operating in quite different settings and cultures this is not a very informative and reliable indicator, in particular in a cross-border context. A further difficulty is that present quality evaluation instruments focus on past performance (only), and are not suitable to looking ahead at: what is expected from a student when he /she graduates, which will be normally three to five years from the moment he or she started higher education studies. The purpose of CALOHEE has been to address these omissions by developing a novel – additional – 'revolutionary' approach towards quality enhancement and assurance.

According to CALOHEE, two main factors play a role in measuring the quality of degree programmes:

a. programmes should meet agreed (academic) quality standards;
b. programmes should be relevant for society now and in the (near) future.

Relevance should cover four elements:

a. allow for personal development;
b. meet the requirements of the subject area / academic field;
c. prepare for the world of work and

d. prepare for civic, social and cultural engagement.

Building on the QA for EHEA and the EQF for LLL, CALOHEE distinguishes the categories or 'learning domains' of 'knowledge', 'skills', and 'autonomy and responsibility' ('wider competences') taken from the EQF, and so-called 'dimensions' based on the categories applied in the QF for EHEA, to identify what quality implies, i.e. quality of the design and delivery of study programmes. While dimensions focus on the learning process itself ('fit for purpose'), the EQF categories focus first of all on the *outcomes* of the learning process ('fit in purpose'). In CALOHEE the categories 'knowledge', 'skills' and 'autonomy and responsibility' ('wider competences') reflect a progressive level of complexity and quality. CALOHEE offers reference frameworks of internationally agreed 'quality descriptors' for both the first and the second cycle (Bachelor and Master) at subject area level. These descriptors are clear indicators for the quality of a degree programme and can and should be used to check whether a degree programme is up to standard. CALOHEE makes a distinction between Subject Area Qualifications Reference Frameworks, which it has named *Tuning Guidelines and Reference Points for the Design and Delivery of Degree Programmes in …* (name of subject area) and so-called Assessment Reference Frameworks. These frameworks build on (one page) subject area qualifications reference frameworks, by breaking them down in measurable learning outcomes statements.

In the context of CALOHEE (updates of) Tuning reference points documents have been produced for five subject areas representing the five main academic domains, that is Civil Engineering (Engineering), Teacher Education (Social Sciences), History (Humanities), Nursing (Health Care) and Physics (Natural Sciences). They were published as stand-alone brochures in 2018. CALOHEE has also prepared a separate document, which offers an overview of one-page descriptors for the first and second cycle (BA and MA) of these subject areas. Both types of publications are meant to inform the respective fields, but are also intended to inspire other (related) academic fields. They are also intended to be used as a robust basis for degree programme enhancement and quality assurance, that is internal and external quality assurance. They fit the European Standard and Guidelines as endorsed by the European ministers of education in 2005 and again in 2015 in the setting of the Bologna Process.

The much more detailed *Assessment Reference Frameworks* presented in this publication offer - besides a breakdown of subject area general descriptors in measurable learning outcomes statements - examples of good practice of learning, teaching and assessment methods and approaches to achieve the learning outcomes defined. The use of a variety of appropriate methods and approaches is another indicator for deciding on the quality of a degree programme. They offer broad 'menus' of what has been identified as the learning of the subject area and allow for motivated choices regarding the composition and implementation of individual degree programmes.

Ultimately, CALOHEE intends to develop assessments / tests to measure and compare the quality and relevance of degree programmes. The backbone of such assessments are the Subject Area Assessment Reference Frameworks.

The comparative assessments will be based on:

a. the CALOHEE multi-dimensional assessment model which distinguishes 'knowledge': theory and methodology, the 'application of knowledge and skills', 'preparation for the labour market' and 'preparation for civic, social and cultural engagement' and

b. the appropriate Subject Area Assessment Reference Framework.

The assessments will be developed by international groups of academics, again using the bottom-up approach applied in all Tuning projects, including CALOHEE. The test will be diagnostic and will offer information about the strengths and weaknesses of individual degree programmes in absolute terms and comparative perspective. Strengths and weaknesses are determined by taking the different profiles and missions of institutions into account. This is possible by applying a variety of assessment models and criteria, which do justice to differences, e.g. such as those between research intensive and applied Higher Education institutions. The basis for these different assessment templates will be the U-Multi-rank 'settings'. The CALOHEE information and dissemination process has indicated that there is support for setting up comparative testing in particular among higher education management and academic staff.

The European Engineers' Association FEANI has expressed its support in a formal letter to the CALOHEE project team. The approach is also supported by the CALOHEE Advisory Board in which European university networks and European HE organisations and associations are represented.

The CALOHEE documents have been produced by international groups of experts, involving student representatives, and have been checked through a consultation process among stakeholders. They reflect European-wide consensus on the key descriptors and related Assessment Reference Frameworks for the five subject areas covered here. The outcomes are the result of intense reflection and debate in each of the groups. Each subject area group has followed a comparable procedure and process to reach results, but as the reader will notice, the outcomes of these processes have led to variations. These differences do justice not only to the work of these groups, which were each led by two subject area coordinators, but also to the specificities of the academic domain / subject area involved. In the introduction of each section these differences are highlighted.

The CALOHEE Management Committee, consisting of the ten subject coordinators, experts from the non-profit unit of Educational Testing Service (ETS), based in Princeton USA, as well as the CALOHEE Management team – all presented in an appendix -hope and expect that this publication will offer a significant contribution to the modernisation of higher education programmes in Europe (and possibly beyond), that is the transfer from expert driven to student-centred degree education and programmes by stimulating active learning which meets the needs of society. Those responsible for the content of this publication welcome any suggestions for further improvement of the materials presented here. As every person involved in the higher education sector well knows, enhancement of higher education programmes is a never-ending process.

Tuning-CALOHEE Management Team
Robert Wagenaar, CALOHEE project-coordinator

1. General introduction

The *Tuning-CALOHEE Assessment Reference Frameworks* offer an important and novel tool for understanding, defining and visualising the requirements for a degree programme. In this publication five of those frameworks are represented. These are for the subject areas of Civil Engineering, Teacher Education, History, Nursing and Physics, which represent respectively the academic sectors Engineering, Social Sciences, Humanities, Health Care and Natural Sciences.

Assessment Reference Frameworks show, in a detailed but also general and flexible way, which competences - phrased as learning outcomes - should be developed by a programme in a particular subject area. They provide useful indications about the relevant learning areas: not only core *knowledge* content, including theories and methodologies, but also *skills* for developing and applying that content, as well as the *level* at which the graduate will be able to operate meaningfully in his or her profession and, more broadly, in society. It distinguishes between the first and second cycle degree (Bachelor and Master) in the subject area, clarifying the progressive nature of the learning process, and showing the connections between levels of learning to be developed.

The Assessment Reference Frameworks comprise easily readable reference tables containing descriptors covering the categories 'knowledge', 'skills' and 'autonomy and responsibility' ('wider competences') according to the *European Qualifications Framework for Lifelong Learning*. The tables build on Subject Area based Qualifications Reference Frameworks. These are an integral part of the documents *Tuning Guidelines and Reference Points 2018 for the Design and Delivery of Degree Programmes in (name of Subject Area)*, which have been published as stand-alone publications. Assessment Reference Frameworks offer a breakdown of topics – and therefore much more detail – of the Subject Area based Qualifications Reference Frameworks.

While the *Tuning Guidelines and Reference Points* documents are intended to inform a wide group of stakeholders, such as Higher Education institutions, that is its management, policy staff, teachers and students, as well as provisional organisations, quality assurance and accreditation organisations and those interested in a particular subject area, the Assessment Reference Frameworks have been prepared for specialists. This is staff responsible for degree programme design, development, implementation, evaluation and enhancement.

The Guidelines and Reference Points documents and the Assessment Reference Frameworks have been developed by international working groups of informed academics in the framework of the EU co-financed project *Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe (CALOHEE)* during the period 2016-2018.

The advantages of being able to refer to a *Subject Area Qualifications Reference Framework* and its related Assessment Reference Framework are numerous. Such reference frameworks provide:

- a widely accepted comprehensive overview of the key learning topics a degree programme can include, developed by an international group of experts, and validated by peers and other stakeholders;
- a range of up-to-date strategies, methodologies and approaches to learn, teach and assess the topics of learning, formulated in terms of learning outcomes.
- different stakeholder groups' insight into what could be usually covered in terms of learning in a particular subject area and a particular degree programme. Stakeholders include disciplinary experts, teaching staff, university and faculty management, professional organisations, employers, and (potential) students;
- a menu through which an individual degree programme at bachelor or master level can be composed and defined on the basis of motivated and articulated choices and a transparent decision-making process;
- a fair indicator of the completeness and quality of a degree programme which allows for different institutional missions and profiles;

- a reliable mechanism for quality assurance based on a robust reference framework based on well-defined sets of measurable learning outcomes;
- a format for comparing different degree programmes in terms of profile, content and approach;
- a robust and articulated reference framework for developing comparable diagnostic assessments which offer reliable evidence regarding the strengths and weaknesses of a particular degree programme benchmarked against programmes with comparable missions and profiles.

A Tuning-CALOHEE Assessment Reference Framework can be seen as a general table providing a complete overview of the subject area in terms of measurable learning outcomes statements. These statements, taken together, are much more precise than the more general reference points descriptors of the subject area involved. The focus in Assessment Reference Framework is not only on 'what' to learn, but also on 'how' this 'what' can be learned. It represents the lowest, but at the same time most detailed level in the hierarchy of qualifications frameworks. This hierarchy starts with the overarching European frameworks, followed by national, sectoral and subject area frameworks. As in the case of the subject area reference frameworks, the Assessment Reference Framework organises its descriptors according to the categories knowledge, skills and autonomy and responsibility ('wider competences') distributed among so-called 'Dimensions'. Each framework contains a multiple number of dimensions. Dimensions are constructive key elements, which provide structure and transparency to the descriptors according to the other overarching European qualifications framework, the *Qualifications Framework for the European Higher Education Area*. The relation between this qualifications framework and the EQF for LLL is explained in detail in chapter 2 of this publication.

While the general descriptors have the primary purpose of indicating the *type* and *level* of learning, in an Assessment Reference Framework they are broken down using 'sub-descriptors' or 'subsets' which describe the key elements and topics that constitute each descriptor in greater detail. Although the general descriptors are often called learning outcomes, in practice they are much more competence statements. The real, utilizable, learning outcomes of a subject area are the sub-descriptors, because they meet the condition of being measurable, indicating not only a subject, but also context, level and complexity. The dimensions, sub-dimensions, descriptors and sub-descriptors together form an Assessment Reference Framework, which is complimented by an overview of the most appropriate learning, teaching and assessment strategies and approaches to achieve the intended learning outcomes. These can be formulated per sub dimension but are more often formulated for several related sub descriptors in order to avoid repetition.

The dimensions, sub-dimensions, descriptors and sub-descriptors or subsets appear in the Reference Framework as follows:

Dimension	Knowledge descriptor	Skills descriptor	Autonomy and Responsibility (Wider competence) descriptor
1.	Descriptor K6/7_1*	Descriptor S6/7_1	Descriptor C6/7_1
	Sub-descriptor K6/7_1.1	Sub-descriptor S6/7_1.1	Sub-descriptor C6/7_1.1
	Sub-descriptor K6/7_1.2	Sub-descriptor S6/7_1-2	Sub-descriptor C6›/7_1-2
2.	Descriptor K6/7_2	Descriptor K6/7_2	Descriptor C6/7_2
	Sub- descriptor K6/7_2.1	Sub-descriptor S6/7_2.1	Sub-descriptor K6/7_2.1
Etc.			

*Level 6 EQF / Bachelor; Level 7 EQF / Master

According to the Tuning and CALOHEE philosophy, learning, teaching and assessment – in that order - should be fully aligned. A specific body of learning (knowledge, skills and competences), identified by the intended learning outcomes, is split into modules or units spread over the available learning period (e.g. academic years) in such a way that progression routes are established. Appropriate modes of learning,

teaching and assessment are linked to each unit or module. These, of course, should fit the level of learning identified.

In CALOHEE, the highest level of learning is represented by the 'autonomy and responsibility' descriptor, which is based on the knowledge and the skills that have been obtained and ideally practiced as part of the learning process. The autonomy and responsibility ('wider competence') descriptor can be compared to a 'competency framework' applied by employers or fields of employment. Such a framework describes in some detail which competences an employee in a particular occupation is expected to possess and be able to apply in practice. They are often reflected in job descriptions and job advertisements. Employment can range from research and analytical oriented positions to more practical ones; the competences required will vary, but will be related to the general competences linked to the subject area.

An Assessment Reference Framework should first and foremost be understood as a source of reference - inspiration and guidance - for modernising, revising and enhancing existing degree programmes and constructing new ones to meet the needs of the learners, preparing them appropriately for their role in society, both in terms of employability and as citizens. For this reason, CALOHEE has developed a model in which the different aspects of the learning process are defined. The 'knowledge set of descriptors' is expected not only to cover core knowledge of the subject area, but also related theories and methodologies. The 'skills set of descriptors' focusses on the skills/competences – generic and subject specific – which are relevant for applying knowledge. With regard to the generic skills /competences, one normally thinks of such abilities as critical thinking, analysing and synthesising, creativity and originality and written and oral communication, but it is important to include also value related competences such as ethical commitment.

The 'competence framework' as has been indicated covers not only preparation for operating successfully in the workplace, but also in society through effective civic, social and cultural engagement. To ensure that forming the competences necessary for such engagement constitutes an integral part of each degree programme, CALOHEE has developed a framework based on four dimensions, which prepare for and underpin civic, social and cultural engagement. These dimensions have knowledge and skills descriptors as well as descriptors in the 'autonomy and responsibility' column. The dimensions chosen are:

1. Societies and Cultures: Interculturalism;
2. Processes of information and communication;
3. Processes of governance and decision making;
4. Ethics, norms, values and professional standards.

In chapter 3 the choice for these dimensions is explained in more detail. It contains a total of three times four descriptors. Although presented here as supplementary 'dimensions', CALOHEE strategy is that its descriptors should be integrated in the (sub-)descriptors of each subject area, at both first and second cycle. This also applies to the Assessment Reference Frameworks presented here.

The Guidelines and Reference Points document and the Assessment Reference Framework for a subject area are both important instruments for course design, delivery and enhancement. According to Tuning and CALOHEE, they are suitable to becoming cornerstones of a new quality assurance system at programme level; a system that offers reliable evidence in terms of outcomes and performance based on descriptors developed and supported by the academics directly responsible for implementing degree programmes. Such a system can become an alternative to present-day overly bureaucratic models resulting from highly detailed but often abstract quality assurance procedures and processes, and including peer review with its obvious possible shortcomings resulting from subjective personal judgements and opinions.

The ultimate ambition of the CALOHEE initiative is to develop a transnational multi-dimensional assessment model, which allows for actual measuring and comparing of learning, while taking into account the specific mission and profile of each degree programme within its cultural and academic context. This model should offer sets of consistent test formats and items which make it possible the assessment of deep knowledge and understanding, as well as high level skills. One could think of, for

example, critical awareness, analysing and composition skills. An Assessment Reference Framework is a key tool in this case because it offers a basis for identifying and developing the items to be tested. Although students' achievements will be individually assessed, the outcomes of the assessments will be generated at degree programme level (not at the individual student level), because the intention is – in line with traditional quality assurance systems – to diagnose whether the intended learning outcomes are actually achieved. In other words, does the programme offer what it has promised and does it meet the standards which have been agreed by the academic community? The Assessment Reference Frameworks presented here should be understood as a planning tool, but also as a tool for answering this question.

To offer additional support this publication also offers examples of 'good practices' regarding state of the art learning, teaching and assessment (LTA) strategies, methods and approaches to achieve the learning outcomes as included in the Assessment Reference Frameworks. A distinction is made between LTA relevant for all degree programmes independent of the Subject Area, and examples which are Subject Area related.

A final note. These Assessment Reference Frameworks are part of the outcomes of the work done by the five Subject Area Groups (SAGs) which were established in the context of the CALOHEE project. The outcomes are presented in tables to facilitate readability and rapid comparison across the subject areas. The tables show in synthesis the consensus reached by a SAG after intense and lively discussions in the group. We hope that these Assessment Reference Frameworks will be of interest to many, and look forward to receiving comments and suggestions from the stakeholders, in view of further improvement.

Tuning-CALOHEE Management Team and CALOHEE Management Committee
Robert Wagenaar, CALOHEE project-coordinator

2. The Concept of Assessment Reference Frameworks explained[1]

Introduction

Over the last fifteen years much time and effort has been invested in the development of what are often called 'meta-level Qualifications Frameworks'. Good examples in this respect are the Qualifications Framework for the European Higher Education Area (the QF for EHEA), based on the 'Dublin Descriptors'; and the European Qualifications Framework for Lifelong Learning (EQF for LLL). Both frameworks provide useful indications of what is expected in terms of outcomes of a learning process at different levels. However, because of their purpose and role, the descriptors included in meta-frameworks are necessarily rather general. Although they set the level for first, second and third cycle programmes (bachelor, master and doctorate), which equals the levels 6 to 8 in the EQF, they have limited value when the actual (knowledge domain related) learning at degree programme level is compared.

Responding to an obvious need to allow for fair recognition of studies taken at another institution, starting in 2001, benchmarks or reference points have been developed for specific subject areas or disciplinary fields as well as for academic domains or sectors in the context of Tuning and the European Thematic Network Programmes (TNPs). The meta-frameworks and the subject area / domain qualifications reference frameworks should be perceived as complementary. Although they are more detailed, subject area based qualifications reference frameworks or benchmarks are also still rather general by nature, since each one of them is expected to cover a broad academic field.

It is now widely accepted that both programme level descriptors and unit or module level descriptors, described as programme and unit 'learning outcomes', are useful to determine whether the intended level of learning has actually been achieved. However, experience has shown that learning outcome statements are of limited use when they are not formulated sufficiently clear and precise in order to guarantee objectivity /fairness and transparency. Tuning has developed a model, related to the work of educational scientists Bloom, Biggs and others, which helps in elaborating reliable statements. Reliability is to be understood in this context as allowing for measuring and assessing the progress of learning and/or its achievement. The Tuning model distinguishes five elements that should be covered in a learning outcomes statement. Hence it is more precise than models which focus (mainly) on the use of the most appropriate 'verb' to indicate the level to be achieved during a specified piece of learning.[2] Dependence on verbs has its limitations because it lacks precision in defining the scope and complexity and therefore the level of a learning outcome, which is conditional for comparing learning.

An additional instrument for determining the level of performance of an individual learner are so-called rubrics. Rubrics or score cards offer more detail and precision in terms of the criteria employed to assess and grade a piece of student work and the weighting of different elements. Rubrics can have quite different formats, and are used to assess an individual course unit or module.

Although qualifications reference frameworks, level descriptors and rubrics are all indispensable tools for judging the quality of learning, they are not sufficient for comparing the results obtained by different study programmes in the same field of study in a national or international context. This requires

[1] This section is partly based on the publication Robert Wagenaar, What do we know – What should we know? Measuring and Comparing Achievements of Learning in European Higher Education: Initiating the New CALOHEE Approach. In: O. Zlatkin-Troitschanskaia, H. Anand Pant, Miriam Toepper, et al., eds., *Assessment of Learning Outcomes in Higher Education: Cross National Comparisons and Perspectives.* Cham: Springer International Publishing AG, 2018, 169-189. This paper was prepared as one of the outcomes of the CALOHEE project and is founded on the *CALOHEE Working paper on Subject Area based Assessment Frameworks.* Groningen, November 2016

[2] See for example: Cliff Adelman, *To Imagine a Verb: The Language and Syntax of Learning Outcome Statements.* (Occasional Paper No. 24). Urbana, IL: University of Illinois and Indiana University, National Institute for Learning Outcomes Assessment, February 2015:
http://www.learningoutcomeassessment.org/documents/OccasionalPaper24.pdf

according to the CALOHEE initiators, a new type of instrument: an Assessment Reference Framework. Such a framework offers much more detail than qualifications reference frameworks about what a graduate in a particular subject area is expected to know, understand and be able to do when successfully finishing his or her studies and/or a well-defined (structured) period of studies.

In this section we explain what is meant by a 'Subject Area Assessment Reference Framework' in the context of CALOHEE. This explanation has provided the basis for constructing a European Assessment Reference Framework for each of the five subject areas covered by the project. It intends to offer insight into 1) the definition applied, 2) the application of Qualifications Reference Frameworks based on so-called dimensions, 3) the multi-dimensional parameters identified, that is the items to be assessed - in terms of theory, methodology, skills, application, employability and civic related competences -, and 4) the structure of the framework, that is the topics of assessment and their related approaches regarding teaching, learning and assessment which can be applied.

Definition

The term Assessment Reference Framework can have different meanings. On the one hand it may refer to an instrument used as a basis for an accreditation procedure, that is to check whether a study programme meets minimum quality standards. On the other, it can also be understood as a framework that offers a detailed scheme or schedule of phases in an assessment process, including the different approaches to be used with respect to the course units/modules that together form a particular study programme. The teaching staff involved in such a programme is expected to respect this scheme when implementing the programme. It should offer a well thought through and balanced structure for assessment of the different programme components.

In the case of CALOHEE, 'Assessment Reference Framework' has a third meaning. It is a table, which contains the learning outcomes or descriptors defined as part of a Subject Area Qualifications Reference Framework and more precise subsets of each one of them. Each subset, taken together, describes in some detail the key elements and topics covered by a general learning outcome statement. In addition, the Assessment Reference Framework intends to offer insight into the most appropriate strategies and approaches to assessing the constituent elements of each learning outcome. The term is used in CALOHEE in the same way as in the OECD Assessment of Higher Education Learning Outcomes (AHELO) feasibility study, where assessment reference frameworks were defined for the disciplinary fields of Economics and Civil Engineering, based on respectively the Tuning AHELO conceptual frameworks for those two Subject Areas.

Qualifications Frameworks

As mentioned above, the Assessment Reference Frameworks developed are based on the grids or tables of descriptors included in the Tuning Sectoral and Subject Area Qualifications Reference Frameworks, which are - as stated before - on a merger of the two European qualifications frameworks.

The present version of the EQF for LLL uses the categories of 'knowledge', 'skills' and 'autonomy and responsibility' to structure its descriptors. Thus, the three columns form a 'knowledge framework', a 'skills framework' and a 'competency framework', linked by level. The last column, the competency framework, refers to the world of work and identifies the competences required to operate successfully in the work place. In the EQF, the competency column builds on the other two domains of learning: 'knowledge and understanding' and the 'skills' necessary to develop and use this knowledge. Together these can be seen as 'technical competences' or 'subject specific competences'. As is well known, besides these, Tuning distinguishes 'generic or general competences', which are grouped in three categories: instrumental, interpersonal and systematic competences. These should be covered in the 'competency' strand, but are also related to the 'skills' strand.

To illustrate this point, it is worth mentioning that over time many so-called *Competency Frameworks* have been developed for a specific job sector, company or institution. They define the requirements for a given job and are used in job vacancy announcements. These announcements normally contain content-

related or subject specific competences as well as generic competences. As an example of a well-developed Competency Framework we may take the one the OECD produced in 2014 for the selection/assessment and promotion of its own staff.[3] This Competency Framework is linked to the catchwords: learn, perform, succeed. It makes a distinction between 'technical competences' (subject specific competences) and 'core competences' (generic competences). It identifies 15 'core competences' which are organised in three clusters: 'delivery-related competences' focusing on achieving results; 'interpersonal competences' focusing on building relationships; and 'strategic competences' focusing on planning for the future. The 'delivery-related competences' are: analytical thinking, focus on achievement, drafting skills, flexible thinking, resource management, teamwork, and team leadership. The Interpersonal competences selected are: client focus, diplomatic sensitivity, negotiating and organizational knowledge. The strategic competences identified are developing talent, organizational alignment, strategic networking and strategic thinking. For each of these competences a definition was formulated.

To offer some insight into the definitions used, two examples related to the levels 2 and 3 (out of a total of 5), which seem to come close to the bachelor and master level (EQF 6 and 7) are highlighted here:

Table 1

OECD key indicators

	Level 2	Level 3
Analytical Thinking	Identifies critical connections and patterns in information/ data. Soundly analyses verbal and numerical data. Recognises causes and consequences of actions and events that are not readily apparent. Anticipates and thinks ahead about next steps.	Independently engages in tasks requiring interpretation of complex and often vague sets of information. Identifies gaps in information and makes assumptions in order to continue analysis and/or take action. Seeks a wide range of sources of information.
Diplomatic Sensitivity	Listens actively, considers people's concerns and adjusts own behaviour in a helpful manner. Understands the reason behind, or motivation for someone's actions. Is attentive when doing projects, assignments or interacting with people from different countries and backgrounds. Expresses negative feelings constructively.	Maintains objectivity when one's own positions or opinions are challenged by peers or stakeholders. Encourages others to contribute by overcoming cultural barriers and background differences. Remains objective when facing criticism.

Taken from: OECD Competency Framework, 2014

Based on these competences the OECD Competency Framework offers indicators for different levels, which are associated with types of jobs. Level 1 is typically associated with jobs as Assistants, Secretaries

[3] OECD, Competency Framework: https://www.oecd.org/careers/competency_framework_en.pdf

and Operators etc.; Level 2 with jobs as Statisticians, Corporate Management and Administration Assistants/Officers, Logistics Officers and Documentalists; Level 3 with jobs as Economists/Policy Analysts, IT Analysts and HR Advisers; Level 4 with jobs as Senior Economists/Policy Analysts or Managers. Level 5, the highest level identified, is associated with jobs as Heads of Division, Counsellors, Deputy Directors and Directors and so forth. The typical jobs identified for the OECD might have limited value for many of the subject areas covered by CALOHEE, but the operationalization of levels is useful. This is because the indicators used are clearly related to levels of 'responsibility and autonomy', the main indicators covered in the strand of the EQF using the same terminology. The OECD Framework is also relevant because it makes a clear link to the 'tasks and roles' executed as part of the jobs identified, and therefore to consultations executed in the setting of the CALOHEE project. The OECD document distinguishes three job families: 'Executive Leadership', 'Policy Research, Analysis and Advice', and 'Corporate Management and Administration'. The OECD Framework is only one example; many others can be found on the Internet.[4] These types of frameworks are operational in particular in the health care sector.

The competency framework defined as autonomy and responsibility reflects preparation for the labour market and therefore the relevance of the degree. In this perspective, it has to be understood that the labour market ranges from academic related occupations to those offered by governmental organisations, enterprises, non-profit organisations and self-employment. These entities offer different types of occupations in which both subject related knowledge and skills (technical competences) and generic competences have their specific role. To be employable the graduate must show he/she is able to perform a particular set of tasks and roles successfully. Employability has been defined in short as *the skills and abilities that allows someone to be employed*. The UK Higher Education Academy / ESECT have come up with the following definition of employability related competences: *"A set of skills, knowledge and personal attributes that make an individual more likely to secure and be successful in their chosen occupation(s) to the benefit of themselves, the workforce, the community and the economy."*[5] It is obvious that both subject specific and general/generic competences are understood to be quite important in this context. In respect of the latter, the publication of the UK Higher Education Academy *Student employability profiles* is of relevance. It offers short profiles for each of the subject areas covered in the CALOHEE project.[6] In the context of the CALOHEE project, the five subject areas have identified specific roles and tasks performed by their graduates. This inventory has been leading to define the descriptors in both the Subject Area Qualifications Reference Frameworks and in the Assessment Reference Frameworks. They intend 'real' competency of the graduate and therefore relevance of the subject area involved for the world of work.

Dimensions

In the setting of the CALOHEE project, the EQF for LLL has been merged with the QF for EHEA to make use of 'the best of two worlds'. While the EQF is focused on the application of knowledge and skills in society, the focus of the QF for the EHEA is more related to the learning process itself: it applies descriptors which cover different areas or 'dimensions' of learning: knowledge and understanding, application of knowledge and understanding in relation to problem solving, making judgments, communicating information, conclusions., and learning capability. In developing the CALOHEE approach, it was concluded that 'dimensions' are indispensable to define the field of study for which it is required to distinguish the different constituting areas. The 'dimension approach' is complementary to the three categories included in the EQF for LLL. Dimensions help to give structure to a particular sector or subject area and make these more transparent. They are aligned with the five categories of learning applied in the QF for the EHEA for the bachelor and master.

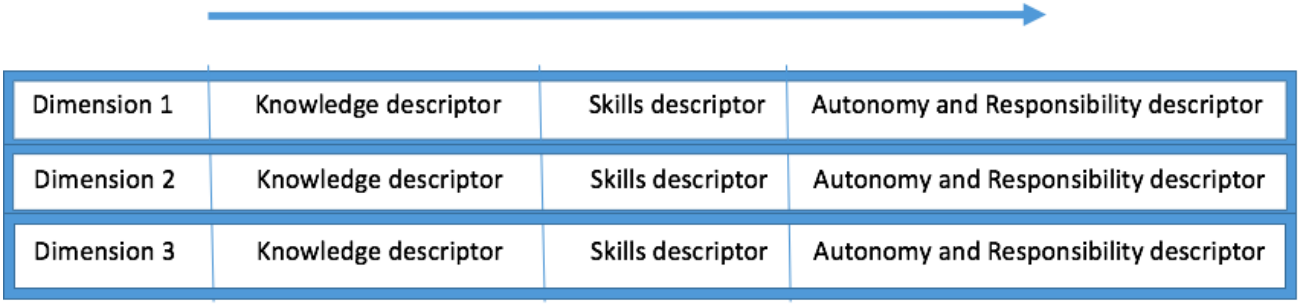
[4] See for example, the Microsoft Education competencies for teachers and school leaders: https://www.microsoft.com/en-us/education/training-and-events/education-competencies/default.aspx?tabselect=1

[5] Mantz Yorke, *Employability in higher education: what it is – what it is not*. Learning & Employability. Series One. York, 2006: http://www.employability.ed.ac.uk/documents/Staff/HEA-Employability_in_HE(Is,IsNot).pdf.

[6] Claire Rees Peter Forbes Bianca Kublerm, *Student employability profiles. A guide for higher education practitioners.* York, 2006: https://www.heacademy.ac.uk/system/files/student_employability_profiles_apr07.pdf

Each dimension in a Tuning CALOHEE Qualifications Reference Framework includes three related descriptors, respectively for knowledge, skills and autonomy and responsibility ('wider competences'). This is illustrated in the following image:

Image 1



The 'skills descriptor' builds on the 'knowledge descriptor' and the 'autonomy and responsibility descriptor ('wider competences') on the other two. Tuning and CALOHEE have a slight preference for the concept 'wider competences' instead of 'autonomy and responsibility' , because it reflects better the fact that 'knowledge and understanding' must also be understood as competences, in this case 'subject specific' ones or in OECD terms 'technical competences'. Using the term 'wider competences' also expresses the fact that the aim of a period of study is both to foster personal development and to increase the learner's competences – in terms of knowledge and skills development, besides autonomy and responsibility -for future employment.

The use of 'dimensions' facilitates breaking down the rather general level descriptors into more precise ones. This process is necessary in order to develop an Assessment Reference Framework, which must be sufficiently detailed to permit comparing and measuring. Such an approach also provides far better indicators for evaluating the quality of a degree programme than are available at present. Although there should be an obvious connection with the five or six areas of learning (depending on the cycle covered) or 'dimensions' formulated as general descriptors in the QF for the EHEA, each sector must define its own set of sectoral / subject area dimensions in order to be able to do justice to its field. In the sectoral frameworks developed so far, diversity has been found between sectors/subject areas as well as some overlap. The following overview based on the identified 'dimensions' by the five subject areas involved, illustrates these findings.

Table 2

Subject area dimensions

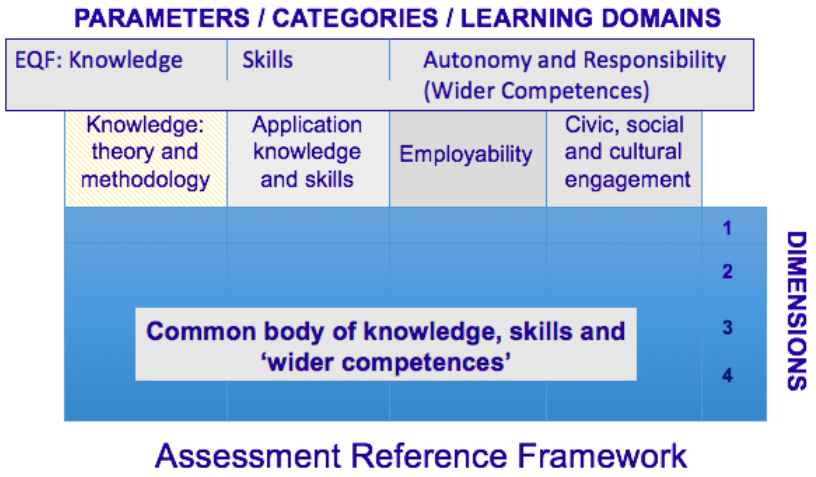
Subject area/ dimension	**Civil engineering**	**Teacher education**	**History**	**Nursing**	**Physics**
1.	Knowledge and understanding	Knowledge management and creation	Human beings: cultures and societies	Professional values and the role of the nurse	Knowledge and understanding
2.	Analysis and problem-solving	Design and management of processes of learning, teaching and assessment	Texts and contexts	Nurse practice and clinical decision-making	Mathematical methods
3.	Design	Learner empowerment, potential and creativity	Theories and concepts	Knowledge and cognitive competences	Experimental design and scientific investigation
4.	Investigations	Communication	Interdisciplinarity	Communication and interpersonal competences	Problem-solving

5.	Practice	Values and social leadership	Communication	Leadership, management and team working	Scientific (physics) culture
6.	Decisions	Development as professionals and life-long learners	Initiative and creativity		Ethical awareness
7.	Team working		Professional development		Communication
8.	Communication				Management and teamwork
9.	Lifelong learning				

Multi-dimensional parameters

In order to accommodate the different missions and profiles of Higher Education institutions and their programmes, the CALOHEE Assessment Reference Frameworks are based on four parameters or categories. This is completely compatible with the existing Tuning CALOHEE Sectoral / Subject Area Qualifications Reference Frameworks whose core is formed by the grid or table of descriptors/learning outcomes. As the following image illustrates, the four parameters of assessment are related to the three strands: 'knowledge', 'skills' and 'autonomy and responsibility'. The latter strand is split into two: employability and civic, social and cultural engagement.

Image 2



This distinction in strands is made for clarity, although it must be kept in mind that the four strands are closely interrelated, as are the three strands in the EQF for LLL and the five or six dimensions in the QF for the EHEA.

The first parameter encompasses the core knowledge of a particular academic field as well as the related theoretical concepts and methodologies, which are judged essential for a good understanding of that field. The depth to which this knowledge and its understanding is developed in a programme depends on the type of degree programme and type of institution offering it. For example, in the case of a research-intensive institution, deep knowledge of theoretical concepts and methodologies in relation to highly developed analytical competences / skills and critical thinking will be considered essential. While the outcomes of Tuning consultations have shown that stakeholders consider the ability to apply knowledge and skills in practice – the second strand - very important in preparing for a societal role, in the case of the research-intensive institution the focus on the first strand will be much stronger. The balance will be different in the case of a university of applied science or a more applied degree programme. However, the Assessment Reference Framework will indicate the optimum achievement level in both categories (for

both bachelor and master), that is the highest level achievable and feasible for a higher education degree programme.

This means that students are not all expected to achieve the highest levels that are formulated as 'intended' learning outcomes in the Framework. The norm of achievement – threshold, average, above average, excellent – with regard to each of the parameters will depend on the type of programme taken by the student, as well as its aims. This approach, which can be compared to the tests used to select pupils/students for different types of secondary and higher education, does justice to CALOHEE's multi-dimensional approach. It also takes into account that in national and international contexts a distinction is made on the basis of the different missions of universities or other types of higher education institutions if these exist (grand écoles, skola normal, etc.). Although all these institutions will offer bachelor and/or master programmes (or their equivalents) it does not mean that these are understood to be of the same higher education 'type' or 'character'. This is why it so important to distinguish profiles and missions of institutions, each of which have an intrinsic value and place and role in the Higher Education landscape, but therefore also have the obligation to describe and justify the choices they make.

In the Subject Area Qualifications Reference Frameworks as well as the related Assessment Reference Frameworks, the 'optimum' feasible learning outcomes are defined. Each Higher Education institution has to decide for itself whether these 'ideal learning outcomes' require adjustment to do justice to its mission and profile. Not every key element or topic described in a descriptor and/or sub-descriptor has to be covered by each degree programme. Whether, and to which level, each will be covered in practice will depend on the programme.

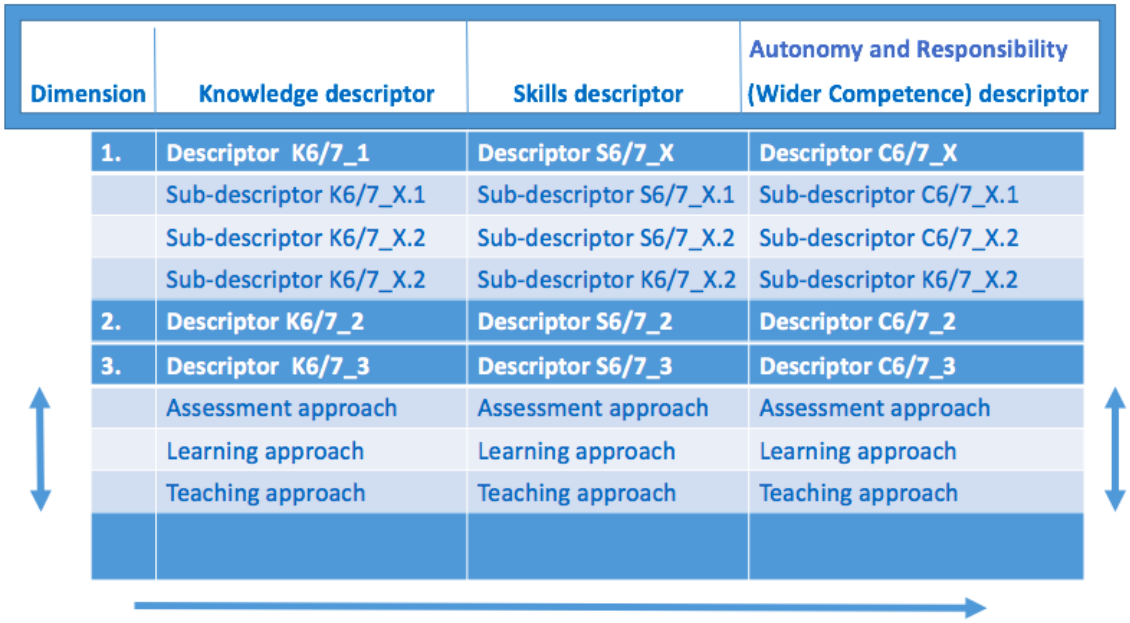
In the case the Assessment Reference Frameworks will be used for the measuring and comparing of learning between institutions it will be necessary to accommodate the learning outcomes to reflect the different profiles of HE institutions and programmes in an appropriate manner. These should also be the basis for deciding on the assessment norms to be used. In order to avoid complicating the model excessively, it is suggested to apply two main subdivisions (research-based and applied), which can be further split into two subsets, to distinguish levels. This allows for four 'types' of degree programmes, having partially different programme learning outcomes and taking into account more academic and more professional orientations. All types, however, are expected to cover the identified common body of knowledge, skills and (wider) competences and all students are expected to meet a threshold level to be identified and agreed upon by the academic communities responsible.

Learning, teaching and assessment

Defining level descriptors is one thing, achieving these quite another. As stipulated above, in an Assessment Reference Framework the dimensions and related descriptors are broken-down in sub-dimensions and related sub-descriptors. The number of sub-descriptors will differ between subject areas and dimensions. For both the learning domains and the (sub-) dimensions designated approaches regarding assessment, learning and teaching – which should be aligned - can be identified and described. This is visualized in the following image.

Image 3

Relation between descriptors, sub-descriptors, dimensions and aligned assessment, learning, teaching approaches



Dimension	Knowledge descriptor	Skills descriptor	Autonomy and Responsibility (Wider Competence) descriptor
1.	Descriptor K6/7_1	Descriptor S6/7_X	Descriptor C6/7_X
	Sub-descriptor K6/7_X.1	Sub-descriptor S6/7_X.1	Sub-descriptor C6/7_X.1
	Sub-descriptor K6/7_X.2	Sub-descriptor S6/7_X.2	Sub-descriptor C6/7_X.2
	Sub-descriptor K6/7_X.2	Sub-descriptor K6/7_X.2	Sub-descriptor K6/7_X.2
2.	Descriptor K6/7_2	Descriptor S6/7_2	Descriptor C6/7_2
3.	Descriptor K6/7_3	Descriptor S6/7_3	Descriptor C6/7_3
	Assessment approach	Assessment approach	Assessment approach
	Learning approach	Learning approach	Learning approach
	Teaching approach	Teaching approach	Teaching approach

As part of the development of the Assessment Reference Frameworks, the five subject area groups identified strategies and approaches to turn the agreed descriptors into modes of aligned learning, teaching and assessment. The different groups came up with a rich variation of possibilities. While two groups, Civil Engineering and Nursing, related one-to-one modes of learning, teaching and assessment to the dimensions and sub-dimensions, other subject area groups defined a model for developing methods, approaches and techniques for one dimension. Finally, some groups came up with current educational approaches to develop particular forms of learning. This rich source of examples of good practice intends to be inspirational to achieve the learning outcomes defined according to the student-centred approach.

Prepared by Robert Wagenaar

3. Descriptors for Civic, Social and Cultural Engagement[7]

Introduction

Given the role of Higher Education institutions to prepare students for their role in society and to form strong bases for personal development – in addition to preparing them for participating in the work force –, it is thought important – even essential – that attention in the learning process is paid to civic, social and cultural engagement. This formulation is often referred to in the European context as 'active citizenship'. It may well be that this aspect is not explicitly pursued at present in the vast majority of higher education programmes, but this is a serious omission, given the fact that the stability of many societies is under severe pressure. We list and describe the most obvious ones.

It seems fair to state that, anno 2018, the world is in turmoil. The banking and mortgage crisis in the USA starting a decade ago and the related growing setback of globalization and neo-liberal policies has developed into a rather disturbing cocktail.[8] Resulting high unemployment in many countries - in particular among the average and lower income groups as well as youth in general - has had a considerable negative effect on trust and confidence in the political and economic elite. In the perception of large segments of society – rightly or wrongly – the incomes gap between the very rich – lacking obvious self-constraint - and the relatively poor has widened. Health care systems – resulting the aging population – and the traditional European welfare system has come under pressure. Tenured employment contracts have partly given way to flex-contracts. The number of self-employed has grown. Hedge funds, large investment organisation and international companies seem sometimes more powerful - in the opinion of the typical citizen - than governments in making politics and steering policies. As an example: a company as Apple has at present a cash flow of 250 billion dollars. Global companies have also built a reputation in tax avoiding. Companies have closed down and have moved to low(er) salary countries to allow for more profit to please shareholders and to stay competitive. Solidarity has been challenged as a result.

Growing unease with these developments combined with bloody conflicts in parts of North- and West-Africa, the Middle East and South-Asia has resulted in a refugee crisis which has given (further) rise to populism. At the same time, integration of earlier groups of (political and economic) migrants in Europe has only partly succeeded and for many has failed, making the multi-cultural society a highly debated issue. Resulting terrorism, inspired by developments elsewhere, has led to growing concern, even outspoken fear among large segments of society. Tolerance regarding other cultures, religions and even well-defined opinions has been put under (severe) pressure.

It can be noticed that the self-confidence of many societal groups has been gradually undermined. There is an obvious tendency to look for safety and security by retreating to the own local community by taking distance from 'the other'. This process results in voting for local political parties, and local representatives, which can be interpreted as symbolic protests again the traditional nationally organized parties. It is reflected in nationalistic rhetoric, which seems also to be embraced by the old parties. It also has resulted in the wish for closing borders to protect economic self-interest, e.g. employability and the traditional values of society. The reproach that the established political parties lack (a) understanding of the needs of society and lack (b) a well-defined and convincing political programme which allows for tackling the problems felt and (c) that their politicians seems often to be more interest in their personal welfare than that of society as a whole, has implicitly undercut the democratic process. It has resulted in asking / opting for strong personal leadership by large groups in society. This seems to affect freedom of speech and expression. Journalism, for example, is under growing pressure in a number of countries,

[7] This section is based on the *CALOHEE Working Paper on Civic, Social and Cultural Engagement*, Groningen, May 2017 and Robert Wagenaar, Developing a new strategy for defining and measuring what is needed: Agreeing common ground. Chapter 10 in: Robert Wagenaar, *Reform! TUNING the Modernisation Process of Higher Education in Europe. A blueprint for student-centred learning. The Bologna Process Revisited.* (expected 2019).

[8] See for example: Jan Zielonka, *Counter-revolution. Liberal Europe in Retreat*. Oxford: Oxford University Press, 2018.

which leads to repression and to (self-) censure-ship. The fact that autocratic leaders base some of their policies on the creation of hostile images of the other and make constructions of the past and present that fits them best, is reason for serious concern; in particular, when it involves the blackening of groups of citizens with a different cultural and/or religious background. It even leads to territorial claims, which endangers world peace.[9]

Populist politicians play on the group of 'angry citizens' and fear by making promises which cannot been kept. They are communicating directly with their followers, through social media such as Facebook and Twitter. Followers are not organised in regular political parties, but in so-called movements.[10] In many cases, social media - which make automatic selections of news according to the expectations of the users - and the yellow press are often their only source of information. Through social media so-called misinformation and fake news has been introduced and widely distributed, having also a clear commercial dimension. This type of news but also misleading information resulting from 'quoting politicians' by traditional news media has undermined the reliability of news reports. In a very short time, 'fact checking' has become a profession in itself. Part of the same discourse is the denial of the value of experts' opinion in policy making and decision making processes in general, with clear examples in the underpinning of economic policies and the dangers of climate change. The introduction in the public dialogue of so-called 'alternative facts' is symbolic in this respect. In practice, it means that the significance of science for running and organizing our societies is subverted and in general its credibility is undermined. It has also implications regarding the importance of upholding ethical principles and values as well as professional standards, for keeping these societies sustainable.[11]

Another remarkable phenomenon is the grown interest for 'the self', which finds it expression in making selfies, but also in blogs and in particular vlogs. These are not only forms of self-expression that should be perceived as positive, but also as exhibitionism.[12] In more negative terms this has been an inspiration / has culminated in 'me first' behaviour with consequences for behaviour and ethical commitment. Self-enrichment and optimising individual profit fit in this picture. For obvious reasons this is related to neo-liberalism, but also as an outcome to the widening the gap of the haves (those who manage well) and haves not (the victims of neo-liberalism and globalisation). Civic, social and cultural engagement have suffered as a consequence, which has put the welfare state and the sustainable (multi-cultural) society under severe pressure.

Should these reflections be a concern for Higher Education institutions and their degree programmes? According to the role of higher education in society as it is perceived by CALOHEE, it should. The traditional empowerment of new generations with societal norms and values, and basic principles of cooperation and tolerance has for long been seen as a responsibility of both parents, and primary and secondary education. Although it has been promoted that higher education has an obvious role in preparing students for active citizenship, in practice it is not part of (most) existing curricula, at least it is not made explicit in the outcomes of the formal learning programmes. Given the developments described above, which can and should be understood as current and future challenges, there seems to be an obvious responsibility for HE. Because HE prepares the next generation of societal leaders, it influences – at least partly – their future behaviour and therefore society.

Existing Frameworks

The call for giving attention to active citizenship or in CALOHEE terms 'civic, social and cultural engagement' is not new. Already in 2001 it was defined as an integral part of the Tuning approach. Also, the European Commission highlighted its relevance in its European Reference Framework identifying 8

[9] See for example: James Kirchick, *The End of Europe. Dictators, Demagogues, and the Coming Dark Age.* New Haven and New York: Yale University Press, 2017.
[10] See for example: Jan-Werner Müller, *What is Populism?* London: Penguin Books, 2017.
[11] See for example: Hsiao-Hung Pai, Angry White People. Coming Face-to-Face with the British Far Right. London: Zed Books, 2016.
[12] See for example: Will Storr, *Selfie. How the West became self-obsessed*. London: Picador, 2018.

key competences for Lifelong Learning.[13] One of these competences is 'social and civic competences', another one is 'cultural awareness and expression'. These were published in December 2006 as a formal EU recommendation and they were particularly meant for secondary education. However, they are very relevant for HE as well. Competences are defined in this framework as 'a combination of knowledge, skills and attitudes appropriate to the context'. They are those 'which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment'. According to the framework social and civic competences 'include personal, interpersonal and intercultural competence and cover all forms of behaviour that equip individuals to participate in an effective and constructive way in social and working life, and particularly in increasingly diverse societies, and to resolve conflict where necessary. Civic competence equips individuals to fully participate in civic life, based on knowledge of social and political concepts and structures and a commitment to active and democratic participation'. It is an important document in the context of CALOHEE and therefore deserves substantial coverage, in particular because it relates to many of the issues and concerns mentioned in the introduction to this chapter, but also because it addresses civic, social and cultural topics explicitly.

In the European Key Competences Framework social competence is linked to personal and social well-being and successful interpersonal and social participation in society, making the argument that 'it is essential to understand the codes of conduct and manners generally accepted in different societies and environments (e.g. at work). It is equally important to be aware of basic concepts relating to individuals, groups, work organisations, gender equality and non-discrimination, society and culture'. It is also thought essential to understand 'the multi-cultural and socio-economic dimensions of European societies and how national cultural identity interacts with the European identity'. As the core skills of this competence 'include the ability to communicate constructively in different environments, to show tolerance, express and understand different viewpoints, to negotiate with the ability to create confidence, and to feel empathy'. It is also mentioned that 'individuals should be capable of coping with stress and frustration and expressing them in a constructive way and should also distinguish between the personal and professional spheres'. It therefore requires 'an attitude of collaboration, assertiveness and integrity. Individuals should have an interest in socio-economic developments and intercultural communication and should value diversity and respect others, and be prepared both to overcome prejudices and to compromise'.

According to the European Framework civic competence requires 'knowledge of the concepts of democracy, justice, equality, citizenship, and civil rights, including how they are expressed in the Charter of Fundamental Rights of the European Union and international declarations and how they are applied by various institutions at the local, regional, national, European and international levels'. It also stipulates 'knowledge of contemporary events, as well as the main events and trends in national, European and world history', as well as the development of awareness of the aims, values and policies of social and political movements. Finally, it expects that EU citizens have 'knowledge of European integration and of the EU's structures, main objectives and values, as well as an awareness of diversity and cultural identities in Europe.

In the Framework text it is stated that 'skills for civic competence relate to the ability to engage effectively with others in the public domain, and to display solidarity and interest in solving problems affecting the local and wider community. This involves critical and creative reflection and constructive participation in community or neighbourhood activities as well as decision-making at all levels, from local to national and European level, in particular through voting'. It asks for full respect and a positive attitude 'for human rights including equality as a basis for democracy, appreciation and understanding of differences between value systems of different religious or ethnic groups lay the foundations'. This implies 'displaying both a sense of belonging to one's locality, country, the EU and Europe in general and to the world, and a willingness to participate in democratic decision-making at all levels. It also includes demonstrating a sense of responsibility, as well as showing understanding of and respect for the shared values that are necessary to ensure community cohesion, such as respect for democratic principles. Constructive

[13] Recommendation of the European Parliament and the Council of 18 December 2006 on key competences for lifelong learning (2006/962/EC)

participation also involves civic activities, support for social diversity and cohesion and sustainable development, and a readiness to respect the values and privacy of others'.

As part of the key competence 'Cultural awareness and expression' it is thought essential to understand the cultural and linguistic diversity in Europe and other regions of the world, and the need to preserve it. This requires 'a solid understanding of one's own culture and a sense of identity' as 'the basis for an open attitude towards and respect for diversity of cultural expression'.

The 10th anniversary of the European Key Competences Framework motivated the European Commission to organize an extensive review of the Framework which was launched mid-2016 and reached the level of a public consultation which was implemented from February to May 2017[14]. In June 2017 a closing conference took place. It offered input for making informed changes in the original 2006 framework.[15] The process itself was meant to enhance the feeling of ownership. It is made explicit in the defined Consultation Strategy paper that aimed to tackle a number of issues. Besides referring to the skills mismatch, it also mentions the Paris Declaration of March 2015[16] and the ET Joint Report of November 2015.[17] In these documents, the role of education is stressed in two of the four European priorities, to 'ensure that pupils acquire solid social, civic and intercultural competences by promoting democratic values and fundamental rights, social inclusion and non-discriminating, as well as active citizenship'. Both documents also call 'for enhancing critical thinking and media literacy, particular in the use of Internet and social media, so as to develop resistance to of discrimination and indoctrination'.[18] It was noted that the European Key Competences Framework needed updating 'to reflect political, social, economic, ecological and technological developments since 2006, such as migration, globalisation, digital communication, the increased importance of STEM skills and social networks, and sustainable development issues'.[19] In January 2018 the Commission published its final proposal to update the key competences for lifelong learning. The paper suggests eight key competences, of which the following three are of relevance here: 'Personal, social and learning competence', 'Civic competence' and 'Cultural awareness and expression competence'. As in the case of the 2006 version, (the revised) Key Competences are explained in detail in the Commission paper.[20]

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[14] European Commission, DG EAC, *Review of the 2006 Framework of Key Competences for Lifelong Learning. Consultation Strategy*. Brussels, 2017. See also European Commission, DG EAC, *Education and Training 2020 Work programme. Thematic Working Group "Assessment of Key Competences'. Literature review, glossary and examples*. Brussels, November 2012.

[15] European Commission, Support of the stakeholder consultation in the context of the Key Competences review. Conference Report. Authors: Janne Sylvest and Elisabeth Kwaw. Luxembourg: Publications of the European Union, 2017.

[16] Declaration on Promoting citizenship and the common values of freedom, tolerance and non-discrimination through education. Informal meeting of European Union education ministers**.** Paris, Tuesday 17 March 2015. Retrieved on 1 August 2015 from:
http://ec.europa.eu/dgs/education_culture/repository/education/news/2015/documents/citizenship-education-declaration_en.pdf

[17] 2015 Joint Report of the Council and the Commission on the implementation of the strategic framework for European cooperation in education and training (ET 2020). New priorities for European cooperation in education and training (2015/C 417/04)

[18] European Commission website: Education and radicalisation - the Paris Declaration one year on. Retrieved on 1 August 2018 from:
https://ec.europa.eu/education/news/20160316-paris-declaration-education_en

[19] European Commission, DG EAC, *Review of the 2006 Framework of Key Competences for Lifelong Learning. Consultation Strategy*. Brussels, 2017, 8.

[20] European Commission, Commission Staff Working Document. Accompanying the document Proposal for a Council Recommendation on Key Competences for Life Long Learning {COM(2018) 24 final} Brussels, 17.1.2018. The 2006 edition distinguishes 8 key competences, the new proposal also includes 8 key competences: Literacy competence; Languages competence; Science, technological, engineering and mathematical competence; Digital competence; Personal, social and learning competence; Civic competence; Entrepreneurship competence; and Cultural awareness and expression competence. The 2006 edition identified the following eight key competences: Communication in the mother tongue; Communication in foreign languages; Mathematical competence and basic

In terms of its topics the EU approach covers a wider set of topics than for example the Australian Civics & Citizenship Professional Learning Package[21] intended for secondary education pupils as well, making the distinction between three types 'in the class room' learning, 'beyond the class room' learning and 'participation in the community' learning for which modules have been developed. In EU terms this can be defined as formal, informal and non-formal learning contexts, being the scope of the Key Competences Framework.

The Australian learning package offers three modules to foster 'civics and citizenship', respectively 'in the class room', 'beyond the class room' and 'participation in the community' intend to 'educate' knowledge, skills and dispositions (which can be explained as an artificial habit, a preparation, a state of readiness, or a tendency to act in a specified way that may be learned). Actually, the modules can be read as the EQF for LLL categories: knowledge, skills and autonomy and responsibility ('wider competences'), the last expecting an active role. Key items digested from the learning outcomes (which have been defined for these modules) are: democracy and social cohesion, values and principles, rights and responsibilities, social and political issues, fair processes for participation and decision making, awareness of self-held beliefs and values. Interesting is also that many of the competences that have been formulated for upper secondary education can easily be applied to HE, because clear level indicators are lacking. Bloom's verbs model is of no help. What to make of: engaging, developing, defining and exercising, recognising and understanding, identifying, applying, creating, fostering, raising, having and building?

In March 2016 the Council of Europe published, *Competences for Democratic Culture: Living together as equals in culturally diverse democratic societies*[22], which offers a conceptual model of 20 generic competences clustered in four groups: values, attitudes, skills and knowledge and critical understanding. By values is meant human dignity and human rights, cultural diversity, valuing democracy, justice, fairness, equality and the rule of law. The label attitudes encompass openness to cultural otherness and to other beliefs, world views and practices as well as civic-mindedness, responsibility, self-efficacy and tolerance of ambiguity. As skills have been identified autonomous learning, analytical and critical thinking, listening and observing, empathy, flexibility and adaptability, co-operation, conflict-resolution and linguistic, communicative and plurilingual abilities. The knowledge category lists knowledge and critical understanding of the self, knowledge and understanding of language and communication as well as the world, in terms of politics, law, human rights, culture, cultures, religions, history, media, economies, environment and sustainability. The list of 20 generic competences chosen by the Council of Europe is based on a longer list of 55 identified in 101 competences schemes. Each of the 20 competences is clarified in the document and supported by a number of pre-assumptions, ranging from 3 to 12, which can be read as learning outcomes statements. This leads to a total number of 162. In total, they offer clarity about what is expected of a citizen in a democratic culture.

Finally, an ETS research group also has studied the issue. Its report published in 2015 by Judith Torney Puta, et al., *Assessing civic competency and engagement*. *Research background, Frameworks, and Directions for Next-Generation Assessment. Research Report*[23] stipulates that civic learning is increasingly recognized as being important by both the Higher Education sector and workforce communities. It offers a review of the outcomes of some 30 projects covering 'existing frameworks, definitions and assessments of civic related-constructs'. Already this number shows how hot the issue is in particular the USA. The number of civic competency and engagement frameworks identified outside the USA is limited. The ETS group identifies a total of 31 competences ranging from civic literacy, civic engagement, civic identity, political knowledge, civic knowledge and skills, ethical and social responsibility in a diverse world, civic-mindedness and civic responsibility to political and civic participation. It also addresses the term 'civic learning' in terms of learning outcomes in the Lumina US Degree Qualifications Profile (DQP) both at

competences in science and technology; Digital competence; Learning to learn; Social and civic competences; Sense of initiative and entrepreneurship; and Cultural awareness and expression.

[21] Australian Government, Civics & Citizenship Education Professional Learning Package (2010): http://www.civicsandcitizenship.edu.au/verve/_resources/DEEWR_CCE_PLP.pdf

[22] Full report: http://www.coe.int/t/dg4/education/Source/competences/CDC_en.pdf

[23] http://www.ets.org/research/policy_research_reports/publications/report/2015/jvdz

associate level (level 5 of the EQF) and at bachelor level.[24] The ETS study offers a table of 'existing assessments measuring civic competency and engagement' and comes up with its own framework, distinguishing between the civic competency domain (covering civic knowledge, analytical skills, participatory and involvement skills) and the civic engagement domain (covering motivations, attitudes and efficacy, democratic norms and values and participation and activities). These competences are defined and completed with measurable topics / learning outcomes (table 3). The report concludes with examples of so-called 'test item formats' (task types) to assess civic competency and engagement.

CALOHEE framework

The documents mentioned above, supplemented with some other sources, offer a rich range of the items that can be covered in HE giving substance to 'civic, social and cultural engagement'. To make these items applicable in the context of CALOHEE they have to be ordered. Taking the current developments as described above as a basis, four dimensions have been identified, which together should make the CALOHEE framework of general descriptors for Civic, Social and Cultural Engagement. These four are perceived as the minimum to be covered in all higher education programmes. Not included among them are environmental issues and challenges, such as coping with climate change, but these may be added at a later stage. It is intended in a follow-up project to give more subsistence and detail to the model presented at present.

As in the case of the domain/ subject area frameworks, each dimension includes a knowledge descriptor, a skills descriptor and an autonomy and responsibility ('wider competence') descriptor. The general framework should ideally be turned into an Assessment Reference Framework by breaking down the general descriptors into sub-descriptors. However, in the setting of this project this proved not be possible due to time constraints. The sub dimensions and sub-descriptors to be developed should allow for variation in the actual inclusion in a degree programme. The relevance of each (sub-)descriptor will differ from academic field to academic field as well as per individual degree programme. It might also be required to accommodate these per academic field to do justice to the (role of the) discipline in society.

The four dimensions that have been identified for the CALOHEE framework model that should offer input to the category/parameter civic, social and cultural engagement are:

1. Societies and Cultures: Interculturalism;
2. Processes of information and communication;
3. Processes of governance and decision making;
4. Ethics, norms, values and professional standards.

Together, they cover very many of the items as included the European key competences framework, the Australian learning package, the ETS framework for civic competencies and engagement as well as a number of documents related to ethics and professional standards[25], the scholarly paper *A new definition and conceptualisation of ethical competence* (2013)[26], and the publication of the DARE+ project

[24] https://www.luminafoundation.org/files/resources/dqp.pdf

[25] CFA Code of Ethics and Standards of Professional Conduct; NSPE Code of Ethics for Engineers; Code of Professional Ethics for Compliance and Ethics Professionals.

[26] Annelies De Schrijver, Jeroen Maesschalk (2013), A new definition and conceptualization of ethical competence. In Menzel,D & Cooper,T. (Eds.), Achieving ethical competence for public service leadership. Armonk (NY); M.E. Scharp, 29-51:
https://www.researchgate.net/publication/263424837_A_new_definition_and_conceptualization_of_ethical_competence?enrichId=rgreq-e91c3596703196efd22e56417c65ff71-XXX&enrichSource=Y292ZXJQYWdlOzI2MzQyNDgzNztBUzoxNTQyNjMzODA1NjYwMTdAMTQxMzc5MDY2NDA2Ng%3D%3D&el=1_x_2&_esc=publicationCoverPdf

coordinated by the University of Granada[27]. Reflection on these documents has resulted in the following provisional framework, which is open for further revision.

Table 1

CALOHEE Reference Framework for Civic, Social and Cultural Engagement

	Knowledge	Skills	Responsibility and autonomy (Wider competences)
1.	Demonstrate critical understanding of **communalities and differences in and between *societies and cultures***	Identify, describe and analyse issues in and between societies and cultures	Demonstrate engagement by developing scenarios and alternatives and/or identifying best practices of interaction between societies and cultures and – if required - interventions in case of tensions and/or conflicts
2.	Demonstrate critical understanding of the **processes of *information and communication***	Review and judge (mis)use of sources, data, evidence, qualities, intentions and transparency and expert opinions	Active contribution to societal debates using reliable data and information sources and informed judgements
3.	Demonstrate critical understanding of the **processes of *governance and decision making***	Apply and support agreed governing principles, norms and values regarding fairness, transparency, accountability, democracy and relevance in policy making processes	Active contribution to and with local and (inter)national communities, community groups, (political) organisations and pressure groups respecting agreed principles, norms and values
4.	Demonstrate critical understanding of general **ethical principles, norms and values and professional standards**	Understand and apply the processes of decision making and the consequences of actions taking into account principles, norms, values and standards both from a personal and a professional standpoint.	Active contribution to upholding, promoting and defending general ethical principles, norms, values and professional standards in governance, communication and cultural interaction.

Table prepared by a CALOHEE ad-hoc experts' group consisting, in alphabetic order, of Pablo Beneitone, Julia González Ferreras, Alfredo Soeiro, Ingrid van der Meer, Robert Wagenaar and Maria Yarosh.

The descriptors included in this framework have not been related to a particular level yet, that is a first or second cycle (BA or MA), neither – as already mentioned - have they been broken-down into sub-dimensions and sub-descriptors and defined as measurable learning outcomes statements. Because it might be expected that every first cycle graduate should be able to demonstrate the knowledge, skills and autonomy and responsibility ('wider competences') identified in this table, it seems obvious to link the table to level 6 of the EQF for LLL, that is the first cycle of the QF for the EHEA.

The framework is presented here as a stand-alone one and could as such be added to any subject area conceptual framework as four additional (general) dimensions. However, from the CALOHEE perspective

[27] Maria Yarosh, Anna Serbati and Aidan Seery (eds.), Developing Generic Competences Outside the University Classroom. Granada, 2017.

it is highly preferable to integrate the items identified here into the subject area reference (assessment) frameworks. This can be done by accommodating the descriptors that have been defined already and/or by inserting sub-dimensions as part of the already identified dimensions and their descriptors for knowledge, skills and wider competences. The five subject area groups involved have been able to successfully to integrate the descriptors for civic, social and cultural engagements in their qualifications reference frameworks (meta-profiles) and in their Assessment Reference Frameworks. We offer here as an illustration the example of History regarding dimension 1 of its Assessment Reference Framework for the first cycle.

Table 2

Integration of descriptors in Assessment Reference Framework for History *(first cycle Level 6 EQF)*

Dimension 1: Human Beings: Cultures and Societies			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_1. Level descriptor	**K6_1** **Demonstrate basic knowledge and critical insight into changes and continuities in human conditions, environment, experience, institutions, modes of expression, ideas and values in diachronic and synchronic perspective.**	**S6_1** **Drawing on knowledge of history, identify and define, with guidance, significant problems and areas of enquiry with respect to social and cultural interaction.**	**C6_1** **Apply historical knowledge and perspectives in addressing present day issues, bringing to bear analytical understanding and respect for individuals and groups in their personal, cultural and social dimension.**
Subset 1 L6_1.1 Historical interpretation of changes and continuities	K6_1.1 Show general acquaintance with diverse criteria of historical explanation and understanding on different time- and spatial scales. Demonstrate awareness of how explanations and interpretations are conceptualized.	S6_1.1 Formulate historical explanations and interpretations of phenomena and processes though comparison and differentiation using quantitative and qualitative methods.	C6_1.1 Recognize consistent interrelations concerning phenomena and processes of different nature and scale, at the same time showing awareness of their uniqueness.
Subset 2 L6_1.2 Environmental transformations and knowledge development	K6_1.2 Relate social and economic change to environmental transformations and to the accumulation/modification of knowledge.	S6_1.2 Describe the interaction between the natural environment and social change, on the one hand, and knowledge production on the other.	C6_1.2 Evaluate the impact of knowledge production and accumulation on society and the environment, and vice-versa.
Subset 3 L6_1.3 Power relations and organization	K6_1.3 Demonstrate knowledge about the development of power relations and how they shape collective organizations, institutions and representations of the world through conflict, negotiation, and adaptation.	S6_1.3 Recognize tools and mechanisms of power in societal and collective relations and their genesis, continuity and transformations in time.	C6_1.3 Contribute to discussions and debates on power relations and political organization in a broad sense, placing them in historical perspective.
Subset 4 L6_1.4 Knowledge, culture, religious beliefs and practices	K6_1.4 Demonstrate knowledge about modes of expression and transmission of knowledge and culture, including beliefs and practices concerning	S6_1.4 Describe different conceptual frameworks, symbolic representations and discourses that underpin and support	C6_1.4 Engage critically with the dynamics of collective beliefs and practices and how they are expressed by individuals and groups.

	moral values, immaterial and transcendental concerns and narratives, and their dynamics.	collectively held beliefs and related practices	
Subset 5 L6_1.5 Intercultural encounters	K6_1.5 Demonstrate knowledge about (inter-)cultural encounters and their consequences on every field of human activities and on personal and collective identities.	S6_1.5 Describe and illustrate different dimensions (e.g. social, economic, religious, and political) in cultural encounters via comparison and connections of specific cases, and be able to collaborate effectively in a multicultural context.	C6_1.5 Contribute to understanding and respect for individuals and groups in their personal, cultural, economic and political and social dimension; conduct critical appraisal of conflicting views and facilitate intercultural mediation.

This table was prepared by the History Subject Area Group

In this example dimension 1 of the CALOHEE Reference Framework for Civic, Social and Cultural Engagement is covered by the level descriptor 'autonomy and responsibility' in the History Qualifications Reference Framework as well as in subset 4 'Knowledge, culture, religious beliefs and practices' and subset 5 'Intercultural encounters'. *'Processes of information and communication'* is covered by subset 3 'Environmental transformations and knowledge development'; *'Processes of governance and decision making'* by subset 3 'Power relations and organization'. The descriptor *Ethical principles, norms and values and professional standards* is covered by the dimension 7 'Professional Development' in the History Assessment Reference Framework for the first cycle (Bachelor).

As the example shows, it is desirable to add an 'overarching' assessment reference framework to the *CALOHEE Reference Framework for Civic, Social and Cultural Engagement*, by defining sub-dimensions and sub-descriptors that provide much greater detail. As in the case of the qualifications reference frameworks the number should however be limited to a maximum of five sub-descriptors per dimension to keep the framework feasible and applicable. Furthermore, it is thought necessary to add examples of good practice in order to assess, learn and teach these learning outcomes statements according to the model of constructive alignment. This is expected to be a major task of a CALOHEE follow-up initiative.

Prepared by Robert Wagenaar

4. Assessment Reference Frameworks for first and second cycle degree programmes (Bachelor and Master)

Introduction

The Assessment Reference Frameworks presented for the subject areas Civil Engineering, Teacher Education, History, Nursing and Physics are based on the one-page Qualifications Reference Frameworks prepared for each of these subject areas in the setting of the CALOHEE project. Both the first cycle (Bachelor) / level 6 EQF and second cycle (Master) / level 7 EQF are covered. They all follow a fixed format based on a combination of three strands, the learning domains of 'knowledge', 'skills' and 'autonomy and responsibility' ('wider competences') according to the ordering used in the EQF for LLL. For each of the learning domains a set of dimensions have been identified, which reflect core elements of a particular field of study. In the Assessment Reference Framework dimensions and descriptors are broken down in sub-dimensions and sub-descriptors.

Assessment Reference Frameworks offer a broad 'menu' which is meant to be tailored to individual degree programmes to make them unique, and respect at the same time the internationally agreed core learning outcomes defined.

Added to the frameworks of Civil Engineering, Nursing (all dimensions) and Physics (dimension no. 3) are approaches for learning, teaching and assessment, which are suggested for achieving the defined intended learning outcomes. In the case of Civil Engineering in a number of cases sub-dimensions have been combined to avoid overlap. Nursing has formulated learning, teaching and assessment strategies for each sub-dimension. Physics identified dimension 3 'Experimental design and scientific inquiry', which was perceived as a central one for that academic field for formulating those approaches.

All groups defined more detailed examples of good practice, which are included in chapter 4, focus on one or more dimensions both at first cycle and second cycle level (Bachelor and Master). Particularly the examples of History and Teacher Education offer much detail.

4.1. Civil Engineering

The Tuning-CALOHEE Assessment Reference Framework for Civil Engineering offers a relevant tool for understanding, defining and visualising the requirements for any degree programme in this Subject Area. It shows, in a detailed but also general and flexible way, which competences should be developed by such types of programmes. It provides useful suggestions about knowledge, skills and wider competences (also classified as attitudes) in terms of autonomy and responsibility. All three types of competences are grouped in dimensions that are knowledge and understanding, analysis and problem solving, design and investigation, practice, design, team-working, communication and lifelong learning. These are learning outcomes of the Civil Engineering programmes that intend to provide competences that are recognized by society, by professional engineering organisations and by employers as those required to operate. The Assessment Reference Framework is proposed for first and second cycle levels (Bachelor and Master) in Civil Engineering. In the European Qualification Framework these levels correspond to the level 6 and 7.

The CALOHEE Assessment Reference Frameworks comprise easily readable reference tables containing descriptors covering knowledge, skills and wider competences. These tables were described and explained in the *TUNING Guidelines and Reference Points for the Design and Delivery of Degree Programmes in Civil Engineering*. The Guidelines and Reference Points and the Assessment Reference Framework have both been developed by an international working group of academics, students and representatives of ENAEE in the context of the European Union co-financed project Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe (CALOHEE). These two referred documents complement each other, and the current one is a continuation of the other publication.

According to the Tuning and CALOHEE philosophy, learning, teaching and assessment should be fully aligned. A specific body of learning (knowledge, skills and autonomy and responsibility ('wider competences'), identified by the intended learning outcomes, is split into modules or units spread over the available learning period. Appropriate modes of learning, teaching and assessment are then linked to each unit or module of the Civil Engineering programme.

Presented here are examples of modes of learning, teaching and assessments (LTA) linked to the identified dimensions. These modes of LTA were obtained as part of the CALOHEE from the consultation, from desk research and from the contributions of the participants in the Civil Engineering subject area group. The distribution of the set of these modes and approaches by each of the learning outcomes was made by the group through a participated debate and exchange of opinions. Concerning the assessment methods chosen, the proposal for each learning outcome was based on the model *Alignment of Learning Outcomes and Assessment* (ALOA) using the web tool *Time to Assess Learning Outcomes in E-learning* (TALOE) which makes a proposal for each sub-descriptor formulated as a learning outcome statement: http://taloetool.up.pt.

We hope that this Assessment Reference Framework will be of interest to many, and that it becomes a useful tool for course design, delivery and enhancement across Europe.

The Civil Engineering SAG of the CALOHEE project,
Alfredo Soeiro and Alfredo Squarzoni, coordinators

Assessment Reference Framework for Civil Engineering -First Cycle / LEVEL 6 (EQF)

Dimension 1: Knowledge and Understanding			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_1. Level descriptor	**K6_1** **Demonstrate knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering specialisation at a level necessary to achieve the other programme outcomes.**	**S6_1** **Apply knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering specialisation to solve / design / investigate / conduct complex civil engineering problems / products, processes and systems / issues / activities.**	**C6_1** **Identify knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering specialisation necessary to solve / design / investigate / conduct complex civil engineering problems / products, processes and systems / issues / activities.**
Subset 1 L6_1.1 **Mathematics**	K6_1.1 Define and describe key factual information and problem-solving processes related to mathematics through differential equations.	S6_1.1 Solve / design / investigate / conduct civil engineering problems / products, processes and systems / issues / activities using and applying knowledge and understanding of mathematics through differential equations.	C6_1.1 Identify knowledge and understanding of mathematics necessary to solve / design / investigate / conduct civil engineering problems / products, processes and systems / issues / activities through differential equations.
Subset 2 L6_1.2 **Sciences underlying civil engineering specialisation**	K6_1.2 Define and describe key factual information and problem-solving processes related to calculus-based physics and chemistry.	S6_1.2 Solve / design / investigate / conduct civil engineering problems / products, processes and systems / issues / activities using and applying knowledge and understanding of calculus-based physics and chemistry.	C6_1.2 Identify and justify knowledge and understanding of calculus-based physics and chemistry to solve / design / investigate / conduct civil engineering problems / products, processes and systems / issues / activities.
Subset 3 L6_1.3 **Engineering disciplines underlying civil engineering specialisation**	K6_1.3 Define and describe key factual information and problem-solving processes related to engineering disciplines underlying civil engineering specialisation being aware of the forefront of civil engineering specialisation and of the wider multidisciplinary context of engineering.	S6_1.3 Solve / design / investigate / conduct complex civil engineering problems / products, processes and systems / issues / activities, using and applying knowledge and understanding of engineering disciplines underlying civil engineering specialisation.	C6_1.3 Identify knowledge and understanding of engineering disciplines underlying civil engineering specialisation necessary to solve / design / investigate / conduct complex civil engineering problems / products, processes and systems / issues / activities.
Assessment approaches	Short Answer Questions Multiple Choice Questions Essays	Essays Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning	Participating in exercise courses/ practical classes Preparing and making oral presentations Researching and writing papers, reports, dissertations	Participating in exercise courses/ practical classes Problem-based learning Design-based learning

	Preparing and making oral presentations Researching and writing papers, reports, dissertations	Problem-based learning Design-based learning	
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Oral Assessment Written assessment	Exercise courses/Practical classes Oral Assessment Written assessment Problem-based classes Design-based classes	Exercise courses/Practical classes Problem-based classes Design-based classes

Dimension 2: Analysis and problem solving			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_2. Level descriptor	**K6_2** **Demonstrate knowledge and understanding of the processes and established methods of analysis / solution of engineering issues (products, processes, systems, situations) / engineering problems in the civil engineering subject area and of their limitations.**	**S6_2** **Analyse / solve complex engineering issues (products, processes, systems, situations) / engineering problems in civil engineering subject area by applying appropriate and relevant established methods of analysis / solution.**	**C6_2** **Identify appropriate and relevant established methods of analysis / solution of complex civil engineering issues (products, processes, systems, situations) / engineering problems.**
Subset 1 L6_2.1 **Analysis of civil engineering issues**	K6_2.1 Define and describe key factual information related to civil engineering issues (products, processes, systems, situations), applicable processes and established methods of analysis and their limitations, and how analysis methods are applied.	S6_2.1 Analyse complex civil engineering issues (products, processes, systems, situations) by applying appropriate and relevant established analysis methods and report the results of the analysis process.	C6_2.1 Identify appropriate and relevant established analysis methods of complex civil engineering issues (products, processes, systems, situations), correctly interpret the analysis outcomes and present recommendations for necessary measures taking requirements and constraints into account.
Subset 2 L6_2.2 **Solution of civil engineering problems**	K6_2.2 Define and describe key factual information related to civil engineering problem recognition, applicable processes and established methods of solution and their limitations, and how solution methods are applied.	S6_2.2 Solve complex civil engineering problems by applying appropriate and relevant established solution methods and report the results of the solution process	C6_2.2 Identify appropriate and relevant established solution methods of complex civil engineering problems and present recommendations for necessary measures taking requirements and constraints into account.
Subset 3 L6_2.3 **Safe, sustainable and of low impact solutions**	K6_2.3 Define and describe key aspects of safety, sustainability and impact on society and environment related to civil engineering phenomena and to the ethical obligation and social responsibility of professional engineers.	S6_2.3 Solve complex civil engineering problems that may involve non-technical – societal, health and safety, environmental, economic and industrial – implications by applying appropriate and relevant established solution methods and report the results of the solution process.	C6_2.3 Identify appropriate and relevant established solution methods of complex civil engineering problems having awareness of non-technical – societal, health and safety, environmental, economic and industrial – implications in formulating recommendations for necessary measures.

Assessment approaches	Short Answer Questions Multiple Choice Questions Essays	Essays Problem Solving	Problem Solving Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Problem-based learning	Participating in exercise courses/ practical classes Problem-based learning	Participating in exercise courses/ practical classes Problem-based learning Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Problem-based classes	Exercise courses / Practical classes Problem-based classes	Exercise courses / Practical classes Problem-based classes Individual supervision

Dimension 3: Design			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_3. Level descriptor	**K6_3** **Demonstrate knowledge and understanding of the process and established methods of design in civil engineering subject area and of their limitations.**	**S6_3** **Design complex civil engineering products (devices, artefacts, etc.), processes and systems by applying appropriate and relevant established design methods.**	**C6_3** **Identify appropriate and relevant established design methods of complex civil engineering products (devices, artefacts, etc.), processes and systems.**
Subset 1 L6_3.1 **Design of civil engineering products, processes and systems**	K6_3.1 Define and describe key factual information related to civil engineering products (devices, artefacts, etc.), processes and systems, applicable processes and methods of design, and their limitations, list major steps in the design process, describe how design methods are applied and define and describe constraints that affect the process and results of engineering designs.	S6_3.1 Design complex civil engineering products (devices, artefacts, etc.), processes and systems by applying appropriate and relevant established design methods and report the results of the design process.	C6_3.1 Identify appropriate and relevant established design methods of complex civil engineering products (devices, artefacts, etc.), processes and systems and present recommendations for necessary measures taking requirements and constraints into account.
Subset 2 L6_3.2 **Safe, sustainable and of low impact designs**	K6-3.2 Define and describe key aspects of safety, sustainability and impact on society and environment related to civil engineering phenomena and to the ethical obligation and social responsibility of professional engineers.	S6_3.2 Design complex civil engineering products (devices, artefacts, etc.), processes and systems that may involve non-technical – societal, health and safety, environmental, economic and industrial – implications by applying appropriate	C6_3.2 Identify appropriate and relevant established design methods and reflect on non-technical – societal, health and safety, environmental, economic and industrial – implications in designing complex civil engineering products (devices, artefacts, etc.), processes and systems, and present recommendations for necessary

		and relevant established design methods and report the results of the design process.	measures taking requirements and constraints into account.
Assessment approaches	Short Answer Questions Multiple Choice Questions Essays	Essays Problem Solving	Problem Solving Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Design-based learning	Participating in exercise courses/ practical classes Design-based learning	Participating in exercise courses/ practical classes Design-based learning Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Design-based classes	Exercise courses / Practical classes Design-based classes	Exercise courses / Practical classes Design-based classes Individual supervision

Dimension 4: Investigation			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_4. Level descriptor	**K6_4** **Demonstrate knowledge and understanding of codes of practice and safety regulations and of investigation methods (consultation of sources of information, simulations, experimental methods) in civil engineering subject area and of their limitations.**	**S6_4** **Consult and apply codes of practice and safety regulations and conduct investigations (consultation of sources of information, simulations, experimental methods) in civil engineering subject area in order to meet specified needs and report the investigation results.**	**C6_4** **Identify appropriate and relevant investigation approaches (among codes of practice and safety regulations, consultation of sources of information, simulations, experimental methods) in civil engineering subject area and analyse, explain and interpret the investigation results with respect to the needs to be met.**
Subset 1 L6_4.1 **Codes of practice and safety regulations**	K6_4.1 Identify and describe codes of practice and safety regulations in the civil engineering subject area, their purpose, procedures and practical applications, potentialities and limitations, also with respect to other investigation approaches.	S6_4.1 Consult and apply codes of practice and safety regulations in the civil engineering subject area in order to meet specified needs and report the investigation results.	C6_4.1 Identify appropriate and relevant codes of practice and safety regulations in the civil engineering subject area to be consulted and applied and analyse and interpret the investigation results with respect to the needs to be met and draw conclusions.
Subset 2 L6_4.2 **Consultation of sources of information**	K6_4.2 Identify and describe literary sources, databases and other sources of information in civil engineering subject area, their purpose, procedures and practical applications,	S6_4.2 Conduct searches of literature, consult and critically use databases and other sources of information in civil engineering subject area in	C6_4.2 Identify appropriate and relevant source of information (literature sources, databases and other sources of information) in civil engineering subject area to be consulted, analyse and interpret the

	potentialities and limitations, also with respect to other investigation approaches.	order to meet specified needs and report the investigation results.	investigation results with respect to the needs to be met and draw conclusions.
Assessment approaches	Short Answer Questions Essays Practical Work	Essays Practical Work	Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Researching and writing papers, reports, dissertations Carrying out investigation assignments	Participating in exercise courses/ practical classes Researching and writing papers, reports, dissertations Carrying out investigation assignments	Participating in exercise courses/ practical classes Practising professional skills Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Written assignments Investigation assignments	Exercise courses / Practical classes Written assignments Investigation assignments	Exercise courses / Practical classes Work-based practice Individual supervision
Subset 3 L6_4.3 **Simulations**	K6_4.3 Identify and describe simulation approaches in the civil engineering subject area, their purpose, procedures and practical applications potentialities and limitations, also with respect to other investigation approaches.	S6_4.3 Conduct simulations in order to pursue detailed investigations and research of technical issues in civil engineering subject area in order to meet specified needs and report the simulation results.	C6_4.3 Identify appropriate and relevant simulation methods in civil engineering subject area to be conducted, analyse and interpret the simulation results with respect to the needs to be met and draw conclusions.
Subset 4 L6_4.4 **Experimental methods**	K6_4.4 Identify and describe the procedures and equipment necessary to conduct civil engineering experiments in at least one of the technical areas of civil engineering, their purpose, procedures and practical applications, potentialities and limitations, also with respect to other investigation approaches.	S6_4.4 Provide evidence of laboratory/workshop skills and design and conduct experiments according to established procedures in order to meet specified needs and report the experiment results.	C6_4.4 Identify appropriate and relevant experiments to be conducted, analyse and interpret the experiment results with respect to the needs to be met and draw conclusions.
Assessment approaches	Short Answer Questions Essays Practical Work	Essays Practical Work	Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom	Participating in exercise courses/ practical classes Carrying out numerical modelling/laboratory assignments	Participating in exercise courses/ practical classes Practising professional skills Individual supervision

	Blended learning Carrying out numerical modelling/laboratory assignments		
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Numerical modelling/laboratory assignments	Exercise courses / Practical classes Numerical modelling/laboratory assignments	Exercise courses / Practical classes Work-based practice Individual supervision

Dimension 5: Practice			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_5. Level descriptor	**K6_5** **Demonstrate practical knowledge and understanding of materials, equipment and tools, processes and technologies in civil engineering subject area and of their limitations.**	**S6_5** **Conduct complex engineering activities in civil engineering subject area, using and applying practical knowledge and understanding of materials, equipment and tools, processes and technologies.**	**C6_5** **Identify practical knowledge and understanding of materials, equipment and tools, processes and technologies necessary to conduct complex engineering activities in civil engineering subject area.**
Subset 1 L6_5.1 **Materials, equipment and tools, technologies and processes**	K6_5.1 Define and describe key factual information related to materials, equipment and tools, technologies and processes and to their practical application in civil engineering subject area.	S6_5.1 Apply appropriate practical knowledge and understanding on materials, equipment and tools, technologies and processes to solve / design / investigate / conduct complex engineering problems / products, processes and systems / issues / activities in civil engineering subject area.	C6_5.1 Identify appropriate practical knowledge and understanding of materials, equipment and tools, technologies and processes to solve / design / investigate / conduct complex engineering problems / products, processes and systems / issues / activities in civil engineering subject area.
Assessment approaches	Short Answer Questions Essays Practical Work	Essays Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Practising professional skills Fieldwork	Participating in exercise courses/ practical classes Preparing and making oral presentations Researching and writing papers, reports, dissertations Practising professional skills	Participating in exercise courses/ practical classes Practising professional skills
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching	Exercise courses / Practical classes Oral Assessment Written assessment Work-based practice	Exercise courses / Practical classes Work-based practice

	Work-based practice Fieldwork		
Subset 2 L6_5.2 **Societal, health and safety, environmental implications and risks**	K6_5.2 Define and describe societal, health and safety, environmental implications and risks in conducting complex civil engineering activities.	S6_5.2 Conduct complex engineering activities in civil engineering subject area having awareness of societal, health and safety, environmental impact and risks.	C6_5.2 Act appropriately, by meeting deliverable, schedule and budget requirements, while fulfilling all legal and regulatory requirements, reflecting on societal, health and safety, environmental impact and risks.
Subset 3 L6_5.3 **Economic, industrial and managerial implications**	K6_5.3 Define and describe key aspects of economic, industrial and managerial implications of complex civil engineering activities, what a project is and key aspects of project management.	S6_5.3 Conduct complex engineering activities in civil engineering subject area having awareness of economic, industrial and managerial implications.	C6_5.3 Act appropriately, by meeting deliverable, schedule and budget requirements, while fulfilling all legal and regulatory requirements, reflecting on economic, industrial and managerial implications.
Assessment approaches	Short Answer Questions Essays Problem Solving Practical Work	Essays Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Practising professional skill	Participating in exercise courses/ practicalclasses Practising professional skills	Participating in exercise courses/ practical classes Practising professional skills
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Work-based practice	Exercise courses / Practical classes Work-based practice	Exercise courses / Practical classes Work-based practice

Dimension 6: Decision making			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_6. Level descriptor	**K6_6** **Demonstrate awareness of the key aspects of professional, ethical and social responsibilities linked to management of civil engineering activities, decision-making and judgment formulation.**	**S6_6** **Manage work contexts in civil engineering subject area, take decisions and formulate judgments.**	**C6_6** **Identify appropriate and relevant approaches to manage work contexts in civil engineering subject area and reflect on professional, ethical and social responsibilities in taking decisions and formulating judgments.**
Subset 1 L6_6.1 **Managing complex work**	K6_6.1 Describe key aspects of professional ethical and social responsibilities linked to management,	S6_6.1 Manage work contexts in civil engineering subject area, gather and interpret information	C6_6.1 Identify appropriate and relevant approaches to manage work contexts in civil engineering subject area

contexts, taking decisions and formulating judgments	decision making and judgment formulation of work contexts in civil engineering subject area.	and data, take decisions and formulate judgments.	and reflect on situations involving professional, ethical and social interests in taking decisions and formulating judgments based on available information and data.
Assessment approaches	Essays Problem Solving Practical Work	Essays Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Problem-based learning Design-based learning Practising professional skills	Participating in exercise courses/ practical classes Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing	Participating in exercise courses/ practical classes Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Problem-based classes Design-based classes Work-based practice	Exercise courses / Practical classes Problem-based classes Design-based classes Work-based practice Role play Peer reviewing	Exercise courses / Practical classes Problem-based classes Design-based classes Work-based practice Role play Peer reviewing

Dimension 7: Team-working			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_7. Level descriptor	**K6_7** **Demonstrate knowledge and understanding of functioning methods of teams that may be composed of different disciplines and levels.**	**S6_7** **Function effectively in national and international contexts as member of teams that may be composed of different disciplines and levels contributing to meet deliverable, schedule and budget requirements.**	**C6_6** **Identify appropriate functioning methods and relevant management strategies of teams that may be composed of different disciplines and levels and elements of successful teamwork.**
Subset 1 L6_2.1 **Team functioning**	K6_7.1 Define and describe key characteristics and functioning methods of effective teams that may be composed of different disciplines and levels.	S6_7.1 Function effectively as a member of teams that may be composed of different disciplines and levels in national and international contexts contributing to meet deliverable, schedule and budget requirements.	C6_7.1 Take responsibility for contributing to professional development of individuals and teams in to meet deliverable, schedule and budget requirements.
Assessment approaches	Essays Problem Solving Practical Work	Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments

Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Fieldwork	Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing	Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Fieldwork	Problem-based classes Design-based classes Work-based practice Role play Peer reviewing	Problem-based classes Design-based classes Work-based practice Role play Peer reviewing

Dimension 8: Communication			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_8. Level descriptor	**K6_8** **Demonstrate knowledge and understanding of established communication methods and tools and of their limitations.**	**S6_8** **Communicate effectively, clearly and unambiguously information, describe activities and communicate their exits/results to engineers or wider audiences in national and international contexts, using appropriate established communication methods and tools.**	**C6_8** **Identify appropriate and relevant established communication methods and tools.**
Subset 1 L6_8.1 **Communication strategies, methods and tools**	K6_8.1 Define and describe established communication methods and tools, the characteristics of effective verbal, written, virtual, and graphical communications and their limitations to communicate effectively, clearly and unambiguously information, describe activities and communicate their exits/results to engineers or wider audiences in national and international contexts.	S6_8.1 Plan, compose, integrate and deliver effective verbal, written, virtual and graphical communications for describing activities and communicating their exits/results to engineers or wider audiences in national and international contexts, by applying rules of grammar and composition in verbal and written communications, properly citing sources, and using appropriate graphical standards in preparing engineering drawings.	C6_8.1 Identify appropriate and relevant established communication strategies, methods and tools to communicate effectively, clearly and unambiguously information, describe activities and communicate their exits/ results to engineers or wider audiences in national and international contexts.
Assessment approaches	Essays Problem Solving Practical Work	Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning	Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing	Problem-based learning Design-based learning Practising professional skills Individual supervision

	Fieldwork		
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Fieldwork	Problem-based classes Design-based classes Work-based practice Role play Peer reviewing	Problem-based classes Design-based classes Work-based practice Individual supervision

Dimension 9: Lifelong Learning			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_2. Level descriptor	**K6_9** **Demonstrate knowledge and understanding of the learning methods necessary to follow developments in science and technology in civil engineering subject area.**	**S6_9** **Engage in independent lifelong learning and follow developments in science and technology in civil engineering subject area autonomously.**	**C6_9** **Identify appropriate learning methods in independent lifelong learning to follow developments in science and technology in civil engineering subject area.**
Subset 1 L6_2.1 **Lifelong learning strategies and methods**	K6_9.1 Define lifelong learning, explain the need for lifelong learning, describe the skills required of a lifelong learner and the learning methods necessary to follow developments in science and technology in civil engineering subject area.	S6_9.1 Engage in independent lifelong learning to follow developments in science and technology in civil engineering subject area autonomously.	C6_9.1 Identify appropriate learning methods in independent lifelong learning to follow developments in science and technology in civil engineering subject area.
Assessment approaches	Essays Problem Solving Practical Work Reflective Practice Assignments	Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Problem-based learning Design-based learning Work-based practice	Problem-based learning Design-based learning Practising professional skills	Problem-based learning Design-based learning Practising professional skills Individual supervision
Teaching approaches	Lectures Seminars Tutorials Problem-based classes Design-based classes Work-based practice Individual supervision	Problem-based classes Design-based classes Work-based practice	Problem-based classes Design-based classes Work-based practice Individual supervision

Assessment Reference Framework for Civil Engineering - Second Cycle / LEVEL 7 (EQF)

Dimension 1: Knowledge and Understanding			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_1. Level descriptor	**K7_1** **Demonstrate in-depth knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering specialisation at a level necessary to achieve the other programme outcomes.**	**S7_1** **Apply knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering specialisation to solve / design / investigate / conduct very complex civil engineering problems / products, processes and systems / issues / activities.**	**C7_1** **Identify and justify knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering specialisation necessary to solve / design / investigate / conduct very complex civil engineering problems / products, processes and systems / issues / activities.**
Subset 1 L7_1.1 **Mathematics**	K7_1.1 Define and describe key factual information related to mathematics through differential equations and explain key concepts and problem-solving processes.	S7_1.1 Solve / design / investigate / conduct very complex civil engineering problems / products, processes and systems / issues / activities using and applying knowledge and understanding of mathematics through differential equations.	C7_1.1 Identify and justify knowledge and understanding of mathematics necessary to solve / design / investigate / conduct very complex civil engineering problems / products, processes and systems / issues / activities through differential equations.
Subset 2 L7_1.2 **Sciences underlying civil engineering specialisation**	K7_1.2 Define and describe key factual information related to calculus-based physics and chemistry and explain key concepts and problem-solving processes.	S7_1.2 Solve / design / investigate / conduct very complex civil engineering problems / products, processes and systems / issues / activities using and applying knowledge and understanding of calculus-based physics and chemistry.	C7_1.2 Identify and justify knowledge and understanding of calculus-based physics and chemistry to solve / design / investigate / conduct very complex civil engineering problems / products, processes and systems / issues / activities.
Subset 3 L7_1.3 **Engineering disciplines underlying civil engineering specialisation**	K7_1.3 Define and describe key factual information related to engineering disciplines underlying civil engineering specialisation and explain key concepts and problem-solving processes having a critical awareness of the forefront of civil engineering specialisation, of the knowledge issues at the interface between different fields and of the wider multidisciplinary context of engineering.	S7_1.3 Solve / design / investigate / conduct very complex civil engineering problems / products, processes and systems / issues / activities, using and applying knowledge and understanding of engineering disciplines underlying civil engineering specialisation.	C7_1.3 Identify and justify knowledge and understanding of engineering disciplines underlying civil engineering specialisation necessary to solve / design / investigate / conduct very complex civil engineering problems / products, processes and systems / issues / activities.
Assessment approaches	Short Answer Questions Multiple Choice Questions Essays	Essays Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning	Participating in exercise courses/ practical classes Preparing and making oral presentations Researching and writing papers, reports, dissertations	Participating in exercise courses/ practical classes Problem-based learning Design-based learning

	Preparing and making oral presentations Researching and writing papers, reports, dissertations	Problem-based learning Design-based learning	
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Oral Assessment Written assessment	Exercise courses/Practical classes Oral Assessment Written assessment Problem-based classes Design-based classes	Exercise courses/Practical classes Problem-based classes Design-based classes

Dimension 2: Analysis and problem solving			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_2. Level descriptor	**K7_2** **Demonstrate comprehensive knowledge and understanding of the processes and methods of analysis / solution of engineering issues (products, processes, systems, situations) / engineering problems in the civil engineering subject area, including new and innovative methods, and of their limitations.**	**S7_2** **Analyse / solve very complex engineering issues (products, processes, systems, situations) / engineering problems in civil engineering subject area by applying appropriate and relevant methods of analysis / solution.**	**C7_2** **Identify and justify appropriate and relevant methods of analysis / solution of very complex civil engineering issues (products, processes, systems, situations) / engineering problems from established or new and innovative methods.**
Subset 1 L7_2.1 **Analysis of civil engineering issues**	K7_2.1 Define and describe key factual information related to civil engineering issues (products, processes, systems, situations), applicable processes and methods of analysis, including new and innovative methods, and their limitations, and explain key concepts related to issue recognition and how analysis methods are applied.	S7_2.1 Conceptualise and analyse very complex civil engineering issues (products, processes, systems, situations) by applying appropriate and relevant analysis methods and report the results of the analysis process.	C7_2.1 Identify and justify appropriate and relevant analysis methods of very complex civil engineering issues (products, processes, systems, situations) from established or new and innovative methods, critically interpret the analysis outcomes and present an understanding of the issue and recommendations for necessary measures taking requirements and constraints into account.
Subset 2 L7_2.2 **Solution of civil engineering problems**	K7_2.2 Define and describe key factual information related to civil engineering problem recognition, applicable processes and methods of solution, including new and innovative methods, and their limitations, and explain key concepts related to problem recognition and how solution methods are applied.	S7_2.2 Identify, formulate and solve very complex civil engineering problems by applying appropriate and relevant solution methods and report the results of the solution process.	C7_2.2 Identify and justify appropriate and relevant solution methods of very complex civil engineering problems from established or new and innovative methods and present an understanding of the problems and recommendations for necessary measures taking requirements and constraints into account.
Subset 3 L7_2.3 **Safe, sustainable and of**	K7_2.3 Define, describe and explain key aspects of safety, sustainability and impact on society and	S7_2.3 Identify, formulate and solve very complex civil engineering problems that may involve non-	C7_2.3 Identify and justify appropriate and relevant solution methods of very complex civil engineering problems

low impact solutions	environment related to civil engineering phenomena and to the ethical obligation and social responsibility of professional engineers.	technical – societal, health and safety, environmental, economic and industrial – constraints by applying appropriate and relevant solution methods and report the results of the solution process.	that may involve non-technical – societal, health and safety, environmental, economic and industrial – constraints from established or new and innovative methods and identify solutions safe, sustainable and of low impact on society and environment.
Assessment approaches	Short Answer Questions Multiple Choice Questions Essays	Essays Problem Solving	Problem Solving Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Problem-based learning	Participating in exercise courses/ practical classes Problem-based learning	Participating in exercise courses/ practical classes Problem-based learning Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Problem-based classes	Exercise courses / Practical classes Problem-based classes	Exercise courses / Practical classes Problem-based classes Individual supervision

Dimension 3: Design			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_3. Level descriptor	**K7_3** **Demonstrate comprehensive knowledge and understanding of the process and methods of design in civil engineering subject area, including new and original methods, and of their limitations.**	**S7_3** **Conceive and design very complex civil engineering products (devices, artefacts, etc.), processes and systems by applying appropriate and relevant design methods.**	**C7_3** **Identify and justify appropriate and relevant design methods of very complex civil engineering products (devices, artefacts, etc.), processes and systems from established or new and innovative methods.**
Subset 1 L7_3.1 **Design of civil engineering products, processes and systems**	K7_3.1 Define and describe key factual information related to civil engineering products (devices, artefacts, etc.), processes and systems, applicable processes and methods of design, including new and innovative methods, and their limitations, list major steps in the design process, explain how design methods are applied and define and describe constraints that affect and explain how they affect the process and results of engineering designs.	S7_3.1 Conceive and design very complex civil engineering products (devices, artefacts, etc.), processes and systems by applying appropriate and relevant design methods and being able to use knowledge and understanding at the forefront of the engineering specialisation, and report the results of the design process.	C7_3.1 Analyse civil engineering products (devices, artefacts, etc.), processes and systems to determine requirements and constraints, identify and justify appropriate and relevant design methods of very complex civil engineering products, processes and systems from established or new and innovative methods systems and present recommendations for necessary measures taking requirements and constraints into account.
Subset 2	K7-3.2	S7_3.2	C7_3.2

L7_3.2 **Safe, sustainable and of low impact designs**	Define, describe and explain key aspects of safety, sustainability and impact on society and environment related to civil engineering phenomena and to the ethical obligation and social responsibility of professional engineers.	Conceive and design very complex civil engineering products (devices, artefacts, etc.), processes and systems that may involve non-technical – societal, health and safety, environmental, economic and industrial – constraints by applying appropriate and relevant design methods and report the results of the design process.	Identify and justify appropriate and relevant design methods of very complex civil engineering products (devices, artefacts, etc.), processes and systems that may involve non-technical – societal, health and safety, environmental, economic and industrial – constraints from established or new and innovative methods and design safe, sustainable and of low impact on society and environment products, processes and systems and present recommendations for necessary measures taking requirements and constraints into account.
Assessment approaches	Short Answer Questions Multiple Choice Questions Essays	Essays Problem Solving	Problem Solving Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Design-based learning	Participating in exercise courses/ practical classes Design-based learning	Participating in exercise courses/ practical classes Design-based learning Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Design-based classes	Exercise courses / Practical classes Design-based classes	Exercise courses / Practical classes Design-based classes Individual supervision

Dimension 4: Investigation			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_4. Level descriptor	**K7_4** **Demonstrate comprehensive knowledge and understanding of codes of practice and safety regulations and of investigation methods (consultation of sources of information, simulations, experimental methods) in civil engineering subject area, including new and original emerging methods, and of their limitations.**	**S7_4** **Consult and apply codes of practice and safety regulations and conduct investigations (consultation of sources of information, simulations, experimental methods) in civil engineering subject area and within broader or multidisciplinary contexts in order to meet specified needs and report the investigation results.**	**C7_4** **Identify and justify appropriate and relevant investigation approaches (among codes of practice and safety regulations, consultation of sources of information, simulations, experimental methods) in civil engineering subject area and within broader or multidisciplinary contexts, and analyse, explain and critically evaluate the investigation results with respect to the needs to be met.**
Subset 1 L7_4.1 **Codes of practice and safety regulations**	K7_4.1 Identify and describe codes of practice and safety regulations in the civil engineering subject area, and explain their purpose, procedures and practical applications,	S7_4.1 Consult and apply codes of practice and safety regulations in the civil engineering subject area and within broader or multidisciplinary contexts	C7_4.1 Identify and justify appropriate and relevant codes of practice and safety regulations in the civil engineering subject area and within broader or multidisciplinary contexts to be consulted and applied, analyse, explain

	potentialities and limitations, also with respect to other investigation approaches.	in order to meet specified needs and report the investigation results.	and critically evaluate the investigation results with respect to the needs to be met and draw conclusions.
Subset 2 L7_4.2 **Consultation of sources of information**	K7_4.2 Identify and describe literary sources, databases and other sources of information in civil engineering subject area, and explain their purpose, procedures, practical applications, potentialities and limitations, also with respect to other investigation approaches.	S7_4.2 Conduct searches of literature, consult and critically use databases and other sources of information in civil engineering subject area and within broader or multidisciplinary contexts in order to meet specified needs and report the investigation results.	C7_4.2 Identify and justify appropriate and relevant source of information (literature sources, databases and other sources of information) in civil engineering subject area and within broader or multidisciplinary contexts to be consulted, analyse, explain and critically evaluate the investigation results with respect to the needs to be met and draw conclusions.
Assessment approaches	Short Answer Questions Essays Practical Work	Essays Practical Work	Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Researching and writing papers, reports, dissertations Carrying out investigation assignments	Participating in exercise courses/ practical classes Researching and writing papers, reports, dissertations Carrying out investigation assignments	Participating in exercise courses/ practical classes Practising professional skills Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Written assignments Investigation assignments	Exercise courses / Practical classes Written assignments Investigation assignments	Exercise courses / Practical classes Work-based practice Individual supervision
Subset 3 L7_4.3 **Simulations**	K7_4.3 Identify and describe simulation approaches in the civil engineering subject area, and explain their purpose, procedures, practical applications potentialities and limitations, also with respect to other investigation approaches.	S7_4.3 Conduct simulations in order to pursue detailed investigations and research of technical issues in civil engineering subject area and within broader or multidisciplinary contexts in order to meet specified needs and report the simulation results.	C7_4.3 Identify and justify appropriate and relevant simulation methods in civil engineering subject area and within broader or multidisciplinary contexts to be conducted, analyse, explain and critically evaluate the investigation results with respect to the needs to be met and draw conclusions.
Subset 4 L7_4.4 **Experimental methods**	K7_4.4 Identify and describe the procedures and equipment necessary to conduct civil engineering experiments in more than one of the technical areas of civil engineering, and explain their purpose, procedures and practical	S7_4.4 Provide evidence of advanced laboratory/workshop skills and design and conduct experiments in more than one of the technical areas of civil engineering according to established procedures in order to meet specified needs and report the experiment results.	C7_4.4 Identify and justify appropriate and relevant experiments to be conducted, analyse, evaluate the accuracy of the results within the known boundaries of the tests, explain and critically evaluate the experiment results according to established

	applications, potentialities and limitations, also with respect to other investigation approaches.		procedures with respect to the needs to be met and draw conclusions.
Assessment approaches	Short Answer Questions Essays Practical Work	Essays Practical Work	Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Carrying out numerical modelling/laboratory assignments	Participating in exercise courses/ practical classes Carrying out numerical modelling/laboratory assignments	Participating in exercise courses/ practical classes Practising professional skills Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Numerical modelling/laboratory assignments	Exercise courses / Practical classes Numerical modelling/laboratory assignments	Exercise courses / Practical classes Work-based practice Individual supervision
Subset 5 L7_4.5 **New and emerging technologies**	K7_4.5 Identify and describe new and emerging technologies at the forefront of civil engineering specialisation.	S7_4.5 Investigate the application of new and emerging technologies at the forefront of civil engineering specialisation and their potentialities and limitations, also with respect to technologies already in use.	C7_4.5 Identify, analyse and explain the impact of new and emerging technologies on society and environment.
Assessment approaches	Short Answer Questions Essays	Essays Problem Solving Reflective Practice Assignments	Problem Solving Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning	Participating in exercise courses/ practical classes Preparing and making oral presentations Researching and writing papers, reports, dissertations Individual supervision	Participating in exercise courses/ practical classes Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching	Exercise courses / Practical classes Oral Assessment Written assessment Individual supervision	Exercise courses / Practical classes Individual supervision

Dimension 5: Practice			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_5. Level descriptor	**K7_5** **Demonstrate comprehensive practical knowledge and understanding of materials, equipment and tools, processes and technologies in civil engineering subject area and of their limitations.**	**S7_5** **Implement and conduct complex engineering activities in civil engineering subject area and within broader or multidisciplinary contexts, using and applying practical knowledge and understanding of materials, equipment and tools, processes and technologies.**	**C7_5** **Identify and justify practical knowledge and understanding of materials, equipment and tools, processes and technologies necessary to conduct complex engineering activities in civil engineering subject area and within broader or multidisciplinary contexts.**
Subset 1 L7_5.1 **Materials, equipment and tools, technologies and processes**	K7_5.1 Define and describe key factual information related to materials, equipment and tools, technologies and processes and explain their practical application in civil engineering subject area.	S7_5.1 Apply appropriate practical knowledge and understanding on materials, equipment and tools, technologies and processes to solve / design / investigate / conduct complex engineering problems / products, processes and systems / issues / activities in civil engineering subject area and within broader or multidisciplinary contexts, integrating theory and practice.	C7_5.1 Analyze existing practices in the use and identify and justify appropriate practical knowledge and understanding of materials, equipment and tools, technologies and processes to solve / design / investigate / conduct complex engineering problems / products, processes and systems / issues / activities in civil engineering subject area and within broader or multidisciplinary contexts.
Assessment approaches	Short Answer Questions Essays Practical Work	Essays Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Practising professional skills Fieldwork	Participating in exercise courses/ practical classes Preparing and making oral presentations Researching and writing papers, reports, dissertations Practising professional skills	Participating in exercise courses/ practical classes Practising professional skills
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Work-based practice Fieldwork	Exercise courses / Practical classes Oral Assessment Written assessment Work-based practice	Exercise courses / Practical classes Work-based practice
Subset 2 L7_5.2 **Societal, health and safety, environmental implications and risks**	K7_5.2 Define, describe and explain societal, health and safety, environmental implications and risks in conducting complex civil engineering activities.	S7_5.2 Implement and conduct complex engineering activities in civil engineering subject area and within broader or multidisciplinary contexts identifying and taking into account societal,	C7_5.2 Act appropriately, by meeting deliverable, schedule and budget requirements, while fulfilling all legal and regulatory requirements, and evaluating and mitigating/minimizing societal, health and safety, environmental impact and risks.

		health and safety, environmental impact and risks.	
Subset 3 L7_5.3 **Economic, industrial and managerial implications**	K7_5.3 Define, describe and explain key aspects of economic, industrial and managerial implications of complex civil engineering activities, what a project is and key aspects of project management.	S7_5.3 Implement and conduct complex engineering activities in civil engineering subject area and within broader or multidisciplinary contexts identifying and taking into account economic, industrial and managerial implications.	C7_5.3 Act appropriately, by meeting deliverable, schedule and budget requirements, while fulfilling all legal and regulatory requirements, evaluating and optimizing economic, industrial and managerial implications and developing solutions to well-defined management problems.
Assessment approaches	Short Answer Questions Essays Problem Solving Practical Work	Essays Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Practising professional skill	Participating in exercise courses/ practical classes Practising professional skills	Participating in exercise courses/ practical classes Practising professional skills
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Work-based practice	Exercise courses / Practical classes Work-based practice	Exercise courses / Practical classes Work-based practice

Dimension 6: Decision making			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_6. Level descriptor	**K7_6** **Demonstrate critical awareness of the key aspects of professional, ethical and social responsibilities linked to management of work contexts, decision-making and judgment formulation in civil engineering subject area.**	**S7_6** **Manage work contexts in civil engineering subject area and within broader or multidisciplinary contexts that may be unpredictable and require new strategic approaches, take decisions and formulate judgments.**	**C7_6** **Identify and justify appropriate and relevant strategic approaches and analyse professional, ethical and social responsibilities linked to the management of work contexts in civil engineering subject area and within broader or multidisciplinary contexts, taking coherent decisions and formulating coherent judgments.**
Subset 1 L7_6.1 **Managing work contexts, taking decisions and formulating judgments**	K7_6.1 Describe and explain key aspects of professional, ethical and social responsibilities linked to management, decision-making and	S7_6.1 Manage work contexts in civil engineering subject area and within broader or multidisciplinary contexts that may be unpredictable and require new strategic	C7_6.1 Identify and justify appropriate and relevant strategic approaches to manage work contexts in civil engineering subject area and within broader or multidisciplinary contexts, identify and analyse

	judgment formulation of work contexts in civil engineering subject area.	approaches, identify, locate, obtain, organize and evaluate information and data, take decisions and formulate judgments.	situations involving multiple conflicting professional, ethical and social interests to determine an appropriate course of action, take coherent decisions and formulate coherent judgments also with incomplete or limited information and data.
Assessment approaches	Essays Problem Solving Practical Work	Essays Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Problem-based learning Design-based learning Practising professional skills	Participating in exercise courses/ practical classes Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing	Participating in exercise courses/ practical classes Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Problem-based classes Design-based classes Work-based practice	Exercise courses / Practical classes Problem-based classes Design-based classes Work-based practice Role play Peer reviewing	Exercise courses / Practical classes Problem-based classes Design-based classes Work-based practice Role play Peer reviewing

Dimension 7: Team-working			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_7. Level descriptor	**K7_7** **Demonstrate knowledge and understanding of functioning methods and management strategies of teams that may be composed of different disciplines and levels and awareness of leadership responsibilities.**	**S7_7** **Function effectively in national and international contexts as member/leader of teams that may be composed of different disciplines and levels meeting deliverable, schedule and budget requirements.**	**C7_7** **Identify and justify appropriate and relevant functioning methods and management strategies of teams that may be composed of different disciplines and levels and elements of successful teamwork.**
Subset 1 L7_2.1 **Team functioning**	K7_7.1 Define and describe key characteristics and functioning methods of effective teams that may be composed of different disciplines and levels.	S7_7.1 Function effectively as a member of teams that may be composed of different disciplines and levels contributing to meet deliverable, schedule and budget requirements.	C7_7.1 Identify and justify appropriate and relevant functioning methods of teams that may be composed of different disciplines and levels and analyse factors affecting the ability to function effectively and to meet deliverable, schedule and budget requirements.
Assessment approaches	Essays Problem Solving	Problem Solving Practical Work	Problem Solving Practical Work

	Practical Work		Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Fieldwork	Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing	Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Fieldwork	Problem-based classes Design-based classes Work-based practice Role play Peer reviewing	Problem-based classes Design-based classes Work-based practice Role play Peer reviewing
Subset 2 L7_7.2 **Team management**	K7_7.2 Define and describe leadership principles and attitudes, role and responsibilities of a leader and management strategies of teams that may be composed of different disciplines and levels.	S7_7.2 Organize and direct the efforts of teams that may be composed of different disciplines and levels applying leadership principles and meeting deliverable, schedule and budget requirements.	C7_7.2 Identify and justify appropriate and relevant management strategies of teams that may be composed of different disciplines and levels and possible needs for reviewing the strategic performance, and take responsibility for contributing to professional knowledge and practice of team members.
Assessment approaches	Essays Problem Solving Practical Work	Problem Solving Practical Work	Problem Solving Practical Work
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Problem-based learning Design-based learning Practising professional skills	Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing	Problem-based learning Design-based learning Practising professional skills
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Problem-based classes Design-based classes Work-based practice	Problem-based classes Design-based classes Work-based practice Role play Peer reviewing	Problem-based learning Design-based learning Work-based practice

Dimension 8: Communication			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_8. Level descriptor	**K7_8** **Demonstrate knowledge and understanding of communication strategies, methods and tools, including new and innovative ones, and of their limitations.**	**S7_8** **Communicate effectively, clearly and unambiguously information, describe activities and communicate their exits/results – and the knowledge and rationale underpinning these – to specialist and non-specialist audiences in national and international contexts and society at large, using appropriate communication strategies, methods and tools.**	**C7_8** **Identify and justify appropriate and relevant communication strategies, methods and tools from established or new and innovative ones.**
Subset 1 L7_8.1 **Communication strategies, methods and tools**	K7_8.1 Define and describe communication strategies, methods and tools, the characteristics of effective verbal, written, virtual, and graphical communications and their limitations to communicate effectively, clearly and unambiguously information, describe activities and communicate their exits/results – and the knowledge and rationale underpinning these – to specialist and non-specialist audiences in national and international contexts and society at large.	S7_8.1 Plan, compose, integrate and deliver effective verbal, written, virtual and graphical communications for describing activities and communicating their exits/results – and the knowledge and rationale underpinning – these to specialist and non-specialist audiences in national and international contexts and society at large, by applying rules of grammar and composition in verbal and written communications, properly citing sources, and using appropriate graphical standards in preparing engineering drawings.	C7_8.1 Identify and justify appropriate and relevant communication strategies, methods and tools among standard and new and innovative ones to communicate effectively, clearly and unambiguously information, describe activities and communicate their exits/results – and the knowledge and rationale underpinning these – to specialist and non-specialist audiences in national and international contexts and society at large.
Assessment approaches	Essays Problem Solving Practical Work	Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Participating in flipped classroom Blended learning Fieldwork	Problem-based learning Design-based learning Practising professional skills Role play Peer reviewing	Problem-based learning Design-based learning Practising professional skills Individual supervision
Teaching approaches	Lectures Seminars Tutorials Flipped classroom Blended teaching Fieldwork	Problem-based classes Design-based classes Work-based practice Role play Peer reviewing	Problem-based classes Design-based classes Work-based practice Individual supervision

Dimension 9: Lifelong Learning			
(Sub)descriptor / TLA approaches	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_2. Level descriptor	**K7_9** **Demonstrate knowledge and understanding of the learning methods necessary to follow developments in science and technology and undertake further studies in new and emerging technologies in civil engineering subject area and within broader or multidisciplinary contexts.**	**S7_9** **Engage in independent lifelong learning and follow developments in science and technology and undertake further studies in new and emerging technologies in civil engineering subject area and within broader or multidisciplinary contexts autonomously.**	**C7_9** **Identify and justify appropriate learning strategies and methods in independent lifelong learning to follow developments in science and technology and undertake further studies in new and emerging technologies in civil engineering subject area and within broader or multidisciplinary contexts.**
Subset 1 L7_2.1 **Learning strategies and methods**	K7_9.1 Define lifelong learning, explain the need for lifelong learning, describe the skills required of a lifelong learner and the learning methods necessary to follow developments in science and technology and undertake further studies in new and emerging technologies in civil engineering subject area and within broader or multidisciplinary contexts.	S7_9.1 Engage in independent lifelong learning to follow developments in science and technology and undertake further studies in new and emerging technologies in civil engineering subject area and within broader or multidisciplinary contexts autonomously.	C7_9.1 Identify and justify appropriate learning strategies and methods in independent lifelong learning to follow developments in science and technology and undertake further studies in new and emerging technologies in civil engineering subject area and within broader or multidisciplinary contexts.
Assessment approaches	Essays Problem Solving Practical Work Reflective Practice Assignments	Problem Solving Practical Work	Problem Solving Practical Work Reflective Practice Assignments
Learning approaches	Attending lectures Attending seminars Attending tutorials Problem-based learning Design-based learning Work-based practice	Problem-based learning Design-based learning Practising professional skills	Problem-based learning Design-based learning Practising professional skills Individual supervision
Teaching approaches	Lectures Seminars Tutorials Problem-based classes Design-based classes Work-based practice Individual supervision	Problem-based classes Design-based classes Work-based practice	Problem-based classes Design-based classes Work-based practice Individual supervision

4.2. Teacher Education

Introduction to the Assessment Reference Frameworks for Teacher Education

It is evident that, in the new paradigm of student centred learning, the role of the learner has changed. Consequently, also the role of the teacher requires modification. Despite what the term might seem to imply – teachers perceived as somehow less important, because it is the learner who is put in the centre – in fact being a teacher has become, if anything, even more demanding. In reality, teachers are more necessary now because learners must obtain not only an appropriate level of knowledge and skills but also are expected to develop 'wider competences' phrased as autonomy and responsibility. The implication is that they have to take full responsibility for their own learning. The more learners need to achieve, the more knowledge, skills and wider competences a teacher must have him or herself in order to be able to help learners achieve their goals.

The CALOHEE group of Teacher Education has tried to define the 'meta-profile' or qualifications reference framework of the "new" teacher for both the first and the second cycle, Bachelor and Master. This was done through agreeing on six critical dimensions, which interweave and complement each other, and around which the teacher competences are organized to build the profile of the teacher we want and need to help children and adolescents develop their full potential and become responsible members of societies.

The six dimensions identified are the following:

Dimension 1: Knowledge management and creation

Dimension 2: Design and management of processes of learning, teaching and assessment

Dimension 3: Learner empowerment, potential and creativity

Dimension 4: Communication

Dimension 5: Values and social leadership

Dimension 6: Development as professionals and life-long learners

The term 'meta-profile' was applied in order to distinguish the construct from degree profile of each individual Teacher Education programme. Meta-profiles identify and organise key "combinations of competences that lend identity to subject area" (González & Beneitone, 2014: 23) and to the graduates pursuing degrees in the subject area. Both degree profiles and meta-profiles "categorise, structure and organise components into recognisable" clusters, illustrating inter-relations among the different elements of the desired graduate profile. The distinctive feature of a meta-profile for a subject area is that meta-profiles do not correspond to any particular degree profile, but rather reflect the key elements all degrees in the subject area should seek to help students develop. Meta-profiles are mental constructions that reflect agreements reached by academics from different institutions and often different countries.

The six dimensions were identified after (1) discussing, comparing and contrasting the different national and sub-national teacher education graduates' profiles from the different project member countries and (2) jointly reflecting on the future needs for the teacher profession. Each of the dimensions comprises 3-4 subsets, whose aim is to further delineate the core of the profile proposed. Each dimension can also be understood through looking at associated competences. These were first formulated by the Tuning Education Group some ten years ago, when they were consulted with a large number of different stakeholders. However, apart from the time that has passed, the original list was made for a broader context (Educational Sciences and Teacher Education together). It had, therefore, to be reinterpreted for a new context – both in terms of scope and historical moment. The CALOHEE Teacher Education group also used two international qualifications frameworks as points of reference: the EQF for Lifelong Learning and the Qualifications Framework for the European Higher Education Area (EHEA) based on the Dublin Descriptors. The logic of formulating the levels of achievement in terms of knowledge, skills and autonomy and responsibility ('wider competences') was adopted from the EQF for Lifelong Learning and guided the formulation of descriptors for each dimension and sub-dimension. The five components

of the Dublin Descriptors, in turn, served as a guiding principle for ensuring the comprehensiveness of the meta-profile and for identifying the key generic competences necessary to complement the desired graduate profile.

The meta-framework or qualifications reference framework for Teacher Education resulting was used as the basis for developing the much more detailed Assessment Reference Framework which is presented below in two tables, covering the first cycle / level 6 of the EQF Level and the second cycle / level 7 of the EQF by breaking down the dimensions in sub-dimensions or subsets.

Teacher Education SAG of the CALOHEE Project,
Julia M. González Ferreras and Maria Yarosh, coordinators

Assessment Reference Framework for Teacher Education - First Cycle / LEVEL 6 (EQF)

Dimension 1: Knowledge management and creation			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_1. Level descriptor Frames, theories and policies	**K6_1 Advanced knowledge of major conceptual elements required of a teacher as knowledge manager and creator**	**S6_1 Ability to develop different types of thinking and apply these to different situations determined by curricular, pedagogical and policy needs**	**C6_1 Capacity to envisage consequences of position taking and commitment to act with intellectual consistency**
Subset 1 L6_1.1 **Academic frames of the subject(s) to be taught**	K6_1.1 Advanced academic knowledge of their curricular subject(s) and subject matter and/or chosen specialisation	S6_1.1 The ability to expand on their curricular subject and subject matter knowledge and/or chosen specialisation	C6_1.1 Capacity and commitment to respond to the curricular needs within an educational institution based on the subject knowledge
Subset 2 L6_1.2 **Educational theories**	K6_1.2 Advanced knowledge and a critical understanding of the theoretical foundations of pedagogy, psychology and their frontier sciences	S6_1.2 The ability to use basic educational research, i.e. testing and applying existing theories and educational methods, in order to enhance their teaching	C6_1.2 Capacity and commitment to influence the educational direction of an institution, having in consideration desirable impacts
Subset 3 L6_1.3 **Policies and their implementation in an educational system**	K6_1.3 Advanced knowledge and a critical understanding of objectives, principles and policies of an educational system and potential connections to educational theories	S6_1.3 The ability to arrange their pedagogical work in line with policies of an education system and with reference to educational theories	C6_1.3 Capacity and commitment to critically reflect on educational policies

Dimension 2: Design and management of processes of learning, teaching and assessment			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_2. Level descriptor Development and management of educational processes	**K6_2 Knowledge of classroom management and syllabus design and enhancement: teaching, learning and assessment processes**	**S6_2 Ability to evaluate and select appropriate techniques and strategies of classroom management and syllabus enhancement: teaching, learning and assessment processes**	**C6_2 Capacity and commitment to ensure that the different elements of the course contribute to the development of desired learner profile**
Subset 1 L6_2.1 **Curriculum development, evaluation and enhancement**	L6_2.1 Advanced knowledge of the key principles of designing, aligning and revising/enhancing teaching, learning and assessment at course unit/syllabus level	S6_2.1 The ability to formulate learning outcomes for different types of course units within educational programme(s) and apply constructive alignment in (re)designing syllabus/course units	C6_2.1 Capacity and commitment to critically reflect on the impact of teaching decisions on the learner's future in order to make responsible syllabus design and enhancement choices
Subset 2	K6_2.2	S6_2.2	C6_2.2

L6_2.2 **Teaching and learning management**	Advanced knowledge of teaching and learning methods and approaches (including ICT) appropriate to the subject and the context	The ability to support students' learning processes by providing differentiated pathways and resources	Capacity and commitment to identify and critically reflect on conditions for learners to enjoy their learning experience and to guarantee their growth
Subset 3 L6_2.3 **Group / classroom management**	K6_2.3 Advanced knowledge of classroom dynamics (including conflict management) and student-centred strategies	S6_2.3 The ability to organise group processes and dynamics in learning environments (including applying conflict-management strategies within the classroom)	C6_2.3 Capacity and commitment to ensure that learners can work together in a friendly and stimulating atmosphere, where potential conflicts are managed both successfully and appropriately (class level)
Subset 4 L6_2.4 **Assessment of learning and for learning**	K6_2.4 Advanced knowledge and a critical understanding of assessment principles, strategies and techniques	S6_2.4 Ability to design and apply assessment tasks and transparent criteria (rubrics) for measurement and evaluation	C6_2.4 Capacity and commitment to critically analyse assessment results in order to enhance the quality of teaching and learning

Dimension 3: Learner empowerment, potential and creativity			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_3. Level descriptor Supporting learner holistic growth and development	**K6_3** **Advanced knowledge of theories, strategies and tools that can support learner empowerment, and development of learner fullest potential and creativity**	**S6_3** **Ability to apply theories, strategies and tools that can foster the development of the fullest potential and creativity of each learner**	**C6_3** **Capacity and commitment to contribute to maintenance of contexts of engagement with learner holistic growth and development**
Subset 1 L6_3.1 **Learner self-esteem and confidence**	K6_3.1 Advanced knowledge of how to raise learner self-esteem and confidence	S6_3.1 Ability to support learners in identifying own strengths and setting goals to build on these	C6_3.1 Capacity and commitment to create situations and climates in which learners increase their self-esteem and confidence
Subset 2 L6_3.2 **Learner motivation and resilience**	K6_3.2 Advanced knowledge on building motivation and developing resilience	S6_3.2 Ability to support learners in building motivation and developing resilience	C6_3.2 Capacity and commitment to motivate, inspire learners and support their empowerment creating situations where they can find their own ways of development and strengthening
Subset 3 L6_3.3 **Learner creativity and mastery of tools**	K6_3.3 Advanced knowledge of tools necessary for learners to develop their full potential (using multiple learning styles) and enhance their creativity	S6_3.3 Ability to select and use tools necessary for each learner to develop their full potential and enhance creativity	C6_3.3 Capacity and commitment to facilitate climates where learners can enhance their creativity and try out new tools

Subset 4 L6_3.4 **Tutoring**	K6_3.4 Knowledge of school counselling processes and of how to give advice to children and adolescents (and their families/guardians) to develop learners' own resources	S6_3.4 Ability to identify the needs and accompany learners towards the development of own resources; directing learners (and their families/ guardians) to other professionals when necessary	C6_3.4 Capacity and commitment to ensuring that learners (and/or their families/guardians) receive necessary accompaniment and counselling in a timely manner

Dimension 4: Communication			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_4. Level descriptor Communication with different actors and in different contexts	**K6_4** **Advanced understanding of different critical elements, methods and tools for communicating at the interpersonal level, as well as in groups and society as a whole**	**S6_4** **Ability to identify and apply resources for improving communication at different levels, as well as stay up-to-date with ICT**	**C6_4** **Capacity and commitment to foster transparency and responsibility in interpersonal interactions, in teams and groups, as well as in social media**
Subset 1 L6_4.1 **Interpersonal communication**	K6_4.1 Advanced knowledge of elements essential for developing and maintaining good interpersonal communication	S6_4.1 Ability to listen actively and to clearly communicate thoughts, attitudes and personal perspectives	C6_4.1 Capacity and commitment to contribute to transparency, trust and personal engagement in interpersonal communicative encounters
Subset 2 L6_4.2 **Communication at group level**	K6_4.2 Advanced knowledge of group communication methods and strategies in educational processes	S6_4.2 Ability to apply communication methods and strategies that permit to work effectively with(in) learner groups	C6_4.2 Capacity and commitment to take responsibility to promote and/or initiate teamwork among learners
Subset 3 L6_4.3 **Social media and communication technologies**	K6_4.3 Critical understanding of social media and communication technologies, as well as their impact on learners and society	S6_4.3 Ability to make use of social media and communication technologies and stay updated with current developments in the domain	C6_4.3 Capacity and commitment to promote responsible and critical use of social media and communication technologies among learners

Dimension 5: Values and social leadership			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_5. Level descriptor Ethics and social commitment	**K6_5** **Advanced knowledge of different value systems and of how to identify and promote those which can foster the fulfilment of the teacher's professional mission**	**S6_5** **Ability to identify and implement approaches and actions required to address the social needs; ability to analyse consequences of different value choices and to manage diversity**	**C6_5** **Capacity and commitment to build a sense of social responsibility in the choices made at personal, professional and contextual levels and act on needs and potentialities identified**
Subset 1	K6_5.1	S6_5.1	C6_5.1

L6_5.1 **Personal and professional ethics and values**	Advanced knowledge of ethical and professional standards, including knowledge about the constitution of an appropriate relationship with learners	Ability to adhere to ethical and professional standards.	Capacity and commitment to critically reflect and work on consistency of own personal and professional identity
Subset 2 L6_5.2 **Values and diversity**	K6_5.2 Critical understanding of potential tensions due to the existence of different value systems	S6_5.2 Ability to promote ethical behaviour in learners and foster a culture of valuing diversity within the classroom setting	C6_5.2 Capacity and commitment to respect different values, when interacting with people in contexts of diversity (social, ethnic, economic, political) and learn from the diversity
Subset 3 L6_5.3 **Social Commitment**	K6_5.3 Critical understanding of the teaching profession (mission) as a public service and its impact/significance in a local context	S6_5.3 Ability to organise curricular and extracurricular actions and educational events as a response to social needs	C6_5.3 Capacity and commitment to contribute to the development possibilities for an educational institution and its social community and build a sense of social responsibility at individual level
Subset 4 L6_5.4 **Social leadership**	K6_5.4 Advanced knowledge of socio-educational needs and trends, as well as principles of social leadership	S6_5.4 Ability to identify needs and strengths in different socio-educational contexts, as well as leadership actions required	C6_5.4 Capacity and commitment to reflect and act according to the needs and potentialities identified

Dimension 6: Development as professionals and life-long learners			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_6. Level descriptor **Personal and professional updating**	**K6_6** **Advanced knowledge of sources, tools, mechanisms and main trends of personal and professional updating**	**S6_6** **Ability to critically examine applied educational research and improve own practice following evidence based approaches**	**C6_6** **Capacity and commitment to act as a critically reflective member of an international teaching community that values evidence-based practice**
Subset 1 L6_6.1 **Acting as learners**	K6_6.1 Advanced knowledge of main sources that permit to stay updated with general and subject related educational research and developments	S6_6.1 Ability to critically examine educational research and developments (publications, events, resources, etc.) in search of solutions for challenges experienced in own classroom	C6_6.1 Capacity and commitment to reflect on their own practice in reference to relevant findings from educational research and developments
Subset 2 L6_6.2 **Acting as researchers**	K6_6.2 Advanced knowledge of selected educational research methods	S6_6.2 Ability to apply educational research in school contexts, in order to improve own teaching practice	C6_6.2 Capacity and commitment to follow an evidence-/research-based approach in own professional practice
Subset 3 L6_6.3 **International dimension**	K6_6.3 Advanced knowledge of the main trends in the profession at international level	S6_6.3 Ability to use other languages, particularly English, for the purposes of continuous professional development	C6_6.3 Capacity and commitment to foster an atmosphere of development where learners can begin to feel and act as global citizens

Assessment Reference Framework for Teacher Education - Second Cycle / LEVEL 7 (EQF)

Dimension 1: Knowledge management and creation			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_1. Level descriptor Frames, theories and policies	**K7_1 Highly specialised knowledge of major frames and theories that shape knowledge creation in the discipline and neighbouring fields at international level**	**S7_1 Ability to integrate knowledge from different fields in order to solve problems and identify innovative approaches for knowledge creation and management**	**C7_1 Capacity to contribute to creation of new frames, theories and policies in order to respond to complex, unknown and unpredictable situations**
Subset 1 L7_1.1 **Academic frames of the subject(s) to be taught**	K7_1.1 Highly specialized knowledge of interrelations of subjects to be taught with associated broader domains and meta-concepts, and well as forefront knowledge of best ways to help learners acquire subject knowledge.	S7_1.1 The ability to continuously and systematically expand knowledge within chosen specialisation and tailor it to students needs	C7_1.1 Capacity and commitment to create the (personalised) learning environment which permits and motivates every learner to achieve the subject-related learning outcomes
Subset 2 L7_1.2 **Educational theories**	K7_1.2 Critical awareness of the epistemology and practical implications of concurrent educational theories	S7_1.2 The ability to use advanced educational research, i.e. testing and applying existing theories and educational methods, in order to enhance their pedagogical practice, tailoring it to the educational needs and context(s)	C7_1.2 The ability and commitment to critically analyse and shape the educational direction of an institution
Subset 3 L7_1.3 **Policies and their implementation in an educational system**	K7_1.3 Highly specialized knowledge of educational policy creation and implementation at local and global level: interactions and means to resolve contradictions and challenges related to differing objectives, principles and policies	S7_1.3 The ability to transfer the knowledge of educational policies and theories to different education systems	C7_1.3 The ability and commitment to critically analyse, reflect and contribute to the improvement of educational policies

Dimension 2: Design and management of processes of learning, teaching and assessment			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_2. Level descriptor Development and management of educational processes	**K7_2 Highly specialised knowledge of classroom management and curriculum design and enhancement: teaching, learning and assessment processes**	**S7_2 Ability to evaluate and select innovative techniques and strategies of classroom management and curriculum enhancement: teaching, learning and assessment processes**	**C7_2 Capacity and commitment to lead and coordinate educational teams in search for innovative learner-centred means to reach the desired learner profile**
Subset 1 L7_2.1 **Curriculum development, evaluation and**	K7_2.1 Highly specialized knowledge of key principles of planning, evaluation and enhancement of	S7_2.1 Ability to define appropriate learning goals for different types of educational programme(s) and ensure that the different planned teaching,	C7_2.1 Capacity and commitment to choose appropriate curriculum strategies in school, taking into account expected impact on students' learning, time

enhancement	teaching, learning and assessment at curriculum level	learning and assessment activities can jointly lead to the programme intended outcomes	available, costs and human resources; as well as to manage the learning progression in the programme, leading an educational, multidisciplinary team
Subset 2 L7_2.2 **Teaching and learning management**	K7_2.2 Highly specialized knowledge of forefront techniques and strategies to support students in developing deep subject knowledge and establishing interdisciplinary connections	S7_2.2 Ability to support students' learning processes by developing pathways and resources, including teacher-students partnership, peer learning activities and peer tutoring activities	C7_2.2 Capacity and commitment to create the conditions for learners to develop competences for college, career and social life readiness
Subset 3 L7_2.3 **Group / classroom management**	K7_2.3 Highly specialized knowledge of a variety of classroom dynamics and student-centred strategies; as well as advanced knowledge of conflict transformation processes	S7_2.3 Ability to responsibly interact with different stakeholders, fostering inclusive processes and transforming potential conflicts in school	C7_2.3 Capacity and commitment to ensure that learners and other actors of the school can work together to achieve common goals, while creating a culture where conflicts can be transformed and built on to achieve personal and collective growth
Subset 4 L7_2.4 **Assessment of learning and for learning**	K7_2.4 Highly specialized knowledge of ways to resolve challenges associated with diagnostic, summative and formative assessment processes within educational institutions, with a special focus on self-, peer and group-assessment	L7_2.4 Ability to actively engage learners in designing and doing assessment, obtaining and providing constructive feedback which enhances individual progress and self-evaluation	C7_2.4 Capacity and commitment to use assessment results to enhance the quality of teaching and learning, as well as to design better educational projects

Dimension 3: Learner empowerment, potential and creativity			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_3. Level descriptor Supporting learner holistic growth and development	**K7_3** **Highly specialized knowledge of forefront theories, frames, strategies and tools that can support learner empowerment, and development of learner fullest potential and creativity**	**S7_3** **Ability to identify the most contextually-appropriate theories, strategies and tools that can foster the development of the fullest potential and creativity of each learner**	**C7_3** **Capacity and commitment to create cultures of engagement with learner holistic growth and development**
Subset 1 L7_3.1 **Learner self-esteem and confidence**	K7_3.1 Highly specialized knowledge of ways to help learners establish links and parallels between learning and advancing their self-esteem and confidence in different contexts (formal, non-formal and informal)	S7_3.1 Ability to engage colleagues and other school actors in fostering learner self-esteem and confidence	C7_3.1 Ability and commitment to uphold and effectively contribute to creating an atmosphere of promoting learner confidence and self-esteem
Subset 2 L7_3.2 **Learner motivation and resilience**	K7_3.2 Highly specialized knowledge of theories and frames in developing learner motivation and resilience	S7_3.2 Ability to foster learners' personal motivation, resilience and growth both within the school context and beyond	C7_3.2 Capacity and commitment to engage others in creating and maintaining cultures of empowerment, where learners develop motivation and resilience,

			and are inspired and supported to find their own ways of development and strengthening
Subset 3 L7_3.3 **Learner creativity and mastery of tools**	K7_3.3 Highly specialized knowledge of methodologies for transforming schools into environments for developing learner creativity and mastery of tools	S7_3.3 Ability to identify and implement contextually-appropriate methodologies for transforming schools into environments for developing learner creativity and mastery of tools	C7_3.3 Capacity and commitment engage all school actors in creating cultures where learners can enhance their creativity and try out new tools
Subset 4 L7_3.4 **Tutoring**	K7_3.4 Knowledge of school counselling processes and of how to give advice to children and adolescents (and their families/guardians) to develop learners' own resources	S7_3.4 Ability to identify the needs and accompany learners towards the development of own resources; directing learners (and their families/ guardians) to other professionals when necessary	C7_3.4 Capacity and commitment to ensuring that learners (and/or their families/guardians) receive necessary accompaniment and counselling in a timely manner

Dimension 4: Communication			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_4. Level descriptor Communication with different actors and in different contexts	**K7_4** **Comprehensive understanding of principles and tools of intercultural and interdisciplinary communication, as critical understanding of the use of social media and communication technologies**	**S7_4** **Ability to identify and apply resources for achieving successful and appropriate communication in intercultural and interdisciplinary teams, including through the use of social media and communication technologies**	**C7_4** **Capacity and commitment to foster cultures of transparency and responsibility in interpersonal interactions, in teams and groups, as well as in social media**
Subset 1 L6_4.1 **Interpersonal communication**	K7_4.1 Highly specialized knowledge of how different mental frames and structures can affect communication, as well as how to identify, understand and manage such differences	S7_4.1 Ability to communicate own ideas, perceptions, and values across different metal frames and structures	C7_4.1 Capacity and commitment to co-create cultures of transparency, trust and personal engagement
Subset 2 L6_4.2 **Communication at group level**	K7_4.2 Highly specialized knowledge of interdisciplinary group communication principles and strategies for educational purposes	S7_4.2 Ability to apply a broad range of communication methods and strategies that permit to work effectively with(in) interdisciplinary professional teams and with all parties involved in the educational process	C7_4.2 Capacity and commitment to take responsibility to promote and/or initiate teamwork based on trust and mutual confidence among colleagues at school and in wider educational contexts
Subset 3 L6_4.3 **Social media and communication technologies**	K7_4.3 Critical understanding of multiple ways in which information can be given and ways of misusing social media and communication technologies	S7_4.3 Ability to participate in authentic information creation and transmission processes through using forefront social media and communication technologies	C7_4.3 Capacity and commitment to promote responsible and critical use of social media and communication technologies at institutional and global level

Dimension 5: Values and social leadership			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_5. Level descriptor Ethics and social commitment	**K7_5 Critical awareness of the multiple complex aspects that interrelate in the process of educating ethically responsible citizens**	**S7_5 Ability to design and implement educational methods, instruments and projects in order to foster the development of civic competences at the school level and beyond**	**C7_5 Capacity and commitment to critically analyse and act on present and future challenges and/or development possibilities in order to contribute to the creation of an inclusive society through communal educational projects**
Subset 1 L7_5.1 **Personal and professional ethics and values**	K7_5.1 Critical awareness of the processes and principles of value systems development and of the definition of ethical and professional standards	S7_5.1 Ability to contribute to the enhancement of ethical and professional standards	C7_5.1 Capacity and commitment to co-create cultures in which each person can uphold their own values, both personal and professional, while engaging constructively with others
Subset 2 L7_5.2 **Values and diversity**	K7_5.2 Critical understanding of mechanisms that can make different value systems interact constructively	S7_5.2 Ability to promote ethical behaviour and foster a culture of valuing diversity within school community and in broader educational contexts	C7_5.2 Capacity and commitment to encourage inclusive dialogue and cooperation among different value systems
Subset 3 L7_5.3 **Social Commitment**	K7_5.3 Knowledge of global trends and high impact practices in fulfilling the mission of a teacher as a socially-committed professional	S7_5.3 Ability to respond to the local social needs through identification and application of the best global educational practices	C7_5.3 Capacity and commitment to contribute to setting situationally appropriate goals for the community and build a sense of social and civic responsibility at institutional and local level
Subset 4 L7_5.4 **Social leadership**	K7_5.4 Highly specialized knowledge of social project development and management	S7_5.4 Ability to initiate and carry through social projects that bring together community and school actors and create social impact	C7_5.4 Capacity and commitment to engage others in realization of shared vision for higher quality education, accepting social leadership role and responsibilities

Dimension 6: Development as professionals and life-long learners			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_6. Level descriptor Personal and professional updating	**K7_6 Advanced knowledge of sources, trends, possibilities and research methodologies that can be used for personal and professional updating**	**S7_6 Ability to systematically follow applied educational research and participate in international collaborative endeavours aimed at professional development**	**C7_6 Capacity and commitment to foster the culture of evidence-based practice enhancement, as well as personal and professional updating through engagement in educational and professional development projects**
Subset 1 L7_6.1 **Acting as learners**	K7_6.1 Highly specialized knowledge of both national and international sources and trends that	S7_6.1 Ability to systematically follow the educational research and developments (publications, events, resources, etc.) in search of solutions for	C7_6.1 Capacity and commitment to encouraging incorporation of evidence-/research-based enhancements into teaching practice at school level

	permit to stay updated with general and subject related educational research and developments	challenges experienced by teams at institutional level	
Subset 2 L7_6.2 **Acting as researchers**	K7_6.2 Highly specialized knowledge of a broad variety of educational research methods	S7_6.2 Ability to initiate and lead educational research in school contexts, in order to improve own and others' teaching practice	C7_6.2 Capacity and commitment to create action research communities fostering rigour and relevance in the research
Subset 3 L.7_6.3 **International dimension**	K7_6.3. Knowledge of possibilities for continuous professional development which involve cooperation with international peer teams	S7_6.3 Ability to identify, join and collaborate with international peer teams focussed on continuous professional development	C7_6.3 Capacity and commitment to foster an atmosphere of engagement in international collaborations that permit communities of teachers to feel and act as global citizens

4.3. History

Introduction to the Assessment Reference Frameworks for History

The CALOHEE History Subject Area Group addressed the task of preparing a full Assessment Reference Framework well aware of the potential difficulties, but also eager to discover how they could be resolved. Most of the members of the SAG had already long been engaged both in Tuning and in the thematic and research networks for History developed from the original History ECTS Subject Area Group (which began work at the end of the 1980s). They had participated personally in developing over the years new tools to support the shift in higher education toward student-centred, competence-based learning, teaching and assessment.

During the initial stages of Tuning, we established a number of key competences important for History graduates, and described ways of forming them. The definitions we gave made it necessary to define levels of achievement, whether 'expected', 'desired', or 'aspirational'. We formulated our ideas in terms of learning outcomes and competences, and elaborated a table of overarching 'cycle level indicators' or 'descriptors'. Because History often constitutes a component of other degree programs, we also elaborated descriptors for single courses and for history minors, as well as majors.

With this background, it was fairly easy to reformulate the History descriptors in accordance with the QF for the EHEA: at that time, however, we were dealing only with very general descriptors at the degree programme level. More work was done in the HUMART project, which led to the formulation of a Sectoral Qualifications Framework for the Humanities, as well as a specific one for History. These frameworks were informed by both the EQF for LLL and the QF for the EHEA. They incorporated the new tool of 'dimensions', thus permitting a more complex and detailed mapping of levels, using the categories of Knowledge, Skills and Competences (the latter defined as level of autonomy and responsibility). The HUMART frameworks provided an advanced starting point for the History Subject Area Group in the CALOHEE project. CALOHEE gave its members the arduous task of finding out whether it is possible to measure and compare levels of achievement of students in different countries and institutions in a fair and sensitive way.

History is the litmus test: as a disciplinary area, it is tightly and often controversially linked to specific national, cultural and political understandings and contexts. This means that the SAG had to isolate the essential ways that historians are trained to think, approach problems, do research, and interact with other individuals and society – without specifying detailed content or subject matter.

The CALOHEE History SAG began by re-elaborating and refining the HUMART frameworks: first by considering carefully and critically the descriptors already developed for each dimension, modifying them when necessary; second, by breaking each of them down into a subset of descriptors and learning outcomes suitable as a basis for fair assessment in any country.

The critical revision of the HUMART frameworks was completed by all members working together on occasion of the plenary meetings (held in Pisa, Porto and Budapest), and circulating the materials between meetings. The materials were shared periodically by email with the Outer Circle. The members of the Inner Circle, coming from 14 countries and able to meet face-to-face, discussed, evaluated, reformulated and finally agreed on the level descriptors for first and second cycle degree programs. Then teams of two SAG members were assigned to develop a particular dimension: this entailed drafting subsets and sub-descriptors in the form of learning outcomes, and then presenting the drafts to the entire group for discussion and further elaboration. The resulting tables were shared and perfected, with the advice of Outer Circle members, and then sent to the several hundred historians who had been involved in Tuning or in the History Networks, both in Europe and in other continents. The latter were invited to consider the Frameworks carefully, judging their suitability for describing the defining features of any History degree course, without reference to specific contexts or content.

The many historians from around the world who responded all evaluated the Frameworks positively and consider them adaptable to their national and institutional context. Many made insightful suggestions on specific points. The CALOHEE Assessment Reference Frameworks for History degree programmes of the first and second cycle (EQF levels 6 and 7) are the result of this intense and complex international

collaborative effort.

The elaboration of an Assessment Reference Framework in the CALOHEE project has provided us with an important new tool for designing, revising and enhancing degree programmes in History and related disciplinary and thematic areas. It is the result of the intensive work of the History SAG, an international group of scholars experienced in Higher Education Reform, in the EHEA/Bologna Process, in Tuning, all of whom have also participated in the transnational European History Networks in various phases of their activity. They are also academics who have tested the findings of CALOHEE and the previous History Tuning projects in their daily practice of university teaching.

The new CALOHEE History Assessment Reference Framework is based on their previous work and experience, most directly on the work of the many SAGs (including History) involved in the HUMART project, which formulated an overarching sectoral framework for the Humanities. This sectoral framework was articulated according to the seven dimensions that appeared to be basic to any Humanities discipline. The CALOHEE SAG has used those same seven dimensions to set up a transnational, transcultural table of competence-based descriptors and learning outcomes for present-day History graduates at first or second cycle level.

We believe that this Assessment Reference Framework will prove useful in practice for educators, academics and administrative personnel involved in the design and delivery of degree programs and/or their components including single course units. In this Framework, we have made every attempt to identify the essential competences for History graduates, including those specifically related to the historian's craft, and those related to social responsibilities, ethical awareness and attitudes, and personal/interpersonal development. The Framework responds in several ways to new understanding and new concerns (or new levels of concern) regarding the role of historians in society.

First, the 'liberal arts' model of the educated person is being eroded to a greater or lesser degree in many countries. Whereas in previous decades in some countries a history degree was tightly linked to a career in teaching or research, in others it was accepted as a mainstream path to nearly any profession in government, politics, management, services and the media. Today to differing extents it has been replaced by a 'technocratic' model, in which specific training in Economics, Management and/or ICT may be required or preferred. At the same time, we begin to observe a backlash, as 'Silicon Valley' declares that 'Arts degrees' are again necessary, and the European Commission has decided to add an "(a)" for Arts to the so-called STEM disciplines.

Second, the role of historians in problematizing and propagating certain largely national readings of the past is well known. In an era of resurgent nationalisms, it becomes ever more imperative that students understand critically and reflexively the necessity of taking into account a variety of points of view in defining and addressing any historiographical question.

Third, for those graduates who will become professional historians it is essential that they be able to use the tools and adopt the mindset and the standards of the profession. At the same time, it is today obviously not sufficient to become highly specialized in a narrow field or theme: the broad understanding and historiographical culture must go hand in hand with precise and workmanlike abilities to penetrate single problems.

Fourth, the professional work of the historian is undergoing a sea change because of the impact of digital technologies. Today the researcher may be able to access a quantity of sources and bibliography in a single day that only decades ago would have required months or even years of travel and exploration of libraries and archives. This means that new techniques and abilities must be learnt and mastered along with the critical tools needed to evaluate the documentation.

These factors, and many others, have been taken into account in the CALOHEE History Assessment Reference Framework.

Using the Assessment Reference Frameworks in practice

The Subject Area Group of History is of the opinion that the Assessment Reference Framework can provide guidance in several ways. Since it has been reviewed and validated by several hundred experienced historians from countries around the world, but largely from Europe, we believe that it can be taken not as a recipe for revising or drawing up a degree program, but rather as a coherent set of suggestions against which an existing or new programme can be mapped and with which it can be compared.

A. **Checking** an existing degree programme. The academic staff responsible for an existing degree programme will easily be able to review the Assessment Reference Framework, to see which of the Learning Outcomes (the 'subsets') correspond to the competences the graduates of their programme will have. The specific subject matter will of course depend on the country, on the institution, and on the specific nature of the program. Still, it will be possible to identify particular strengths, gaps and lacunae, and consider whether the programme will benefit by revision.
B. **Revising** an existing degree programme or **developing** a new one. If the decision is taken to update an existing History programme, the previous mapping exercise will constitute the first step. Since the Framework provides quite a detailed although general view of what the output of a program should be, it can support the work of the academics and other stakeholders who will design the new programme. The general structure and contents of the programme can be established, and the single course units and other activities planned. Acting jointly, the organizers of the programme, working with the teachers involved, will consider the single subset items and check, but means of a matrix that all those desired are taken into account using appropriate learning strategies.
C. **Developing** a single course unit/module/other activity. An academic or group of academics responsible for organizing one or more single course units or components will be able to identify the Level Descriptor/s and subset items to be covered and interpret them in the context of the particular area that the course or the component addresses.

Examples of good practice in designing and articulating approaches to learning, teaching and assessment

A particularly important part of the work of the CALOHEE History SAG has been to ensure, so far as possible, the 'non-denominational' (i.e. transnational/poly-cultural) character of the Assessment Reference Framework. History is the most diverse of the Subject Areas with regard to the actual contents considered necessary in each national and institutional context. In order to make the Framework useful in any country, we have consciously avoided including references to specific topics or ways of conceptualizing the past.

The corpus of the work of the SAG and its predecessors, of which the References Points published with the Framework give an overview, has shown that the subject matter itself will differ vastly between degree programmes, according to the national culture and the research interests of the academic staff. The Reference Points furnish in detail numerous examples of competences and suggestions for aligned learning teaching and assessment strategies, which can be used as reference. Further examples for specific types of degree programmes (History of the EU and European Integration; World History; Regions and Frontiers, EU-Turkey Dialogue among others are also available among the Tuning publications.

We hope that this Assessment Reference Framework will be of interest to many, and that it becomes a useful tool for course design, delivery and enhancement across Europe.

The History SAG of the CALOHEE project,
Ann Katherine Isaacs and Gudmundur Halfdanarson

Assessment Reference Framework for History - First Cycle / LEVEL 6 EQF

DIMENSION 1: HUMAN BEINGS: CULTURES AND SOCIETIES			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_1. Level descriptor	**K6_1** **Demonstrate basic knowledge and critical insight into changes and continuities in human conditions, environment, experience, institutions, modes of expression, ideas and values in diachronic and synchronic perspective.**	**S6_1** **Drawing on knowledge of history, identify and define, with guidance, significant problems and areas of enquiry with respect to social and cultural interaction.**	**C6_1** **Apply historical knowledge and perspectives in addressing present day issues, bringing to bear analytical understanding and respect for individuals and groups in their personal, cultural and social dimension.**
Subset 1 L6_1.1 **Historical interpretation of changes and continuities**	K6_1.1 Show general acquaintance with diverse criteria of historical explanation and understanding on different time- and spatial scales. Demonstrate awareness of how explanations and interpretations are conceptualized.	S6_1.1 Formulate historical explanations and interpretations of phenomena and processes though comparison and differentiation using quantitative and qualitative methods.	C6_1.1 Recognize consistent interrelations concerning phenomena and processes of different nature and scale, at the same time showing awareness of their uniqueness.
Subset 2 L6_1.2 **Environmental transformations and knowledge development**	K6_1.2 Relate social and economic change to environmental transformations and to the accumulation/modification of knowledge.	S6_1.2 Describe the interaction between the natural environment and social change, on the one hand, and knowledge production on the other.	C6_1.2 Evaluate the impact of knowledge production and accumulation on society and the environment, and vice-versa.
Subset 3 L6_1.3 **Power relations and organization**	K6_1.3 Demonstrate knowledge about the development of power relations and how they shape collective organizations, institutions and representations of the world through conflict, negotiation, and adaptation.	S6_1.3 Recognize tools and mechanisms of power in societal and collective relations and their genesis, continuity and transformations in time.	C6_1.3 Contribute to discussions and debates on power relations and political organization in a broad sense, placing them in historical perspective.
Subset 4 L6_1.4 **Knowledge, culture, religious beliefs and practices**	K6_1.4 Demonstrate knowledge about modes of expression and transmission of knowledge and culture, including beliefs and practices concerning moral values, immaterial and transcendental concerns and narratives, and their dynamics.	S6_1.4 Describe different conceptual frameworks, symbolic representations and discourses that underpin and support collectively held beliefs and related practices	C6_1.4 Engage critically with the dynamics of collective beliefs and practices and how they are expressed by individuals and groups.
Subset 5 L6_1.5 **Intercultural encounters**	K6_1.5 Demonstrate knowledge about (inter-)cultural encounters and their consequences on every field of human activities and on personal and collective identities.	S6_1.5 Describe and illustrate different dimensions (e.g. social, economic, religious, and political) in cultural encounters via comparison and connections of specific cases, and be able to collaborate effectively in a multicultural context.	C6_1.5 Contribute to understanding and respect for individuals and groups in their personal, cultural, economic and political and social dimension; conduct critical appraisal of conflicting views and facilitate intercultural mediation.

Dimension 2: Texts and Contexts			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_2. Level descriptor	**K6_2** **Demonstrate knowledge and understanding of the main kinds of sources for historical research.**	**S6_2** **Identify, select with guidance, and present information from a variety of historical sources in an appropriate form.**	**C6_2** **Retrieve, manage and use information in order to formulate and address problems in their contexts using suitable methodologies.**
Subset 1 L6_2.1 **Source identification**	K6_2.1 Demonstrate knowledge of the main types of sources used for historical study (including oral history sources, statistical data, material evidence, etc.) and how and why they were produced.	S6_2.1 Identify, with guidance, the appropriate type of sources for a given purpose.	C6_2.1 Draw on a plurality of sources when defining and addressing a particular problem.
Subset 2 L6_2.2 **Source retrieval**	K6_2.2 Demonstrate knowledge of where and how historical data and sources can be accessed (archives, libraries, internet, repositories, etc.).	S6_2.2 Use inventories, catalogues, electronic resources and the like as appropriate to locate needed data and source material.	C6_2.2 Retrieve the relevant sources and data and organize them to address problems.
Subset 3 L6_2.3 **Source analysis**	K6_2.3 Demonstrate knowledge of the methodology of source analysis: how to read and understand a text, written or of another kind.	S6_2.3 Analyse texts of different kinds and evaluate their relevance with respect to a specific inquiry	C6_2.3 Critique groups of sources and evaluate their usefulness for addressing a specific problem.
Subset 4 L6_2.4 **Contextualization of source production and transmission**	K6_2.4 Demonstrate sensitivity to how the context (institutional, technical, archaeological and so forth) has determined the formation and preservation of the sources available today.	S6_2.4 Identify the context in which specific sources were created, disseminated and preserved.	C6_2.4 Present a set of data critically, describing the sources and the context of their production, selection and preservation.

Dimension 3: Theories and concepts			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_3 Level descriptor	**K6_3** **Collect knowledge about and classify a range of analytical, theoretical and methodological approaches relevant to history. Demonstrate orientation in the major themes of present historical debate and knowledge of world chronology.**	**S6_3** **Apply appropriate critical and methodological approaches to historical questions and societal issues.**	**C6_3** **Examine and explore historical and societal issues and processes using relevant theories and concepts.**
Subset 1 L6_3.1 **Working with theories and methods**	K6_3.1 Describe significant methodological approaches to history illustrating their implications and range of application.	S6_3.1 Apply appropriate theoretical and clear conceptual approaches to historical and societal issues.	C6_3.1 Explore and describe significant examples of the effects of using different theories and methodologies in historical research.

Subset 2 L6_3.2 **Historicizing concepts**	K6_3.2 Outline major current thematic and methodological trends in historiography, defining the key concepts associated with them.	S6_3.2 Analyse approaches, definitions of concepts and use of categories in significant works in one's field of interest.	C6_3.2 Explore critically and describe the changes in definition and understanding of key concepts used to address societal issues.
Subset 3 L6_3.3 **Periodization and other national and historiographical frameworks**	K6_3.3 Describe existing periodizations of history, their multiplicity and their dependence on specific national traditions, ideological frameworks and historical debate.	S6_3.3 Identify critical and methodological approaches to questions of periodization and national traditions.	C6_3.3 Connect explanations of historical and societal issues and processes to the conceptual and value frameworks in which they have developed.

DIMENSION 4: INTERDISCIPLINARITY			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_4 Level descriptor	**K6_4** **Demonstrate knowledge of the intellectual underpinnings and contexts of history in relation to other fields of study.**	**S6_4** **Utilise, when opportune, knowledge and understanding from other fields to address problems and issues in the historical domain.**	**C6_4** **Work with others in a multidisciplinary and/or multi-national settings when useful.**
Subset 1 L6_4.1 **Placing History in the context of the sciences**	K6_4.1 Demonstrate basic knowledge of the contributions of other sciences, particularly but not only the human and social sciences (e.g. cultural/social anthropology, sociology, philosophy, economy, cultural heritage studies, archaeology etc.) for history studies.	S6_4.1 Search for and identify appropriate data and insights presented by other human, social and/or natural sciences according to the problem dealt with.	C6_4.1 Describe the value of adopting different approaches to historical questions including those that derive from other disciplinary areas.
Subset 2 L6_4.2 **Working with methods of other social sciences and Humanities**	K6_4.2 Demonstrate initial knowledge on how selected method of other human and social sciences can contribute to history research (e.g. participant observation, interview, oral history, discourse, case study, statistical, economical methods etc.).	S6_4.2 Use appropriate methods from other sciences to collect and analyse information for specific research, applying them correctly.	C6_4.2 Contribute with one's historical knowledge, perspective and methodologies to the work of an interdisciplinary group.
Subset 3 L6_4.3 **Working with data produced by other disciplines or in other national contexts**	K6_4.3 Specify what information can be obtained and evaluated by using selected methods of other human and social sciences or using other national perspectives.	S6_4.3 Use properly information received employing methods from other human and social sciences and from other countries to address issues in the history domain.	C6_4.3 Recognize and describe the possibilities of an interdisciplinary and/or transnational approach to gathering data and evaluating it.

Dimension 5: COMMUNICATION			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_5 Level descriptor	**K6_5** **Demonstrate knowledge of the main means of communication used to convey information and perspectives in both academic and broader public contexts.**	**S6_5** **Write and speak correctly in one's own language according to the various communication registers (informal, formal, scientific).Understand the appropriate terminology and modes of expression of the field of history, also in a second language.**	**C6_5** **Demonstrate ability to listen to and understand different viewpoints, and discuss ideas, problems and solutions with diverse audiences. Participate in group-work, present information clearly and with appropriate terminology.**
Subset 1 L6_5.1 **Linguistic abilities**	K6_5.1 Demonstrate a reading knowledge of another language as appropriate to the field of study, in addition to an excellent knowledge of one's first language. If appropriate to the field this may include an ancient language.	S6_5.1 Read and assimilate information about the field of history in another language as appropriate to the field of study, in addition to one's first language.	C6_5.1 Conduct research on documentation in another language as appropriate to the field of study, in addition to one's first language. If appropriate to the field, this may include an ancient language.
Subset 2 L6_5.2 **Engaging with historical debate**	K6_5.2 Demonstrate sound knowledge of the characteristics and techniques of argument in historical debate.	S6_5.2 Engage in historical debate, identifying key schools of thought and offer solid, evidence-based arguments to support one's ideas.	C6_5.2 Engage in constructive debate on relevant societal issues using sound arguments based on historical evidence.
Subset 3 L6_5.3 **Engaging with different audiences**	K6_5.3 Show knowledge of the main qualities and features of oral and written communication by scholars and of the differences between scholarly and public communication, both oral and written.	S6_5.3 Demonstrate ability to produce and deliver a written and/or oral presentation of one's own research to audiences having varying degrees of knowledge, from basic to specialist.	C6_5.3 Convey specialist information, both oral and written, in forms and styles appropriate to scholarly and general audiences.
Subset 4 L6_5.4 **Digital communication**	K6_5.4 Demonstrate knowledge of main digital communication technologies.	S6_5.4 Use a general range of digital communication technologies acquire, elaborate and share knowledge with peers and others.	C6_5.4 Communicate in the digital environment with critical awareness of the potential implications of what is said, shown and to whom.
Subset 5 L6_5.5 **Effective group work**	K6_5.5 Demonstrate knowledge of the similarities and differences between an individual and group presentation and of the features of group work and discussion.	S6_5.5 Participate in a group discussion related to one's own field, make an individual presentation on one's own research, and collaborate in a group presentation on a topic from the discipline.	C6_5.5 Participate in group work taking different roles (e.g. leader, contributor, compiler, etc.); contribute to the group's shared knowledge and understanding and help present its findings effectively on a range of topics.

DIMENSION 6: INITIATIVE AND CREATIVITY			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_6 Level descriptor	**K6_6** **Knowledge of the on-going nature of historical research and debate and of how historians contribute to key areas of academic and public discussion.**	**S6_6** **Approach issues with curiosity, creativity and critical awareness; retrieve and handle information from a variety of sources (electronic, written, archival, oral) as appropriate to the problem, integrating it critically into a grounded argument.**	**C6_6** **Reflect on one's own perspective, capabilities and performance to improve and use them in a creative way. Think in scientific terms, pose problems, gather and analyse data, and propose findings.**
Subset 1 L6_6.1 **Critical and self-critical approach**	K6_6.1 Demonstrate knowledge of the background, processes and dynamics of particularly significant historical discussions and debates.	S6_6.1 Identify key contributions to and turning points in specific historical debates and discussions.	C6_6.1 Analyse one's pre-existing knowledge and opinions with respect to significant historical questions, and identify ways of exploring them in a scientific way.
Subset 2 L6_6.2 **Creative contribution to historical debate**	K6_6.2 Demonstrate knowledge of how an individual can contribute to historical debate and thus also to public discussion.	S6_6.2 Formulate original questions and hypotheses relating to a particular historical question and propose what data can be brought to bear on it.	C6_6.2 Contribute creatively and originally to an historical debate, presenting it, researching and bringing evidence to bear on it, in order to formulate tentative conclusions.
Subset 3 L6_6.3 **Initiative and public engagement**	K6_6.3 Demonstrate knowledge of public discussions relating to particular historical questions connected to one's specific area of knowledge.	S6_6.3 Retrieve and elaborate relevant information from a variety of sources (archival, print, online, other media) to address specific historical questions which appear relevant to the public debate.	C6_6.3 Analyse evidence and different perspectives in order to use historical knowledge correctly with respect to the public sphere.

DIMENSION 7: PROFESSIONAL DEVELOPMENT			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_7 Level descriptor	**K6_7** **Demonstrate knowledge of the intellectual bases and ethical aspects of historical studies and of the diverse contributions historians make to society.**	**S6_7** **Apply different methods, to stay up to date with learning. Work autonomously and in a team, taking initiatives and managing time.**	**C6_7** **Identify and/or create an appropriate study and/or work environment and participate effectively in it.**
Subset 1 L6_7.1 **Engaging with academic contexts**	K6_7.1 Demonstrate knowledge of the role of historiography in different intellectual and national contexts as well as classifications of different types of historical studies according to their complexity and target groups.	S6_7.1 Keep up to date about current developments in historical research and debates and direct one's knowledge so that it relates to ongoing debates.	C6_7.1 Identify a study opportunity for further education in order to increase one's qualification.

Subset 2 L6_7.2 **Historians' standards, mindset, and modus operandi**	K6_7.2 Demonstrate knowledge of historians' scholarly role, academic standards and ethical imperatives, including the taboo on plagiarism.	S6_7.2 Create a work-plan including time-management; collaborate with others, perform specific tasks and take own initiatives when appropriate.	C6_7.2 Identify or create appropriate initiatives or businesses in which historical skills can be useful.
Subset 3 L6_7.3 **Contribution of historians to society**	K6_7.3 Describe instances of how historical research or debates have affected societies in different times.	S6_7.3 Identify and describe examples of contributions to society by historians.	C6_7.3 Identify one's particular skills and abilities and experience how they can be beneficial for society or when applied in a work setting.

Assessment Reference Framework for History -Second Cycle / LEVEL 7 (EQF)

DIMENSION 1: HUMAN BEINGS - CULTURES AND SOCIETIES			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_1 Level descriptor	**K7_1** **Demonstrate broad knowledge and focused and analytical understanding of changes and continuities in human conditions, environment, experience, institutions, specific modes of expression, ideas and values in diachronic, synchronic and comparative perspective.**	**S7_1** **Draw on knowledge and experience of history to identify, define and formulate significant problems and areas of inquiry with respect to social and cultural interaction.**	**C7_1** **Utilise the critical and practical tools of historical knowledge to illuminate cultural and social phenomena. Contribute to understanding and respect for individuals and groups in their personal, cultural and social dimension.**
Subset 1 L7_1.1 **Historical interpretation of changes and continuities**	K7_1.1 Show broad and analytical experience in employing diverse criteria of historical explanation and understanding on different time- and spatial scales. Demonstrate focused awareness of how historical explanations and interpretations are conceptualized.	S7_1.1 Formulate, define and analyse historical explanations and interpretations of phenomena and processes though comparison and differentiation with a range of quantitative and qualitative methods.	C7_1.1 Recognize and critically explain consistent interrelations concerning phenomena and processes of different nature and scale, showing at the same time awareness of their uniqueness.
Subset 2 L7_1.2 **Environmental transformations and knowledge development**	K7_1.2 Relate social and economic change to environmental transformations and to the accumulation/modification of knowledge in a diachronic perspective and with analytical knowledge of specific cases.	S7_1.2 Describe and analyse the interaction between the natural environment and social change, on the one hand, and knowledge production on the other.	C7_1.2 Evaluate and explain the impact of knowledge production and accumulation on society and the environment and vice-versa, and apply this to public debate.
Subset 3 L7_1.3 **Power relations and organization**	K7_1.3 Demonstrate knowledge about and investigate analytically power relations and how they shape collective organizations, institutions and representations of the world through conflict, negotiation, and adaptation.	S7_1.3 Recognize and identify the tools and mechanisms of power in societal and collective relations and their genesis, continuity and transformations in time.	C7_1.3 Contribute to discussions and debates in order to explain and evaluate power relations in a broad sense, connecting current debates to the historical context.
Subset 4 L7_1.4 **Knowledge, Culture, religious beliefs and practices**	K7_1.4 Demonstrate complex knowledge about modes of expression and transmission of knowledge, culture, including beliefs and practices concerning moral values, immaterial and transcendental life, and their dynamics.	S7_1.4 Describe, analyse and explain different conceptual frameworks, symbolic representations and discourses that account for widely held religious beliefs and practices.	C7_1.4 Engage critically with the dynamics of collective beliefs and practices and investigate their impact on individuals and groups.
Subset 5 L7_1.5 **Intercultural encounters**	K7_1.5 Demonstrate specific knowledge about inter-cultural encounters and their consequences in	S7_1.5 Analyse and integrate different dimensions (e.g. social, economic, religious, political) in cultural encounters via comparison and connections of	C7_1.5 Utilise knowledge and experience in order to promote understanding and respect for individuals and groups in their personal,

	every field of human activities and identities in analytical and comparative perspective.	case studies. Be able to organize effective collaboration in a multicultural context.	cultural, economic, political and social dimensions, demonstrating both critical appraisal and skills of cultural mediation.

Dimension 2: TEXTS AND CONTEXTS			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_2 Level descriptor	**K7_2 Demonstrate focused knowledge and critical understanding of relevant data and sources for historical research and of their associated conceptual frameworks.**	**S7_2 Locate, select from a variety of sources and manage historical information and place it in its political, social and cultural context.**	**C7_2 Manage different information sources, analyse texts and data and discuss them in order to formulate and address problems in their contexts using advanced methodologies.**
Subset 1 L7_2.1 **Source identification**	K7_2.1 Show knowledge of the relevant sources (including archival material, historiographical contributions and debates) for one's chosen chronological period and thematic field of historical study.	S7_2.1 Identify the appropriate sources to address a historical research problem.	C7_2.1 Collect and categorize various kinds of data and bring together to address a research problem.
Subset 2 L7_2.2 **Source retrieval**	K7_2.2 Show precise and specific knowledge of how to access the relevant historical sources for one's chosen research theme.	S7_2.2 Use independently inventories, catalogues, electronic resources to locate needed data and source material.	C7_2.2 Retrieve information, manage gathered data and utilise it to contribute to historical debate.
Subset 3 L7_2.3 **Source analysis**	K7_2.3 Demonstrate knowledge of the relevant languages, writing systems and techniques necessary to read and analyse written or other kinds of texts.	S7_2.3 Apply the necessary techniques to analyse and understand relevant texts and other source materials.	C7_2.3 Conduct a well-founded analysis of the sources identified and use them perceptively to address defined problems.
Subset 4 L7_2.4 **Contextualizing source production and transmission**	K7_2.4 Demonstrate clear and nuanced awareness of how one's research materials have been formed and preserved.	S7_2.4 Identify the problems related to context in which one's research materials were created, disseminated and preserved.	C7_2.4 Manage information about the context in which sources were produced and preserved as part of one's research evidence.

DIMENSION 3: THEORIES AND CONCEPTS			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_3 Level descriptor	**K7_3** **Accumulate specialized knowledge and critical understanding of relevant analytical and methodological approaches relevant to history. Differentiate between the principal theoretical approaches to history, current debates and research orientations in the field.**	**S7_3** **Formulate an historical problem, analyse it with appropriate information and methodology, to arrive at a valid conclusion.**	**C7_3** **Design appropriate methodological approaches to historical and societal issues and processes.**
Subset 1 L7_3.1 **Working with theories and methods**	K7_3.1 Define correctly the key points of a theory/methodological approach and be able to identify its weak and strong points.	S7_3.1 Identify appropriate theories and methodologies to formulate or address an historical problem taking into account the available information.	C7_3.1 Design appropriate methodological approaches to explain and document societal issues related to one's research context.
Subset 2 L7_3.2 **Historicizing concepts**	K7_3.2 Investigate the thematic and methodological trends in historiography, and assess how categories and key concepts change according to research orientations and contemporary debates.	S7_3.2 Analyse definitions of concepts and manage them to construct significant formulations and explanations of historical problems.	C7_3.2 Appraise historical transformation of key concepts and categories critically and employ the results when investigating and offering explanation of societal issues.
Subset 3 L7_3.3 **Periodization and other national and historiographical frameworks**	K7_3.3 Clarify and illustrate how even the very definition of a historical problem depends on/reveals a specific theoretical or historiographical framework, being aware of the multiplicity and diversity of periodisation systems and of national traditions.	S7_3.3 Explain and apply critical and methodological approaches to questions of periodization and national traditions.	C7_3.3 Critically investigate how explanations on societal issues and processes have been formed and reconstruct the conceptual and value frameworks in which they have been developed.

DIMENSION 4: INTERDISCIPLINARITY			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_4 Level descriptor	**K7_4** **Show informed and critical awareness of the intellectual underpinnings and contexts of history and their relationships to other fields of study.**	**S7_4** **Utilise information and manage understandings, methodologies and tools from other fields to address problems and issues in the historical domain and present them to different audiences.**	**C7_4** **Participate in interdisciplinary, transdisciplinary and transnational groups in order to approach relevant problems from different points of view.**

Subset 1 L7_4.1 **Placing History in the context of the sciences**	K7_4.1 Demonstrate clear understanding of interconnection between history and other sciences, especially but not only human and social (e.g. social/cultural anthropology, sociology, philosophy, economy, cultural heritage studies, archaeology etc.).	S7_4.1 Choose the most appropriate field(-s) of human, social and/or other sciences to facilitate specific history research tasks.	C7_4.1 Approach the relevant problem from different points of view taking into account the plurality of disciplinary and national traditions.
Subset 2 L7_4.2 **Working with methods of other social sciences and Humanities**	K7_4.2 Demonstrate informed experience on how selected method of other human and social sciences can contribute to history research (e.g. participant observation, interview, oral history, discourse, case study, statistical analysis, economical methods etc.).	S7_4.2 Select and use the appropriate method(-s) of human and/or social sciences in order to collect and analyse different data necessary for conducting specific historical research.	C7_4.2 Work effectively in an interdisciplinary group, helping to coordinate and deploy knowledge and insights from historical and other fields.
Subset 3 L7_4.3 **Working with data produced by other disciplines or in other national contexts**	K7_4.3 Demonstrate informed experience of what information can be obtained by using selected methods of other human and social sciences.	S7_4.3 Utilise the information obtained using different method(-s) from related sciences and present a coherent and relevant analysis to specialist and non-specialist audiences.	C7_4.3 Take into account interdisciplinary factors and the different articulation of disciplines in different national contexts to understand the ethical commitment and evaluate the data produced by researchers.

DIMENSION 5: COMMUNICATION			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_5 Level descriptor	**K7_5** **Demonstrate knowledge of the specific methods used to communicate information about one's field in scholarly / academic and public contexts.**	**S7_5** **Speak and write clearly and effectively in more than one language, using appropriate terminology, modes of expression, and registers of the discipline.**	**C7_5** **Listen to different viewpoints and discuss ideas, problems, and solutions with diverse audiences; participate actively and constructively in group work, within and outside one's own speciality: present complex ideas and information clearly, using appropriate terminology, modes of expression and academic conventions.**
Subset 1 L7_5.1 **Linguistic abilities**	K7_5.1 Demonstrate an active knowledge of one's own and a second language, and other languages as necessary for the chosen field including, where appropriate, ancient languages.	S7_5.1 Read texts relating to the field of history in a second language; and communicate one's historical knowledge in one's own and the second language (in written and spoken form).	C7_5.1 Conduct research in one's own and in a second or other languages as appropriate to the field; communicate effectively in one's first and a second language (writing and speaking).

Subset 2 L7_5.2 **Engaging with historical debate**	K7_5.2 Demonstrate advanced knowledge of the characteristics and techniques of sound argumentation in historical debate.	S7_5.2 Identify problems or interpretations debated in historiography for which one's research can offer useful evidence and insight. Compare and connect different schools of thought with their historical context.	C7_5.2 Bring one's research and reflection into relationship with existing historiography and debated historical issues, offering an original arguments based on expert use of evidence.
Subset 3 L7_5.3 **Engaging with different audiences**	K7_5.3 Demonstrate a thorough knowledge of the differences between scholarly and public communication, and of modes, qualities, and features of written and oral communication by scholars (including journal articles, monographs, chapters in edited collections, conference papers, research seminars, public and scientific lectures).	S7_5.3 Convey scholarly material with confidence and skill in a form tailored to a specific audience; compose a journal article suitable for scholarly publication, adapting contents, structure and style to suit the topic and the publishing requirements.	C7_5.3 Communicate effectively on a variety of topics in a range of written and oral forms; make confident, engaging and expert individual presentations to audiences having varying degrees of knowledge, from basic to specialist.
Subset 4 L7_5.4 **Digital communication**	K7_5.4 Demonstrate a thorough knowledge of digital and communication technologies and their uses.	S7_5.4 Use a wide range of technologies in a skillful and effective way to facilitate the communication of historical knowledge and research results.	C7_5.4 Employ advanced digital technologies to organize and enhance one's capabilities not only to communicate but also to conduct historical research.
Subset 5 L7_5.5 **Effective group work**	K7_5.5 Demonstrate thorough knowledge of the similarities and differences between an individual and group presentation and informed experience of the features of group discussion.	S7_5.5 Design and make an effective and engaging presentation of one's own research and the wider field to a group, answering questions and discussing implications to facilitate shared conclusions.	C7_5.5 Participate with skill and confidence in a group work and discussions, taking various roles ((e.g. leader, contributor, compiler, discussant, etc.), and contributing to defining results and communicating them effectively in appropriate forms.

Dimension 6: INITIATIVE AND CREATIVITY			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_6 Level descriptor	**K7_6** **Demonstrate detailed knowledge and understanding of a particular period/thematic domain and the methodologies and historiographical debates, contributing to innovative perspectives.**	**S7_6** **Formulate original interpretations of phenomena relevant to a particular period/thematic domain, comparative perspective; plan, complete and deliver an individual research-based contribution to historiographical knowledge bearing on a significant problem.**	**C7_6** **Build on one's strengths and weaknesses optimizing the former to deal with relevant problems in an original manner; organize complex efforts integrating the results of diverse studies and analyses and producing the required product according to**

			established deadlines.
Subset 1 L7_6.1 **Critical and self-critical approach**	K7_6.1 Demonstrate detailed knowledge and understanding of particular periods and historical debates, reflecting on the evidence and contributing new ideas and hypotheses.	S7_6.1 Formulate original interpretations of phenomena relevant to particular periods with awareness of key contributions to and turning points in historical debates.	C7_6.1 Optimize analytic and creative strengths to design and carry out an original project based on scientific analysis.
Subset 2 L7_6.2 **Creative contribution to historical debate**	K7_6.2 Demonstrate detailed knowledge and understanding of a particular thematic domain and its methods, and pose new questions about it.	S7_6.2 Formulate original interpretations of phenomena relevant to particular thematic domains and methods, and indicate what data or sources can support them.	C7_6.2 Organize complex research efforts and produce results according to requirements and on time.
Subset 3 L7_6.3 **Initiative and public engagement**	K7_6.3 Demonstrate detailed knowledge and understanding of particular historiographical debates and public discussions and ability to connect them in an original way.	S7_6.3 Plan, complete, and deliver a contribution to historiographical knowledge of a significant problem, bringing to bear on it a deep understanding of its relevance in the public debate.	C7_6.3 Handle complex data to formulate original scientific interpretations of phenomena relevant to public debate on societal issues.

DIMENSION 7: PROFESSIONAL DEVELOPMENT			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_7 Level descriptor	**K7_7** **Show knowledge of the concrete ways which the historical perspective can be developed in professional situations and be of benefit to society.**	**S7_7** **Work effectively individually and in a team to complete specific tasks relating to the discipline (gathering and treating data, developing analyses, presenting results); organise complex projects and carry them out over a period of time, producing the required result on schedule; update one's knowledge and organize on-going learning.**	**C7_7** **Plan one's on-going learning in order to adapt to employment opportunities and develop its range, while maintaining the standards required for scientific research and publication including critical awareness and intellectual honesty.**
Subset 1 L7_7.1 **Engaging with academic contexts**	K7_7.1 Demonstrate knowledge and experience about the place of the study of history in different intellectual, national and social contexts, as well as classifications of different types of historical studies.	S7_7.1 Keep up to date with current developments in historical research and debates and work in academic teams to conduct historical research within structured research projects.	C7_7.1 Plan and implement an own learning-process in order to increase one's qualifications and update one's scientific knowledge.
Subset 2 L7_7.2 **Historians' standards, mindset, and modus**	K7_7.2 Demonstrate knowledge of historians' professional standards; of how to keep up to date (with books, articles, sources, databases),	S7_7.2 Gather and manage complex data, develop autonomous research projects relating to history, organize, meet deadlines and take initiatives in	C7_7.2 Valorise one's own skills and identify the competences needed in order to develop a range of employment opportunities.

operandi	and of academic standards and ethics.	research teams, producing the required results on schedule.	
Subset 3 L7_7.3 **Contribution of historians to society**	K7_7.3 Demonstrate broad knowledge about methods to evaluate historical information that has impact on society.	S7_7.3 Present results according to the particular audience, managing with tact and empathy controversial issues dealing with diversity (social, ethical, gender etc.)	C7_7.3 Increase one's range of experience and qualifications in order to identify and promote opportunities in which historical skills would be useful.

4.4. Nursing

Introduction to the Assessment Reference Frameworks for Nursing

This Assessment Reference Framework is one of the outcomes of the work done by the Subject Area Group (SAG) in **Nursing** which was established in the context of the CALOHEE project. In our earlier work we had identified five domains within which the competences were organised in the first and second cycles. These domains naturally became the dimensions of the Assessment Reference Framework because they had been validated, adopted and adapted in many countries. The dimensions were:

1. Professional values and role of the nurse.
2. Nursing practice and clinical decision-making.
3. Knowledge and cognition necessary for professional practice.
4. Communication and interpersonal competences.
5. Leadership, team working and management.

Within this project, the original competences were refined to reflect changes in legislation and developments in health care. The original categorisation retained its validity and facilitated the alignment between competences, assessment and learning and teaching strategies. Each individual competence was then articulated as a learning outcome and analysed to reflect the associated knowledge, skills and wider competences. We do stress however, that this reductionist approach does not always align with the reality of practice, where the role of the nurse is to exercise their competence in a holistic, ethical and applied manner. While assessments can isolate elements of knowledge, when it comes to higher order practice, it is the application and decision-making competences that become most important. As a consequence of our analysis we developed a model of *enacted competence* which took account of scope of practice, governance and regulation and culture and context in the reality of nursing practice (Gobbi and Kaunonen, 2018).

With respect to the Civic, Social and Cultural engagement competences, they were naturally aligned within the nursing competences in an integrated manner embedded across several competences and domains. For the purposes of explanation and simplicity, we indicated where the strongest correlation of civic competences was located.

Assessment strategies were varied and drew on a range of strategies, both alone and in combination, depending on the nature of the competence (e.g. values, knowledge, communication, teamwork, skills and decision making). The strategies would also need to take account of the developmental phase of the student/registered nurse, for example first year nurse compared with third year nurse or specialist nurses/advanced practitioners.

The approaches and strategies for assessment, learning and teaching that are thought (most) appropriate to achieve the defined learning outcomes, have been added to the table for each subset or sub-dimension.

Feedback from stakeholders confirmed the importance of real time, situated assessment.

We hope that this Assessment Reference Framework will be of interest to many, and that it becomes a useful tool for course design, delivery and enhancement across Europe.

The Nursing SAG of the CALOHEE project,
Mary Gobbi and Marja Kaunonen

Assessment Reference Framework for Nursing - First Cycle / LEVEL 6 (EQF)

Dimension 1: Professional values and the role of the nurse			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_1. Level descriptor	**K6_1** **The professional, moral, ethical and/or legal principles, dilemmas and issues in day-to-day-practice.**	**S6_1** **The ability to respond appropriately and effectively to professional, moral, ethical and/or legal dilemmas and issues in day to day practice.**	**C6_1** **Within the scope of his/her professional practice and accountability, the ability to adjust their role to respond effectively to population/patient needs. Where necessary and appropriate can challenge current systems to meet population/patient needs.**
Subset 1 L6_1.1 **Practise within the context of professional, ethical, regulatory and legal nursing codes.**	K6_1.1 Identifies professional, moral, ethical and/or legal dilemmas and issues in day-to-day practice.	S6_1.1 Demonstrates the ability to respond appropriately and effectively to professional, moral, ethical and/or legal dilemmas and issues in day-to-day practice.	C6_1.1 Within the scope of his/her professional practice and accountability, demonstrates the ability to adjust their role to respond effectively to population/patient needs. Where necessary and appropriate is able to challenge current systems to meet population/patient needs.
Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of professional, ethical, regulatory and legal nursing codes. MCQ/OSCE, case study report. **Exemplar – indicators, suggestions** Through case study/practice can provide examples of professional, moral, ethical and/or legal dilemmas in practice. Can identify issues that are not case specific and refer to relevant theories and/or legal frameworks.	Theoretical and/or clinical assessment of skills to respond appropriately and effectively to professional, moral, ethical and/or legal dilemmas and issues in day-to-day practice. OSCE, MCQ, practical demonstration (skills lab/ or in clinical practice). **Exemplar – indicators, suggestions** Through case study/practice can provide concrete examples of how to respond to professional, moral, ethical and/or legal dilemmas in practice.	Theoretical and/or clinical assessment of ability to recognize and challenge current systems/policies in order to meet population/patient needs. Case Study, Debate, Problem Solving Discussion. **Exemplar – indicators, suggestions** Through case study/practice demonstrates an understanding of the different roles of the nurse (in response to different actors –patient, family, HCP etc.) in responding to professional, moral, ethical and/or legal dilemmas in practice.
Learning approaches	Theoretical and/or clinical.	Theoretical, clinical and/or reflection.	Theoretical, clinical and reflection.
Teaching approaches	Exposure to professional practice, requirements and standards, ethical, regulatory and legal codes.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or case study of health care systems and populations.

Subset 2 L6_1.2 **Accept responsibility for his/her own professional development and life-long learning**	K6_1.2 Knows the different roles, responsibilities and functions of a nurse.	S6_1.2 Uses evaluation as a way to reflect and improve upon his/her performance so as to enhance the quality of service delivery and inform their development as life-long learners.	C6_1.2 Shows awareness of the scope of his/her professional practice and accountability.
Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of the different roles, responsibilities and functions of the nurse. Case study report. Reflective essay. **Exemplar – indicators, suggestions** Through written case study and reflection demonstrates knowledge of the different roles, responsibilities and functions of a nurse.	Theoretical and/or clinical assessment of the quality of service delivery and their development as life-long learners. Case study report. Reflective essay. **Exemplar – indicators, suggestions** Through written case study and reflection demonstrates an understanding of the importance of engaging in professional development and life-long learning.	Theoretical and/or clinical assessment of ability to recognize the scope of his/her professional practice and accountability. Case study, Debate, Problem solving discussion. **Exemplar – indicators, suggestions** Through written case study and reflection demonstrates an understanding of the importance of engaging in professional development and life-long learning.
Learning approaches	Theoretical and/or clinical.	Theoretical, clinical and reflection.	Theoretical, clinical and reflection.
Teaching approaches	Exposure to the different roles, responsibilities and functions of a nurse.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or case study.
Subset 3 L6_1.3 **Educate, facilitate, promote, support and encourage the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death**	K6_1.3 Demonstrates knowledge of the issues pertaining to the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	S6_1.3 Demonstrates the ability to use education, facilitation, and health promotion to support and encourage the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	C6_1.3 Shows awareness of the role of the nurse in, and of the value of health promotion and education for populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.
Assessment approaches	Theoretical and/or clinical assessment of knowledge of the issues pertaining to the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	Theoretical and/or clinical assessment of skills to engage in education, facilitation, and health promotion to support and encourage the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease,	Theoretical and/or clinical assessment of the role of the nurse, and awareness of the value of health promotion and education for populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.

	Case Study Report. Reflective Essay. **Exemplar – indicators, suggestions** Through written case study and reflection demonstrates knowledge of the issues pertaining to the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	disability or death. Case Study Report. Reflective Essay. **Exemplar – indicators, suggestions** Through written case study and reflection demonstrates an ability to engage in education, facilitation, and health promotion initiatives that support and encourage the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	Case Study, Debate, Problem solving Discussion. **Exemplar – indicators, suggestions** Through written case study and reflection demonstrates an understanding of the professional values and role of the nurse. Also demonstrates an understanding of the theoretical and/or clinical assessment of the role of the nurse, and an awareness of the value of health promotion and education for populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.
Learning approaches	Theoretical and/or clinical.	Theoretical, clinical and reflection	Theoretical, clinical and reflection.
Teaching approaches	Exposure to the issues pertaining to the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or exemplars of health promotion practice and education.

Dimension 2: Nursing practice and clinical decision making			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_2. Level descriptor	**K6_2** **The principles, concepts, practises and procedures that underpin the practice and decision making of daily nursing practice.**	**S6_2** **The ability to make, and enact, clinical decisions within their Scope of Practice. The ability to fulfil the Scope of Practice articulated at national and European level. The ability to be a reflective practitioner.**	**C6_2** **Can reflect upon societal and population health and social needs, contributing as appropriate to policy making. Familiar with cultural competence. Has technical skills that can be utilised in the public space.**
Subset 1 L6_2.1 **Perform comprehensive and systematic assessments**	K6_2.1 Knowledgeable about frameworks/tools used for assessment of, physical, social, cultural, psychological, spiritual and environment factors.	S6_2.1 Demonstrates the ability to undertake comprehensive and systematic assessments using the tools/frameworks appropriate to the patient/client taking into account relevant physical, social, cultural, psychological, and spiritual and environment factors.	C6_2.1 Demonstrates the ability to recognize and interpret signs of normal and changing health/ ill health, distress, or disability in the person (assessment/diagnosis).Demonstrates the ability to undertake an effective risk assessment and take appropriate actions.

Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of professional, ethical, regulatory and legal nursing codes. MSQ/OSCE case report, round table discussion. **Exemplar – indicators, suggestions** Demonstrates knowledge of types of assessment frameworks/tools that can be used to holistically explore and understand the patient/client's needs. Is aware of different tools and methods of collect information.	Theoretical and/or clinical assessment of skills to respond appropriately and effectively to professional, moral, ethical and/or legal dilemmas and issues in day-to-day practice. Case study, report, practical demonstration simulation, clinical placement. **Exemplar – indicators, suggestions** Demonstrates the relevant clinical, cognitive and communication skills that are required to holistically assess the patient/client's needs.	Theoretical and/or clinical assessment of ability to recognize and challenge current systems/policies in order to meet population/patient needs. Simulation, clinical placement, case study, patients report, problem solving discussion. **Exemplar – indicators, suggestions** Demonstrates the ability to recognise and interpret changing trends and distress, disability, or other critical situation and based on local policies and professional standards, can correctly identify the steps to take.
Learning approaches	Theoretical and/or clinical.	Theoretical, clinical and reflection.	Theoretical, clinical and reflection.
Teaching approaches	Exposure to varied clinical/ professional practice.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or case study of health care systems and populations.
Subset 2 L6_2.2 **Plan, deliver and evaluate appropriate and individualised programmes of care**	K6_2.2 Knowledgeable of classification diagnostic systems, interventions and outcomes.	S6_2.2 Demonstrates the ability to respond to patient/client needs by planning, delivering and evaluating appropriate and individualised programmes of care working in partnership with the patient/client, their careers, families and other health/social workers.	C6_2.2 Able to adapt to specific patients, healthcare environments and systems. Demonstrates the ability to inform, educate and supervise patient/carers and their families.
Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of the different roles, responsibilities and functions of the nurse. MSQ/OSCE. **Exemplar – indicators, suggestions** Demonstrates the ability to plan, deliver and evaluate individualised programmes of care at both a theoretical and clinical level. Can identify the different modalities, and their capacity/	Theoretical and / or clinical assessment of skills to evaluate understanding, analytical and decision making processes. Case study, report, practical demonstration simulation, hospital training. **Exemplar – indicators, suggestions** Demonstrates the relevant clinical and thinking skills that are required to plan, deliver and evaluate individualised programmes of care within the clinical setting. Can select the best	Theoretical and/or clinical assessment of ability to recognize and challenge current systems/policies in order to meet population/patient needs. Case study, clinical practical exam, report, SIMLAB, hospital training. **Exemplar – indicators, suggestions** Demonstrates the ability to identify and apply evidence-based protocols that are relevant to the patient context. Demonstrate holistic attitude.

	importance/complications etc. as they relate to patient care.	way in the practice in reflection for patient's needs.	
Learning approaches	Theoretical and/or clinical.	Theoretical clinical and reflection.	Theoretical, clinical and reflection.
Teaching approaches	Exposure to varied clinical/ professional practice.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or case study of health care systems and populations.
Subset 3 L6_2.3 **Effectively search, access, interpret, utilise and evaluate clinical data (research) effectively**	L6_2.3 Knowledgeable of research ethics and methods Demonstrates knowledge of reliable sources of clinical data and theories of assessment, interpretation and application of data to the clinical situation.	S6_2.3 Demonstrates the ability to critically question, evaluate, interpret and synthesise a range of information and data sources to facilitate patient choice and make sound clinical judgments to ensure quality standards are met and practice is evidence based.	C6_2.3 The ability to adhere to the ethical and legal parameters of a context to enhance and advance nurse practice Using nursing skills, medical devices and interventions/activities to provide optimum care, demonstrates the ability to respond to a person's needs throughout the life span and health/illness experience e.g. pain, life choices, revalidation, invalidity or when dying.
Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of professional, ethical, regulatory and legal research practice of a context. MCQ/OSCE, thesis work, project work, clinical training, research, literature analysis. **Exemplar – indicators, suggestions** Demonstrate knowledgeability and capacity in exploration and evaluation of clinical data, of professional, ethical, regulatory and legal research study' results, they are bridging to practice.	Theoretical and/or practical assessment of skills associated with carrying out and applying research in an appropriate and effective manner, which is professional, moral, ethical and/or legal in any context. MSC/OSCE, thesis work, project work, clinical training, research, literature analysis. **Exemplar – indicators, suggestions** Demonstrate capacity in participation in research studies, in exploration of clinical reliability of researching, demonstrate knowledgeability in applying of evidence based standards , in their complexity with professional, moral, ethical challenges.	Theoretical and/or practical assessment of skills associated with carrying out and applying research in an appropriate and effective manner which is professional, moral, ethical and/or legal in any context. MSC/OSCE, thesis work, project work, clinical training, research, literature analysis. **Exemplar – indicators, suggestions** Commitment to process effective professional, holistic assessment, taking into account the professional, ethical, moral, legal context.
Learning approaches	Theoretical.	Theoretical and practical (the principles of the collection, analysis and use of data/ evidence).	Theoretical and practical (the principles of the collection, analysis and use of data/ evidence).

Teaching approaches	Theoretical.	Theoretical and practical (the principles of the collection, analysis and use of data/ evidence).	Theoretical and practical (principles of the collection, analysis and use of data/ evidence).
Subset 4 L6_2.4 **Using nursing skills, medical devices, appropriate technology, interventions/activities to provide optimum care, and to inform and educate the patient/carer and families**	K6_2.4 Knowledge of (1) what and how to use appropriate equipment and technology and (2) how to communicate effectively with patients for care delivery and education.	S6_2.4 Be able to use equipment and technology in a manner which is consistent with optimal physical and personal needs, organisation needs such as infection control and safe practice and respecting patient dignity, advocacy and confidentiality using appropriate communication channels.	C6_2.4 Able to determine one's learning needs and to address them effectively through life-long learning engagement in order to keep up with advancements in nursing practices, care and systems.
Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of professional, ethical, regulatory and legal research practice of a context in view of (1) using technology in planning, delivering and evaluating care and in view of (2) communicating effectively in any professional context. Written/oral exam, MCQ/OSCE, SIMLAB. **Exemplar – indicators, suggestions** Demonstrate knowledgeability and capacity in decision making what and how to use appropriate equipment and technology and how to communicate effectively with patients for care delivery and education.	Theoretical and/or practical assessment of skills associated with using technology in all aspects of care planning, delivery and evaluation and in the assessment of communication skills, in an effort to secure an appropriate and effective manner, which is professional, moral, ethical and/or legal in any context. Case study, clinical training, SIMLAB, practice. **Exemplar – indicators, suggestions** Prove capacity to use technological equipment (e.g. indication, contraindication, complication), to recognize their limitations and their role in nursing process. Communicate with professional and non-professional partners (e.g. how to use your orthosis).	Theoretical and/or practical assessment of skills associated with using technology in all aspects of care planning, delivery and evaluation and in the assessment of communication skills, in an effort to secure an appropriate and effective manner which is professional, moral, ethical and/or legal in any context. Case study, clinical training, SIMLAB, practice. **Exemplar – indicators, suggestions** Commitment to quality assurance, and keeping regulation in technological discipline.
Learning approaches	Theoretical.	Theoretical and practical. (re the use of technology) and (re effective communication).	Theoretical and practical. (re the use of technology) and (re effective communication).
Teaching approaches	Theoretical.	Theoretical and practical. (use of technology) and (effective communication).	Theoretical and practical. (use of technology) and (effective communication).

Dimension 3: Knowledge and cognitive competencies			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_3. Level descriptor	**K6_3** **Nursing theories, knowledge and concepts of health, ill health, well- being, The humanities, arts and sciences necessary to understand human behaviour, body functioning and adaptive responses in different cultures and contexts.**	**S6_3** **The ability to evaluate evidence and apply this evidence to individual clients, populations and cultures so as to deliver effective nursing care in a timely manner.**	**C6_3** **Aware of the impact of globalisation, particularly with respect to migration of staff and patients and their health and well- being. Knows how to contribute in the public /civic space during emergency or disaster situations.**
Subset 1 L6_3.1 **Current and relevant knowledge of the research process and current nursing research that can be appropriately applied to nursing actions and nursing activities to provide nursing care that is rigorous and evidence based**	K6_3.1 Demonstrates current and relevant knowledge of different types of research methodologies and methods (quantitative and qualitative) and how to use evidence based practice.	S6_3.1 Able to search relevant research literature from databases containing natural and life sciences and Social, health and behavioural sciences. Able to design a research project	C6_3.1 Able to apply relevant research knowledge into own clinical practice.
Assessment approaches	Theoretical and/or clinical assessment of knowledge of research methods. MCQ/OSCE, short answer questions, identifying research strategies/ methodologies from research reports. **Exemplar – indicators, suggestions** BA: can identify research methodology and methods from a published article. Can describe how levels of evidence are used in clinical guidelines.	Theoretical and/or clinical assessment of ability to develop search strategy and undertake a search in databases containing natural and life sciences and Social, health and behavioural sciences. Write a basic CAT. **Exemplar – indicators, suggestions** BA: can find relevant articles using key words generated from a clinical research question (for example by using a PICO). Able to identify elements in a research project and take part in the research process.	Theoretical and/or clinical assessment of the role of the nurse in research and awareness of the value of practicing evidence based nursing. Clinical evaluation, use of evidence applied to a patient in a clinical situation. **Exemplar – indicators, suggestions** BA: uses evidence based clinical protocols and procedures in clinical practice.
Learning approaches	Theoretical and/or clinical research based practice.	Theoretical and/or clinical research based practice**.**	Theoretical and/or clinical research based practice.

Teaching approaches	Exposure to the issues of research paradigms, design, samples, tools to collect and analyse data.	Exposure to research based practice and methods used.	Exposure to research based practice and/or exemplars of research.
Subset 2 L6_3.2 **Current and relevant knowledge of theories related to personal and professional development so as to enhance their professional practice**	K6_3.2 Demonstrates current and relevant knowledge of theories related to personal and professional development so as to enhance their professional practice.	S6_3.2 Demonstrates the ability to problem solve and apply theories about decision making and conflict that can be appropriately applied to nursing practice,	C6_3.2 Demonstrates current and relevant knowledge of ethical theory, law and humanities that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty within the scope of practice.
Assessment approaches	Theoretical and/or clinical assessment of knowledge of the theories of nursing and nursing practice.	Theoretical and/or clinical assessment of ability to apply theories to nursing practice.	Theoretical and/or clinical assessment of the role of the nurse and awareness of the value of theories developed for and derived from nursing practice.
Learning approaches	Theoretical and/or clinical theory driven practice.	Theoretical and/or clinical theory driven practice.	Theoretical and/or clinical assessment of the role of theories for practice.
Teaching approaches	Exposure to theories of nursing and nursing practice.	Exposure to clinical practice and theories.	Exposure to relevant theoretical knowledge of nursing.
Subset 3 L6_3.3 **Current and relevant knowledge of the theories of nursing and nursing practice that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty**	K6_3.3 Demonstrates current and relevant knowledge of theories related to personal and professional development so as to enhance their professional practice.	S6_3.3 Can appropriately apply theories of personal and professional development, including the use of technology and health care informatics in order to support nursing practice	C6_3.3.c Demonstrates current and relevant knowledge of international and national policies that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty, including when, with who and where to apply different health care technologies.
Assessment approaches	Theoretical and/or clinical assessment of knowledge of theories concerning the nature and challenge of professional practice.	Theoretical and/or clinical assessment of ability to apply knowledge of technology and health care informatics into nursing practice.	Theoretical and/or clinical assessment of the role of the nurse and awareness of challenges in relation to professional nursing practice.
Learning approaches	Theoretical and/or clinical evidence based practice.	Theoretical and/or clinical evidence based practice.	Theoretical and/or clinical evidence based application of different health care technologies.
Teaching approaches	Exposure to clinical knowledge of nursing care.	Exposure to clinical evidence based practice.	Exposure to relevant knowledge of nursing care.

Dimension 4: Communication and interpersonal competencies			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_4. Level descriptor	**K6_4** **The art and science of communication in a range of circumstances with individuals, groups and populations in a digital age.**	**S6_4** **Communicating effectively with diverse peoples and abilities in a range of settings using appropriate media.**	**C6_4** **Can communicate with lay and professional groups with an appreciation of (P) political contexts.**
Subset 1 L6_4.1 **Communicate effectively**	K6_4.1 Identifies different communication strategies with patients, families and team members, including those with communication difficulties.	S6_4.1 Demonstrates the ability to enable patients and their carers to express their concerns and worries and can respond appropriately e.g. emotional, social, psychological, spiritual or physical worries, responding appropriately and respecting the patient's perspective.	C6_4.1 Uses holistic approach in communication according to individual needs. Demonstrates the ability to give emotional support and identify when specialist counselling or other interventions are needed.
Assessment approaches	Theoretical and/or clinical assessment of knowledge of different communication techniques (verbal and non-verbal communication, listening techniques…) Short answer questions, case study report. **Exemplar – indicators, suggestions** Student demonstrates knowledge of active listening, 'Ask-tell-ask', 'chunking and checking' techniques to communicate and check communication.	Theoretical and/or clinical assessment of using different communication techniques. Clinical Assessment by a Mentor. **Exemplar – indicators, suggestions** Student communicates effectively in the clinical setting as indicated by patient satisfaction, 'compliance' with treatment/or documentation of refusal. Communicates effectively in the team	Ability to apply holistic approach in communication (empathy, respecting of differentialities…). Clinical Assessment by a mentor, patient evaluations. **Exemplar – indicators, suggestions** Student follows-up cues of emotional needs, provides emotional support/refers to appropriate services
Learning approaches	Theoretical and/or clinical learning of different communication techniques.	Theoretical and/or clinical learning of using different communication techniques. Ability to retrieve and apply information independently.	Ability to recognise and challenge different communication needs of patients, families and team members. Use of different technologies or resources.
Teaching approaches	Verbal and non-verbal communication. Listening techniques. Social cultural peculiarities in communication.	Exposure of different communication strategies (verbal and non-verbal communication, various communication methods, …).	Practice to empower individuals, families and groups.

	Collaboration and teamwork. Delegation of activities.		Practice to recognize, identify and manage challenging behaviour and/or social/cultural differences.
Subset 2 L6_4.2 **Use a range of communication techniques to promote patient's wellbeing**	K6_4.2 Identifies different communication strategies with patients, families and team members. Understands the impact of anxiety, stress and depression on communication.	S6_4.2 Demonstrates the ability to appropriately use counselling skills to promote patient well-being; demonstrates the ability to identify and manage challenging behaviour.	C6_4.2 Uses a range of communication techniques to promote patient's wellbeing. Demonstrates the ability to identify and use opportunities for health promotion and health education activities.
Assessment approaches	Theoretical and/or clinical assessment of knowledge of communication strategies. Role-play/video role-play demonstrating skills. **Exemplar – indicators, suggestions** Can describe strategies to communicate with people with learning difficulties, hearing impairment, dementia etc. Can explain how mental health problems (acute and/or chronic) can affect communication.	Theoretical and/or clinical assessment of using a range of communication techniques. Clinical assessment by a mentor. **Exemplar – indicators, suggestions** Works with patients and families to identify needs and where possible uses basic counselling techniques to support patients and families' well-being. Demonstrates de-escalation techniques where necessary.	Ability to apply holistic approach in communication (empathy, respecting of differentialities, …). Based on a case-study, clinical experience can identify opportunities for health promotion/ harm reduction. **Exemplar – indicators, suggestions** Student uses opportunities for health promotion (harm reduction, lifestyle changes) where appropriate.
Learning approaches	Theoretical and/or clinical learning of communication strategies.	Theoretical and/or clinical learning of using a range of communication techniques.	Practice to recognise and challenge different communication needs of patients, families and team members. Use of different technologies or resources.
Teaching approaches	Verbal and non-verbal communication. Listening techniques. Social cultural peculiarities in communication. Collaboration and teamwork. Delegation of activities. Health care promotion and education.	Exposure of different communication techniques. Practice to communicate comprehensively and professionally. Practise recognising, identifying and managing challenging behaviour and/or social/cultural differences.	Practice to empower individuals, families and groups. Practice to recognize, identify and manage challenging behaviour and/or social/cultural differences. Practice using of different means for teaching.

	Counselling. Teaching (for example: practical skills such as stoma care).	Practice empower wellbeing of individuals, families and groups. Practice counselling individuals, families and groups. Practice transfer knowledge.	Apply different learning strategies according to individual needs (ability, age, disability, readiness…). Practice choosing right timing and optimal environment. Teamwork.
Subset 3 L6_4.3 **Accurately report, record, document and refer care using appropriate technologies**	K6_4.3 Identifies different means to accurately report, record, document and refer care using appropriate technologies.	S6_4.3 Demonstrates the ability to accurately report, record, document and refer care using appropriate technologies.	C6_4.3 Accurately uses appropriate technology to report, record, document and refer care and communicate in the public space.
Assessment approaches	Theoretical and/or clinical assessment of knowledge accurately report, record, document and refer care using appropriate technologies. Practical test using technology, clinical assessment. **Exemplar – indicators, suggestions** Where communication technologies are used (e-medical records, nursing records, recording parameters, tracking medication…), can demonstrate a basic understanding of systems in place after an initial training.	Theoretical and/or clinical assessment of accurately report, record, document and refer care using appropriate technologies. Practical test using technology, clinical assessment. **Exemplar – indicators, suggestions** Demonstrates an active understanding of systems in use and appropriate technologies.	Practise to accurately report, record, document and refer care using appropriate technologies. Practical test using technology, clinical assessment, feedback from end users/system administrators on accuracy. **Exemplar – indicators, suggestions** Safely and effectively documents parameters, care plan/given, medication, referrals etc. using the available communication technologies
Learning approaches	Theoretical and/or clinical learning of knowledge accurately report, record, document and refer care using appropriate technologies.	Theoretical and/or clinical learning of accurately report, record, document and refer care using appropriate technologies.	Practice to recognise different means to accurately report, record, document and refer care using appropriate technologies. Practice the use of different technologies or resources.
Teaching approaches	Use of electronic and non-electronic devices/resources. Data collection, recording, reference.	Exposure of different means to accurately report, record, document and refer care using appropriate technologies.	Practice to accurate report, record, document and refer care using appropriate technologies. Using of different means for teaching.

		Practice the use of electronic and non-electronic devices/resources. Practice the use of data collection, recording, reference. Ability to transfer knowledge.	Practice different learning strategies according to technologies. Teamwork.

Dimension 5: Leadership, management and team working			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_5. Level descriptor	**K6_5** **From the perspective of a new registrant, theories and models of leadership, followership, management and teams within health and social care contexts.**	**S6_5** **Able to lead and work collaboratively in clinical/health care teams. Able to supervise colleagues and junior staff.**	**C6_5** **Ability to work inter-culturally and inter-professionally with both lay and professional groups.**
Subset 1 L6_5.1 **Lead and co-ordinate a team (e.g. co-workers of a shift, care assistants)**	K6_5.1.a Is knowledgeable about nursing leadership theories, can refer to and work with relevant disciplines.	S6_5.1 Demonstrates understanding of own functions, ability to delegate and manage care appropriately.	C6_5.1 Understands structures, processes, roles and responsibilities of the employer/institution and employees (or if self-employed, own roles and responsibilities).
Assessment approaches	Theoretical and/or reflective assessment of knowledge of nursing leadership theories. **Exemplar – indicators, suggestions** Is able to advocate for a distinct division of labour according to recent research.	Theoretical, clinical and/or reflective assessment to demonstrate understanding of own functions and ability to delegate and manage care appropriately. **Exemplar – indicators, suggestions** Demonstrates ability to distribute the tasks of a team to achieve a set goal.	Theoretical, clinical and/or reflective assessment of ability to understand structures and processes of the employer/institution. **Exemplar – indicators, suggestions** Understands the division of labour according to professional education.
Learning approaches	Theoretical.	Theoretical and/or reflective.	Theoretical and/or reflective.
Teaching approaches	Review of nursing leadership theories.	Exposure to clinical practice and/or supervision.	Exposure to structures and processes of employer/institution.
Subset 2 L6_5.2 **Critically use tools to evaluate and audit care according to relevant quality standards**	K6_5.2 Knows approaches, methods and processes of quality control, rating and development.	S6_5.2 Is able to use, evaluate and audit care in accordance with current guidelines and professional standards.	C6_5.2 Demonstrates a fundamental understanding of quality management in the health care system, its financial background and importance for patients care.

Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of quality control, rating and development. **Exemplar – indicators, suggestions** Is able to advocate for proven tools to measure the outcomes of a certain procedure.	Theoretical and/or clinical assessment of skills to using, evaluating and auditing care in accordance with current guidelines and professional standards. **Exemplar – indicators, suggestions** Is skilled to use a set of tools to prove the quality of care according to recent research.	Theoretical and/or reflective assessment of understanding of the quality management in the health care system, its financial background and importance of patient care.| **Exemplar – indicators, suggestions** Is competent to describe the interrelation of quality and budget.
Learning approaches	Theoretical and/or clinical.	Theoretical and/or clinical.	Theoretical and/or reflective approach.
Teaching approaches	Exposure to professional practice of quality control, rating and development.	Exposure to clinical practice guidelines and audit.	Exposure to learning materials and clinical practice.
Subset 3 L6_5.3 **Awareness of the principles of health/social care funding and uses resources effectively**	K6_5.3 Understands theories of team working and personal development. Understands basic principles of local healthcare funding and access to resources.	S6_5.3 Demonstrates the ability to aim to achieve/support patient well-being through accessing/guiding (where appropriate) the combined resources and actions of members of the health/social care team.	C6_5.3 Is committed to using resources effectively while appreciating how health/social care funding influences the organization and delivery of care.
Assessment approaches	Theoretical and/or reflective assessment of understanding psychological theories of personal development. **Exemplar – indicators, suggestions** Can identify how the local service is funded, identify which primary resources (material, services, etc.) are available to support patient well-being, can describe basic roles in a team according to a well-known theory and identify own role within a team.	Theoretical and/or clinical assessment of skills to career plan for self, and assessment of understanding of other's one. **Exemplar – indicators, suggestions** Demonstrates through case study and/or clinical situations, the ability to make concrete suggestions/take actions to achieve patient well-being through using the resources available and the healthcare team.	Clinical and/or reflective assessment of commitment to use resources effectively while appreciating how health/social care funding influences the organization and delivery of care. **Exemplar – indicators, suggestions** Can explain how and which resources (human, material, capital) influence the organisation and delivery of care and options available to patients.
Learning approaches	Theoretical and/or reflective.	Clinical and/or reflective approach.	Theoretical and/or clinical (reflective approach).
Teaching approaches	Exposure to psychological theories of personal development.	Exposure to clinical practice.	Exposure to Theoretical and/or clinical practice.

Assessment Reference Framework for Nursing - Second Cycle / LEVEL 7 (EQF)

Dimension 1: Professional values and the role of the nurse			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_1. Level descriptor	**K7_1** **Within a global context, can identify future trends and challenges with respect to the professional, moral, ethical and/or legal principles, dilemmas and issues in day to day practice within a global context.**	**S7_1** **Exhibits autonomy and leadership in the management and supervision of contemporary challenges in nursing and health care practice.** **Works at the boundaries of the Scope of Practice, which may be extended to improve nursing care practises.**	**C7_1** **Critically contributes to the public health and civic agenda through an awareness of global, national and local trends.**
Subset 1 L7_1.1 **Practise within the context of professional, ethical, regulatory and legal nursing codes**	K7_1.1 Critically examines professional, moral, ethical and/or legal dilemmas and issues in the organisation of healthcare.	S7_1.1 Within their scope of practice, demonstrates the ability to anticipate and respond appropriately and effectively to complex professional, moral, ethical and/or legal dilemmas and issues in the organisation of healthcare.	C7_1.1 Within the scope of his/her professional practice and accountability, demonstrates the ability to adjust and/or develop their role to anticipate and respond effectively to population/patient needs. Where necessary and appropriate he/she is able to challenge current systems to meet population/patient needs.
Assessment approaches	Theoretical and/or clinical assessment of breadth of knowledge and critical understanding of professional, ethical, regulatory and legal nursing codes. Reflective Essay, Clinical Case Study (written report). **Exemplar – indicators, suggestions** Can provide practice examples of professional, moral, ethical and/or legal dilemmas. Can identify service/organisation level issues and provide concrete actions referring to relevant theories and/or legal frameworks.	Theoretical and/or clinical assessment of skills to respond appropriately and effectively to complex professional, moral, ethical and/or legal dilemmas and issues in organization of healthcare. Practical Exam, Clinical Case Study, Project Work. **Exemplar – indicators, suggestions** Can provide practice examples of response to professional, moral, ethical and/or legal dilemmas and lessons learned in order to improve service/organisational level practice.	Theoretical and/or clinical assessment of ability to recognize and challenge and/or develop current systems/policies in order to meet population/patient needs. Critique of national/government policy, thesis work, project work. **Exemplar – indicators, suggestions** Through practice demonstrates an understanding of the different roles of the nurse (in response to different actors –patient, family, HCP etc.) in responding to professional, moral, ethical and/or legal dilemmas in practice. Where necessary challenges the limitations of the role in order to further patient care.
Learning approaches	Theoretical, clinical and/or critical reflection.	Theoretical, clinical and/or critical reflection.	Theoretical, clinical and/or critical reflection.

Teaching approaches	Comprehensive exposure to and critical analysis of (interdisciplinary) professional practice, requirements and standards, ethical, regulatory and legal codes.	Critical reflection on complex clinical practice issues and/or case studies.	Critical reflection on complex clinical practice issues and/or case studies of health care systems and populations.
Subset 2 L7_1.2 **Accept responsibility for his/her own professional development and life-long learning**	K7_1.2 Demonstrates advanced understanding of the different roles, responsibilities and functions of a nurse.	S7_1.2 Uses critical evaluation as a way to reflect and improve upon his/her performance to enhance the quality of service delivery and patient outcomes.	C7_1.2 Understands, implements and evaluates the scope of his/her professional practice and accountability.
Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of the different roles, responsibilities and functions of the nurse. MA: Reflective essay, case study (written report). **Exemplar – indicators, suggestions** Through written critical reflection on practice and by case study, demonstrates the ability to critically analyse the various roles, responsibilities and functions of a nurse as they relate to clinical practice.	Theoretical and/or clinical assessment of the quality of service delivery and their development as life-long learners. Clinical case study, project work. **Exemplar – indicators, suggestions** Through written reflection and case study, demonstrates the ability to actively engage in planning his/her professional development and life-long learning.	Theoretical and/or clinical assessment of ability to recognize the scope of his/her professional practice and accountability. Critique of scope of practice, thesis work, project work. **Exemplar – indicators, suggestions** Through written reflection and case study, demonstrates the ability to actively engage in planning his/her professional development and life-long learning
Learning approaches	Theoretical and/or clinical.	Theoretical, clinical and reflection.	Theoretical, clinical and reflection.
Teaching approaches	Exposure to the different roles, responsibilities and functions of a nurse.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or case study.
Subset 3 L7_1.3 **Educate, facilitate, promote, support and encourage the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death**	K7_1.3 Critically examines the issues pertaining to the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	S7_1.3 Demonstrates the ability to use evidence based education, facilitation and leadership skills, and health promotion to support and encourage the health, wellbeing and comfort of complex populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	C7_1.3 Is aware of, develops and promotes the role of the nurse in, and of the value of health promotion and evidence based education for complex populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.

Assessment approaches	Theoretical and/or clinical assessment of breadth of knowledge and critical understanding of the complex issues pertaining to the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death. Reflective essay, case study (written report). **Exemplar – indicators, suggestions** Through written reflection on practice and case study, demonstrates the ability to identify and critically the professional values and various roles of the nurse as they relate to clinical practice.	Theoretical and/or clinical assessment of advanced skills to engage in evidence based education, facilitation and leadership, and health promotion to support and encourage the health, wellbeing and comfort of complex populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death. Reflective essay, case study (written report). **Exemplar – indicators, suggestions** Through written critical reflection and case study, demonstrates the attainment of the required advanced skills to engage in evidence based education, leadership, and health promotion initiatives to support and encourage the health, wellbeing and comfort of complex populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	Theoretical and/or clinical assessment of an advanced understanding and development of the role of the nurse, and awareness of the value of evidence based health promotion and education for complex populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death. Critique of national/government health promotion strategy/policy, thesis work, project work. **Exemplar – indicators, suggestions** Through written critical reflection and case study, demonstrates the ability to critically analyse the role of the nurse specifically as it pertains to health promotion initiatives and education for complex populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.
Learning approaches	Theoretical, clinical and/or critical reflection.	Theoretical, clinical and/or critical reflection.	Theoretical, clinical and/or critical reflection.
Teaching approaches	Comprehensive exposure to and critical analysis of complex issues pertaining to the health, wellbeing and comfort of populations, communities, groups and individuals whose lives are affected by, ill health, distress, disease, disability or death.	Critical reflection on complex clinical practice issues and/or case studies.	Critical reflection on complex clinical practice issues and/or exemplars of evidence based health promotion practice and education

Dimension 2: Nursing practice and clinical decision making			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_2. Level descriptor	**K7_2** **From a systems and leadership perspective, appraises the principles, concepts, practises and procedures that underpin the practice and decision making of nursing practice.**	**S7_2** **Critically applies best available evidence to each decision and nursing action. Promotes client well-being in all situations. Can self-evaluate.**	**C7_2** **Can apply a range of nursing skills and decision making techniques within civic life.**

Subset 1 L7_2.1 **Perform comprehensive and systematic assessments**	K7_2.1 Has profound knowledge about frameworks/tools used for assessment of, physical, social, cultural, psychological, spiritual and environment factors.	S7_2.1 Demonstrates the ability to undertake advanced and systematic assessments in complex cases taking into account using the tools/frameworks appropriate to the patient/client taking into account relevant physical, social, cultural, psychological, spiritual and environment factors. Based on profound knowledge based and/ or clinical experience, can anticipate complications, outcomes etc.	C7_2.1 Demonstrates the ability to recognize and interpret signs of normal and changing health/ ill health, distress, or disability in the person (assessment/diagnosis). Demonstrates the ability to undertake an effective risk assessment and take appropriate actions safely and efficiently.
Assessment approaches	MCQ/OSCE, reflective essay, leading case study conference/round table (e.g. for nurse students). **Exemplar – indicators, suggestions** Capacity to critically evaluate appropriate tools, frameworks and the relevant aspects of the patient. Demonstrates the ways to explore the different aspects, having influences to nursing, they are coming from patients, physical, social, cultural, psychological, spiritual and environmental factors.	Practical exam, debate, thesis work, project work, hospital leadership training. **Exemplar – indicators, suggestions** Demonstrates the relevant clinical, analytical and communication skills that are required to holistically assess the patient/client's needs in a variety of clinical contexts (e.g. primary, secondary and tertiary care and in different environmental situation, e.g. socioeconomically influencing factors). Can adapt the assessment tools/approach as appropriate.	Problem solving discussion. essay, thesis work, project work, teaching lesson, short paper for stakeholders, clients. **Exemplar – indicators, suggestions** Identifies the need for and (where appropriate) implements monitoring and early warning tools. Liaises with relevant services (based on local policies and professional standards) in order to both plan ahead and react to changing clinical situations.
Learning approaches	Theoretical and/or clinical.	Theoretical, clinical and reflection.	Theoretical, clinical and reflection.
Teaching approaches	Exposure to professional practice, requirements and standards, ethical, regulatory and legal codes.	Exposure to clinical practice.	Exposure to clinical practice.
Subset 2 L7_2.2 **Plan, deliver and evaluate appropriate and individualised programmes of care**	K7_2.2 Knowledgeable of evidence based clinical judgement (classification diagnostic systems, interventions and outcomes) to ensure optimum care and outcomes for patients.	S7_2.2 Demonstrates the ability to manage patient/client needs by planning, delivering and evaluating appropriate and individualised programmes of care working in partnership with the patient/client, their careers, families and other health/social workers.	C7_2.2 Demonstrates the ability to inform, educate and supervise patient and their families to ensure optimum care and outcomes for patients.

Assessment approaches	Project work. Short paper. Reflective essay critically examining an exemplar or incident from clinical practice. **Exemplar – indicators, suggestions** Demonstrates a critical understanding of the issues involved in the effective planning, delivery and evaluation of individualised programmes of care at both a theoretical and a clinical level. Can critically analyse the different modalities and their significance as they relate to patient care.	Practical exam, debate, thesis work, project work, hospital leadership training. **Exemplar – indicators, suggestions** Demonstrates the relevant clinical and analytical skills that are required to plan, deliver and evaluate individualised programmes of care within a variety of clinical contexts (e.g. primary, secondary and tertiary care).	Thesis work, project work, teaching lesson, short paper for stakeholders, clients. **Exemplar – indicators, suggestions** Demonstrates the ability to inform, educate and supervise patient/carers and their families within the context of individualized programmes of care. Can evaluate quality, can innovate in nursing practice on different levels of nursing, and can educate/ teach the stakeholders.
Learning approaches	Theoretical and/or clinical.	Theoretical, clinical and reflection.	Theoretical, clinical and reflection.
Teaching approaches	Exposure to varied clinical/ professional practice.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or case study of health care systems and populations.
Subset 3 L7_2.3 **Effectively search, access, interpret, utilise and evaluate clinical data (research) effectively**	K7_2.3 Ability to engage and conduct research activity and to appraise research work in view of informing practice development and innovation.	S7_2.3 Demonstrates the ability to comprehend, analyse and evaluate development work / research based on scholarly, theoretical and/or practical methods, which are needed to conduct development work/ research activity in a professional, ethical and legal manner.	C7_2.3 Demonstrates the ability to comprehend, analyse and evaluate development work / research in order to make and justify decisions reflecting on social and ethical responsibilities as well as nursing and nursing science issues in wider communities and globally.
Assessment approaches	Assessment of the ability to engage and conduct research activity and to appraise research work in view of informing practice development and innovation. Process Research study project work, thesis work, participation in research work, comprehensive study/analysis of research projects. | **Exemplar – indicators, suggestions**	The theoretical and practical assessment of skills needed to conduct research activity in a professional, ethical and legal manner. Process research study project work, thesis work, participation in research work, comprehensive study/analysis of research projects. **Exemplar – indicators, suggestions**	The theoretical and practical assessment of skills needed to conduct research activity in a professional, ethical and legal manner. Process research study project work, thesis work, participation in research work, comprehensive study/analysis of research projects. **Exemplar – indicators, suggestions**

	Demonstrate knowledgeability and capacity in types of several research programme, capacity in innovation based on research and practical evidence, capacity to understand the different evidence levels in nursing research and evidence for clinical decision making.	Capacity in participating / leading clinical research studies, to generate problem based researching, to be reflective for ethical, legal, moral, professional challenges of research studies.	Commitment to innovation, generate problem based researching, inclusive ethical, moral, socioeconomic, cultural relations as well.
Learning approaches	Theoretical.	Theoretical and practical. (the collection, analysis and use of data/ evidence).	Theoretical and practical. (the collection, analysis and use of data/ evidence).
Teaching approaches	Theoretical.	Theoretical and practical (with focus on the principles of the collection, analysis and use of data/ evidence). Practice theoretical and practical approach to teaching and learning skills associated with conducting research activity/ exercise.	Theoretical and practical (with focus on the principles of the collection, analysis and use of data/ evidence) + The theoretical and practical approach to teaching and learning skills associated with conducting research activity/ exercise.
Subset 4 L7_2.4 **Using nursing skills, medical devices, appropriate technology, interventions/activities to provide optimum care, and to inform and educate the patient/carer and families**	K7_2.4 Advanced knowledge of (1) what and how to use appropriate equipment and technology and (2) how to communicate effectively with patients for care delivery and education.	S7_2.4 Demonstrates the ability to use effectively and efficiently a range of nurse skills and modern technologies to assess, manage and respond appropriately to patient needs to ensure optimum care and outcomes for patients.	C7_2.4 Able to determine one's own and team members' learning needs and to address them effectively through life-long learning engagement in order to keep up with advancements in nursing practices, care and systems.
Assessment approaches	Project work. Short paper. Reflective essay critically examining an exemplar or incident from clinical practice. **Exemplar – indicators, suggestions** Critical and analytical thinking and making decisions: what and how to use appropriate equipment and technology and how to	Project work. Short paper, clinical training, comprehensive evaluation of a given situation in the practice (e.g. introduction and staff preparation for introducing new technology or communication system a.s.o). Reflective essay critically examining an exemplar or incident from clinical practice. **Exemplar – indicators, suggestions** Capacity to introduce , develop new technology, develop new standards / protocols Based on technological innovation,	Project work. Short paper, clinical training, comprehensive evaluation of a given situation in the practice (e.g. introduction and staff preparation for introducing new technology or communication system a.s.o). Reflective essay critically examining an exemplar or incident from clinical practice. **Exemplar – indicators, suggestions** Commitment to develop and innovate quality assurance and technology in nursing.

	communicate effectively with patients for care delivery and education.	develop methods of evaluation, e.g. quality indicators.	Demonstrates the ability to inform, educate and supervise patient/carers and their families within the context of individualized programmes of care. can evaluate quality, can innovate in nursing practice on different level of nursing, and can educate/ teach the stakeholders.
Learning approaches	Theoretical.	Theoretical and practical. (re the use of technology and re effective communication).	Theoretical and practical. (re the use of technology and re effective communication).
Teaching approaches	Theoretical.	Theoretical and practical. (re the use of technology and re effective communication).	Theoretical and practical. (re the use of technology and re effective communication).

Dimension 3: Knowledge and cognitive competencies			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_3. Level descriptor	**K7_3** **Specialist knowledge of the nursing theories, knowledge and concepts of health, ill health, well-being, the humanities, arts and sciences necessary to understand human behaviour, body functioning and adaptive responses in different cultures and contexts.**	**S7_3** **Critically analyses and synthesises best available evidence to all divisions.** **Can use investigative tools to evaluate practise.** **Can initiate new practises to meet client needs.**	**C7_3** **Promotes and contributes evidence-based guidelines, policies and knowledge in the civic sphere.**
Subset 1 L7_3.1 **Current and relevant knowledge of the research process and current nursing research that can be appropriately applied to nursing actions and nursing activities to provide nursing care that is rigorous and evidence based**	K7_3.1 Demonstrates in depth knowledge research methodologies and methods (quantitative and qualitative) and how to use evidence based practice.	S7_3.1.b Undertakes / contributes to research and regularly applies an evidence based practice approach to practice.	C7_3.1 Promotes use of and contributes to the development of evidence-based guidelines.
Assessment approaches	Project work. Short paper, write a research proposal.	Write a research synthesis/ meta-analysis.	Develop/update a protocol/procedure.

	Exemplar – indicators, suggestions Can suggest appropriate research methodologies and methods required to study a clinical questions. Can fully describe the principles and process of creating a clinical guideline.	**Exemplar – indicators, suggestions** Provides examples of EBP in own clinical practice. Designs and undertakes clinical studies and/or audit.	**Exemplar – indicators, suggestions** Can evaluate quality of a published article. Can produce a clinically focused CAT on a relevant clinical topic.
Learning approaches	Theoretical and/or clinical research based practice.	Theoretical and/or clinical research based practice**.**	Theoretical and/or clinical research based practice.
Teaching approaches	Exposure to the issues of research paradigms, design, samples, tools to collect and analyse data.	Exposure to research based practice and methods used.	Exposure to research based practice and/or exemplars of research.
Subset 2 L7_3.2 **Current and relevant knowledge of theories related to personal and professional development so as to enhance their professional practice**	K7_3.2 Demonstrates current and relevant understanding of theories related to personal and professional development so as to enhance independent and professional practice in complex care situations.	S7_3.2 Demonstrates ability to problem solve and apply theories about decision making and conflict that can be appropriately applied to patient care and situations of uncertainty.	C7_3.2 Demonstrates current and relevant knowledge of ethical theory, law and humanities that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty.
Assessment approaches	Theoretical and/or clinical assessment of knowledge of the theories of nursing and nursing practice.	Theoretical and/or clinical assessment of ability to apply theories to nursing practice.	Theoretical and/or clinical assessment of the role of the nurse and awareness of the value of theories developed for and derived from nursing practice.
Learning approaches	Theoretical and/or clinical theory driven practice.	Theoretical and/or clinical theory driven practice.	Theoretical and/or clinical assessment of the role of theories for practice.
Teaching approaches	Exposure to theories of nursing and nursing practice.	Exposure to clinical practice and theories.	Exposure to relevant theoretical knowledge of nursing.
Subset 3 L7_3.3 **Current and relevant knowledge of the theories of nursing and nursing practice that can be appropriately applied to nursing practice, patient/client care and situations of uncertainty**	K7_3.3 Demonstrates advanced knowledge and understanding of the theories of nursing and nursing practice so as to enhance their professional practice, patient care and situations of uncertainty.	S7_3.3 Demonstrates ability to apply the theories of nursing and nursing practice, including the use of technology and health care informatics in order to support nursing practice.	C7_3.3 Demonstrates advanced knowledge and understanding of international and national policies that can be appropriately applied to nursing practice, patient care and situations of uncertainty, including when, with who and where to apply different health care technologies.

Assessment approaches	Theoretical and/or clinical assessment of knowledge of theories concerning the nature and challenge of professional practice.	Theoretical and/or clinical assessment of ability to apply knowledge of technology and health care informatics into nursing practice.	Theoretical and/or clinical assessment of the role of the nurse and awareness of challenges in relation to professional nursing practice.
Learning approaches	Theoretical and/or clinical evidence based practice.	Theoretical and/or clinical evidence based practice.	Theoretical and/or clinical evidence based application of different health care technologies.
Teaching approaches	Exposure to clinical knowledge of nursing care.	Exposure to clinical evidence based practice.	Exposure to relevant knowledge of nursing care.

Dimension 4: Communication and interpersonal competencies			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_4. Level descriptor	**K7_4** **From a systems and leadership perspective, and in the context of specialist areas of practice:** **The art and science of communication in a range of challenging circumstances with individuals, groups and populations in a digital age.**	**S4_4** **Exhibits the ability to prevent, resolve and manage conflicts. Handles difficult conversations within an inter-professional environment (advocacy, whistle blowing, safeguarding).** **Effectively uses a range of communication skills.**	**C7_4** **Uses a range of communication technologies and strategies in their personal, public/civic and professional life.** **Skilled in reflective practice.**
Subset 1 L7_4.1 **Communicate effectively**	K7_4.1 Demonstrates profound knowledge of communication strategies with patients, families and team members and can anticipate communication difficulties.	S7_4.1 Demonstrates the ability to communicate effectively and autonomously with patients and their carers to express their concerns and worries and can anticipate and follow-up patient/family needs. Demonstrates leadership and guidance in teams.	C7_4.1 Uses holistic approach in communication according to individual needs. Demonstrates the ability to anticipate and arrange for intensive support and/or appropriate services.
Assessment approaches	Case study/ oral report. **Exemplar – indicators, suggestions** Student demonstrates profound knowledge of communication strategies/techniques and can anticipate communication problems.	Clinical assessment, supervision. **Exemplar – indicators, suggestions** Student communicates effectively and autonomously. Anticipates and follows-up patient/family needs. Demonstrates leadership and guidance in the team.	360 review, clinical assessment, supervision. **Exemplar – indicators, suggestions** Student anticipates and arranges for intensive support and/or appropriate services.
Learning approaches	Theoretical and/or clinical learning of different communication techniques.	Theoretical and/or clinical learning of using different communication techniques. Ability	Ability to recognise and challenge different communication needs of patients, families and team members.

		to retrieve and apply information independently.	Use of different technologies or resources.
Teaching approaches	Verbal and non-verbal communication. Listening techniques. Social cultural peculiarities in communication. Collaboration and teamwork. Delegation of activities.	Exposure of different communication strategies (verbal and non-verbal communication, various communication methods, …).	Practice to empower individuals, families and groups. Practice to recognize, identify and manage challenging behaviour and/or social/cultural differences.
Subset 2 L7_4.2 **Use a range of communication techniques to promote patient's well-being**	K7_4.2 Demonstrates deep understanding of communication strategies with patients, families and team members. Demonstrates the strategies for reducing anxiety and stress in the clinical setting in order to optimise communication.	S7_4.2 Demonstrates profound counselling and listening skills. Attempts to anticipate situations that may give rise to aggression, and where necessary, demonstrates competent de-escalation techniques.	C7_4.2 Uses a range of communication techniques to promote patient's wellbeing. Anticipates and plans opportunities for tailored health promotion and health education activities.
Assessment approaches	Role-play, standardised patient, observation. **Exemplar – indicators, suggestions** Demonstrates deep understanding of communication strategies for people with communication limitations. Demonstrates strategies for reducing anxiety and stress in the clinical setting in order to optimise communication.	Clinical assessment, supervision. **Exemplar – indicators, suggestions** Demonstrates profound counselling and listening skills. Attempts to anticipate situations that may give rise to aggression, and where necessary, demonstrates competent de-escalation techniques.	Based on case-study, clinical experience, can anticipate opportunities for health promotion/harm reduction and outline a plan. **Exemplar – indicators, suggestions** Student anticipates and plans opportunities for tailored health education and promotion.
Learning approaches	Theoretical and/or clinical learning of communication strategies.	Theoretical and/or clinical learning of using a range of communication techniques.	Practice to recognise and challenge different communication needs of patients, families and team members. Practice the use of different technologies or resources.
Teaching approaches	Verbal and non-verbal communication. Practice Listening techniques.	Exposure of different communication techniques. Practice to communicate comprehensively and professionally.	Practice to empower individuals, families and groups. Practice to recognize, identify and manage challenging behaviour and/or social/cultural

	Practice identification of Social cultural peculiarities in communication. Collaboration and teamwork. Practice delegation of activities. Health care promotion and education. Counselling. Teaching (for example: practical skills such as stoma care).	Practice to recognize, identify and manage challenging behaviour and/or social/cultural differences. Practice to empower wellbeing of individuals, families and groups. Practice to counsel individuals, families and groups. Practice to transfer knowledge.	differences. Practice using different means for teaching. Practice different learning strategies according to individual needs (ability, age, disability, readiness…). Practice choosing right timing and optimal environment. Teamwork.
Subset 3 L7_4.3 **Accurately report, record, document and refer care using appropriate technologies**	K7_4.3 Identifies how changes to communication technologies impact affects the nurse's own communication strategies / opportunities in reporting, recording, documenting and referring care.	S7_4.3 Demonstrates an active understanding and, where appropriate, suggests new technologies / adapts existing communication technologies in reporting, recording, documenting and referring care.	C7_4.3 Safely and effectively uses and adapts the available communication technologies to report, record, document and refer care and communicate in the public space.
Assessment approaches	Practical tests, use in the clinical setting. **Exemplar – indicators, suggestions** Identifies how changes to communication technologies the nurse's own communication strategies/opportunities (pro's and con's).	Practical tests, use in the clinical setting, supervision. **Exemplar – indicators, suggestions** Demonstrates an active understanding and, where appropriate, suggests new technologies/adapts existing communication technologies.	Practical tests, use in the clinical setting, supervision, feedback from end users/system administrators on accuracy. **Exemplar – indicators, suggestions** Safely and effectively uses and adapts the available communication technologies.
Learning approaches	Theoretical and/or clinical learning of knowledge accurately report, record, document and refer care using appropriate technologies.	Theoretical and/or clinical learning of accurately report, record, document and refer care using appropriate technologies.	Practice to recognise different means to accurately report, record, document and refer care using appropriate technologies. Practice the use of different technologies or resources.
Teaching approaches	Use of electronic and non-electronic devices/resources. Data collection, recording, reference.	Exposure of different means to accurately report, record, document and refer care using appropriate technologies. Practice to use of electronic and non-electronic devices/resources.	Practice to accurately report, record, document and refer care using appropriate technologies. Practice to using of different means for teaching. Practice different learning strategies according to technologies. Teamwork.

		Practice to use to data collection, recording, reference. Practice to transfer knowledge.	

Dimension 5: Leadership, management and team working			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_5. Level descriptor	**K7_5** **From a systems and leadership perspective, and in the context of specialist areas of practice:** **Theories and models of leadership, followership, management and teams within health and social care contexts.**	**S7_5** **Leads uni-disciplinary and interdisciplinary teams in complicated and unpredictable situations.** **Initiates and innovates quality improvement programmes. Role models expertise and coaches /teaches others. Effectively uses resources.**	**C7_5** **Comprehends issues associated with leadership, management and team working within civic organisations.** **Plays a key role in epidemics, disaster or emergency situations.**
Subset 1 L7_5.1 **Lead and co-ordinate a team (e.g. co-workers of a shift, care assistants)**	K7_5.1 Has an advanced knowledge of nursing management and leadership theories and a comprehensive understanding of multidisciplinary work settings.	S7_5.1 Demonstrates a developed understanding of own functions, shows ability to organize and delegate care in a multidisciplinary setting.	C7_5.1 Has a comprehensive understanding of structures, processes, roles and responsibilities of the employer/institution and employees (or if self-employed, own roles and responsibilities).
Assessment approaches	Theoretical and/or reflective assessment of knowledge of nursing leadership theories and understanding of a multidisciplinary work settings. **Exemplar – indicators, suggestions** Is competent to generate data to demonstrate the efficiency of various divisions of labour.	Theoretical, clinical and/or reflective assessment to demonstrate understanding of own functions and delegating in a multidisciplinary setting. **Exemplar – indicators, suggestions** Demonstrates ability to distribute the tasks of teams and specialised co-workers (e.g. of a clinic) according to the goal.	Theoretical, clinical and/or reflective assessment of advanced abilities to understand structures and processes of the employer/ institution within the field of health care. **Exemplar – indicators, suggestions** Is capable to advocate for various division of labour based on different educational systems and research outcomes.
Learning approaches	Theoretical and reflective.	Theoretical and reflective.	Theoretical and reflective.
Teaching approaches	Review of theories and studies on nursing management, leadership and multidisciplinary work settings.	Exposure to clinical practice, supervision and reflection and cooperation in health and social services, to design, to develop, to organize.	Exposure to structures and processes of employer/institution and theory based reflection of context.

Subset 2 L7_5.2 **Critically use tools to evaluate and audit care according to relevant quality standards**	K7_5.2 Shows a comprehensive understanding of approaches, methods and processes of quality control, rating and development.	S7_5.2 Is able to use, evaluate and audit care in accordance with current guidelines and professional standards, is able to instruct others to using quality management tools.	C7_5.2 Demonstrates a comprehensive understanding of quality management in the health care system, its financial background and importance.
Assessment approaches	Theoretical, reflective and/or clinical assessment of advanced knowledge and understanding of quality control, rating and development. **Exemplar – indicators, suggestions** Is knowledgeable about criteria that prove validity and reliability of quality tools.	Theoretical and/or clinical assessment of skills to using, evaluating and auditing care in accordance with current guidelines and professional standards and to instructing co-workers. **Exemplar – indicators, suggestions** Is competent to generate data to test a set of tools to identify validity and reliability.	Theoretical and/or reflective assessment of advanced understanding of quality management in the health care system, its financial background and importance for patients care. **Exemplar – indicators, suggestions** Is capable to advocate for proved tools on the basis of recent research and in accordance to given conditions.
Learning approaches	Theoretical and/or clinical.	Theoretical and/or clinical.	Theoretical and/ or reflective approach.
Teaching approaches	Review of studies and exposure to professional practice of quality control, rating and development.	Exposure to clinical practice guidelines and audit.	Exposure to studies and learning materials and clinical practice.
Subset 3 **5.3 Student demonstrates an advanced understanding of human resources**	K7_5.3. Is knowledgeable about theories of team working, personal development and leadership strategies. Has understanding of country-specific healthcare funding and access to resources.	S7_5.3 demonstrates the ability to mobilise the combined resources and actions of all members of the health/social care team in order to achieve/support patient' well-being.	C7_5.3 Is able to effectively use resources and introduce others to an understanding of health/social care funding and its influence on the organization and delivery of care.
Assessment approaches	Theoretical and reflective assessment of advanced understanding of psychological theories of personal development. **Exemplar – indicators, suggestions** Can identify how healthcare is funded at the institutional and national levels, identify what primary resources (material, services, etc.) are available to support patient well-being, can describe roles in a team according to a well-	Theoretical and clinical assessment of skills to career plan for self and others. **Exemplar – indicators, suggestions** In clinical situations demonstrates the ability to take action to achieve patient well-being using the range of available resources, including the wider healthcare team.	Clinical and reflective assessment of enhanced commitment and leadership qualification. **Exemplar – indicators, suggestions** As above and can identify gaps/needs in current provision and organisation of healthcare.

	known theory and identify own role within a team as well as strategies to use the strengths and weaknesses of various roles to efficiently support the service.		
Learning approaches	Theoretical and reflective.	Clinical and reflective approach.	Theoretical reflective and clinical approach.
Teaching approaches	Exposure to studies and theories of psychological personal development theories.	Exposure to clinical practice and to perform resource management related to the specialty performance in the profession.	Exposure to studies, theories and clinical practice.

4.5. Physics

Introduction to the Assessment Reference Frameworks for Physics

This Assessment Reference Framework is the outcome of the work by the Subject Area Group (SAG) in Physics established in the context of the CALOHEE EU project. The present version of the framework reflects the consensus reached by the SAG after intense and detailed discussions.

The Tuning-CALOHEE Assessment Reference Framework for Physics follows the general structure of Tuning-CALOHEE Assessment Reference Frameworks. In the context of this project, two assessment reference frameworks for each of the five subject area have been developed, which cover the first (bachelor) and second (master) level of higher education (levels 6 and 7 of the European Qualification Framework for Life Long Learning) respectively. Each framework is organised according to the three EQF categories 'Knowledge', 'Skills' and 'Autonomy and responsibility' and it is formulated in terms of measurable learning outcomes.

In the development of Assessment Reference Framework for Physics, the SAG started from the common structure adopted in the CALOHEE project, that is the two-dimensional template obtained by merging the Qualifications Framework for the European Higher Education Area and the European Qualifications Framework for Life Long Learning. In order to identify the specific dimensions for Physics, we started by reflecting on the characteristics of the Physics subject area and the profile of Physics graduates. We then analysed the learning outcomes for physics described in previous Tuning works as well as in other qualification frameworks both for physics and for similar or wider areas of Science.

A great importance has been given to the relationship between specific and generic competences and to the need of framing the latter in the context of Physics. We share the Tuning belief that a degree course should provide students not only with subject-specific content but also with the competences needed for effective civic, social and cultural engagement. For this purpose, we referred to the four dimensions of the CALOHEE framework for civic, social and cultural engagement and we attuned them to the context of the subject area.

As a result of this process the SAG identified an initial set of 14 dimensions, that was then reduced to 9 by grouping some of them in a wider dimension. In the table below we show the correspondence between the QF dimensions of the EHEA and the identified dimensions.

QF Dimensions	CALOHEE Dimensions for Physics
Knowledge and Understanding	1.Theories and models 2.Mathematical methods
Applying Knowledge and Understanding	3.Experimental design and scientific inquiry 4.Problem solving
Making Judgement	5.Scientific culture 6.Work ethic and integrity
Communications Skills	7.Communication 8. Project management and teamwork
Learning Skills	9.Professional development

For each dimension, the SAG identified the corresponding descriptors, sub-dimensions and sub-descriptors. The 'real' learning outcomes are in fact the sub-descriptors, since they meet the condition of being measurable and indicating not only the subject, but also its context and complexity. The sub-dimensions for each dimension of the assessment reference framework are reported in the table below.

CALOHEE dimensions for physics	Sub-dimensions
1.Theories and models	1.1 Theories and phenomena 1.2 Applications of theories and models
2.Mathematical methods	2.1 Mathematical tools 2.2 Computational tools

3.Experimental design and scientific investigation	3.1 Experimental design and methodology 3.2 Instrumentation 3.3 Data analysis 3.4 Experiment documentation 3.5 Safety
4.Problem solving	4.1 Problem framing 4.2 Analytical thinking 4.3 Solution procedure and execution 4.4 Validation of results 4.5 Creative and innovative thinking
5.Scientific culture	5.1 History of physics 5.2 Epistemology 5.3 Sources of scientific information
6.Work ethic and integrity	6.1 Ethical rules in the profession 6.2 Awareness of professional actions impact 6.3 Governance and decision making
7.Communication	7.1. Information sources 7.2 Data representation 7.3 Means of communication 7.4 Technical English
8. Project management and teamwork	8.1 Project management tools 8.2 Teamwork 8.3 Organisations, societies and cultures
9.Professional development	9.1 Professional requirements 9.2 Personal capacities and attitudes

This scheme has been then applied for the two cycle levels, Bachelor and Master. The main difference between the two levels lies in the degree of specialisation and the depth and complexity of problems, processes, and activities that can be solved, designed, or conducted.

For the subsets (EQF levels 6 and 7) of dimension 3 *'Experimental design and scientific investigation'* approaches and strategies for assessment, learning and teaching have been added, which are thought (most) appropriate to achieve the defined learning outcomes. Dimension 3 was selected, because it is highly representative of the Physics subject area and has been the subject of a great deal of literature in Physics Education Research.

We hope that this Assessment Reference Framework will be of interest to many, and that it becomes a useful tool for course design, delivery and enhancement across Europe.

The Physics SAG of the CALOHEE project,
Ornella Pantano and Fernando Cornet

Assessment Reference Framework for Physics – First Cycle / LEVEL 6 (EQF)

Dimension 1: Theories and models			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_1. Level descriptor Theories and models	**K6_1 Describe the fundamental concepts, laws, models and theories of classical physics and elements of modern physics, as well as their application across a number of real-life situations.**	**S6_1 Use physical concepts, laws and theories from various domains of physics to model, analyse and explain simple physical phenomena and problems.**	**C6_1 Identify relevant physics theories and models required to interpret phenomena, observations, and real-life situations.**
Subset 1 L6_1.1 **Theories and phenomena**	K6_1.1 Name, describe and explain the fundamental laws, theories, and phenomena of classical physics and elements of modern physics.	S6_1.1 Use the fundamental physics theories and models to model and describe a simple physical system, to explain observations and make predictions.	C6_1.1 Identify relevant physical theories that are required to understand a phenomenon or observation.
Subset 2 L6_1.2 **Applications of theories and models**	K6_1.2 Describe and explain how physics is used across a number of real-life applications.	S6_1.2 Apply basic elements of physics to explain simple real-life applications.	C6_1.2 Identify which physics models and theories are relevant in different real-life problems.

Dimension 2: Mathematical methods			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_2. Level descriptor Mathematical methods	**K6_2 Name and describe standard mathematical (analytical and numerical) tools and methods and their application in the context of physics theories.**	**S6_2 Apply standard mathematical (analytical and numerical) tools and methods to solve problems in physics.**	**C6_2 Identify and employ standard mathematical (analytical and numerical) tools and methods to solve problems and model situations.**
Subset 1 L6_2.1 **Mathematical tools**	K6_2.1 Name and describe standard mathematical tools and their application in the context of physics theories.	S6_2.1 Apply standard mathematical tools to model and solve problems in physics and to model physical phenomena.	C6_2.1 Identify and employ the appropriate mathematical tool to model, represent, and/or solve a problem in physics.
Subset 2 L6_2.2 **Computational tools**	K6_2.2 Name and describe standard computational tools used in physics and the basic features of at least one programming language.	S6_2.2 Use basic computational tools (software, programming language) and methods to model and solve problems in physics.	C6_2.2 Evaluate and employ basic computational tools to model, represent, and/or solve a problem in physics.

Dimension 3: Experimental design and scientific investigation			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_3. Level descriptor Experimental design and scientific investigation	**K6_3 Describe standard methods, instrumentation, techniques, theories and regulations used in experimental physics.**	**S6_3 Design a simple experimental investigation, using standard instrumentation and follow guidelines, and apply basic methods, techniques and theories for data collection, analysis and reporting.**	**C6_3 Set up and carry out simple scientific investigations safely under supervision.**
Subset 1 L6_3.1 **Experimental design and methodology**	K6_3.1 Name and describe the basic aspects of a scientific investigation as well as the physical quantities involved in a situation, and describe the inherent physical models or theories.	S6_3.1 Formulate a simple prediction from a hypothesis and devise a plan to test it, and estimate the order of magnitude of the results of an experiment.	C6_3.1 Conduct simple investigations under supervision, identifying the relevant theoretical framework and the process required to obtain consistent results.
Assessment approaches	Require reference to relevant physical models in the lab report.	Articulated group report containing hypotheses, predictions, and plans. Group observation and interactions during the lab sessions.	Group/individual report describing and justifying hypotheses, predictions, expected outcomes, choices, reference to theoretical frameworks and to literature.
Learning approaches	Historical and literature readings, including recent literature, and discussion with peers.	Design a complex testing experiment for a known physics equation/model, working in small groups. Practice using different modelling tools and software. Receive/give feedback	Engage with complex, open-ended experiments whose goals are drawn from recent scientific literature (e.g. reproduce research results or test them in a new context). Students are free to choose the timing, materials, procedures, setup, analysis methods and priorities.
Teaching approaches	Presentation of case studies and classroom demonstrations. Provide literature/historical readings, highlighting the links between theory and experiment, and prompt reflection.	Provide minimally scaffolded materials and encourage interactions within/between groups. Provide relevant literature/references and comment on them. Prompt reflection on the links between theory and experiment, also highlighting the role of simulations and comparing independent methods to test a theory. Provide feedback.	Provide students with relevant literature. Encourage peer interaction and comparison of different strategies. Highlight critical points and provide feedback.

Subset 2 L6_3.2 **Instrumentation**	K6_3.2 Name and describe standard instrumentation used in experimental physics and their specifications.	S6_3.2 Set up standard experimental arrangements, identify the specifications of standard instrumentation, use it under supervision and apply simple experimental procedures to gather data.	C6_3.2 Identify, arrange and employ the appropriate instrumentation to carry out an investigation, under supervision and/or in standard situations.
Assessment approaches	Require setup description and reference to used instrumentation and its specifications in the lab report.	Require a description of the data collection procedure used in the experiment in the report and verify its consistence. Group observation and interactions during the lab sessions.	Evaluate the consistence and appropriateness of the chosen instrumentation/procedures as described in a group report and require individual reflections/justification.
Learning approaches	Observation of classroom demonstrations focused on instrumentation. Historical readings. Visits to museums and laboratories.	Set up a simple experiment with given equipment and write down the specifications, working in small groups. Receive/give feedback.	Choose between different possible instrumentation and procedures and discuss the choice with peers/instructor.
Teaching approaches	Presentation of case studies and classroom demonstrations focussed on instrumentation. Use of informal environments (museums, laboratories).	Demonstrate use of equipment and assist students in its use. Formulate questions to help them reflect on the purpose of given equipment Provide feedback.	Prepare handouts with guiding questions to help students identify the correct setup. Discuss students' choice.
Subset 3 L6_3.3 **Data analysis**	K6_3.3 Name and describe basic methods and standard techniques for the processing of experimental data.	S6_3.3 Organise and analyse experimental data using standard tools and techniques, including basic software; estimate and correctly apply uncertainties to the measurements and evaluate the reliability of the results.	C6_3.3 Process simple sets of experimental data and evaluate the reliability of the results.
Assessment approaches	Require reference and justification of the chosen data processing techniques in the report.	Require justification of calculated uncertainties and reflection on the significance of results in the lab report. Discuss the reliability of results individually in an oral exam.	Require a critical discussion about the quality and significance of data and results, together with possible explanations of unexpected results, in a group report with individual reflections.
Learning approaches	Observation of classroom demonstrations focussed on data processing techniques. Study of literature and handouts.	Collect and analyse data of from a variety of given sources and evaluate uncertainties, working in small groups.	Compare data obtained by different methods also in terms of handling of uncertainties.

		Receive/give feedback.	Guided meta-cognitive reflection (e.g. judging the agreement between prediction and outcomes)
Teaching approaches	Presentation of case studies and classroom demonstrations focussed on data processing techniques Provide handouts/reference materials.	Set up different experimental situations to help students appreciate the differences between methods/procedures Provide examples and exercises. Prompt reflection on key or critical aspects. Provide feedback.	Prepare worksheets with guiding questions to help students compare data obtained by different procedures/methods Provide questions for meta-cognitive reflection.
Subset 4 L6 _3.4 **Experiment documentation**	K6_3.4 Describe standard methods of recording the details of an experimental activity and storing data.	S6_3.4 Keep a record of the details and steps of an experiment, including the acquisition of data, and write a simple laboratory report.	C6_3.4 Identify the appropriate method to report on an investigation and communicate the results.
Assessment approaches	Require the use of, and correct reference to different methods for documenting an experiment in the report.	Require the presence of all the relevant details and steps of an experiment in a group report. Require clearness and completeness of the documentation.	Require a presentation of an investigation in the form students prefer.
Learning approaches	Literature/historical readings. Discussion with peers.	Regular use of a lab notebook. Hand in a draft report and receive feedback Self-assessment (e.g. by comparison with exemplars or peers).	Study of 'exemplars' (e.g. well-written vs badly-written lab report). Guided meta-cognitive reflection (e.g. on the purpose of a lab and efficacy for learning).
Teaching approaches	Illustrate the purpose and use of a lab notebook. Classroom discussion on report writing. Provide literature/historical readings.	Provide scaffolded worksheets to help students frame their report (but avoid structuring the report for them). Provide feedback on draft reports.	Provide and present 'exemplars' (e.g. well-written vs badly-written lab report). Provide questions for meta-cognitive reflection and organise follow-up activities aimed at reflecting on lab outcomes.
Subset 5 L6_3.5 **Safety**	K6_3.5 Describe the main safety issues, equipment and regulations of a standard physics laboratory.	S6_3.5 Follow the safety regulations of a standard physics laboratory, including using basic individual protection equipment.	C6_3.5 Identify the safety regulations of a physics laboratory and operate accordingly, including the use of appropriate protection equipment.
Assessment approaches	Require reference to safety regulations in the reports when relevant.	Observation of individual and group work.	Discuss the meaning and implication of safety regulations either orally or in the reports.

Learning approaches	Review safety regulations of a laboratory and discuss them with peers/instructor.	Regular use of different kinds of protection equipment.	Reflect with peers/instructor about possible safety regulations each time a new laboratory environment/setup is introduced.
Teaching approaches	Provide and discuss safety regulations. Illustrate the use and location of safety instructions.	Display use of protection equipment Provide opportunities to use different equipment and apply different regulations Give feedback and advice.	Encourage students to reflect about safety regulations each time a new laboratory environment/setup is introduced.

Dimension 4: Problem solving			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_4. Level descriptor Problem solving	**K6_4 Link physics concepts and laws with basic strategies, procedures, tools and criteria for framing, representing, solving and validating the results of a problem.**	**S6_4 Categorise problems based on physical principles, analyse a problem, recognise its structure and devise a (creative) plan for its solution, execute the devised plan and check for its validity.**	**C6_4 Address problems from the point of view of physics, identifying the laws and concepts that apply in a specific situation, devise and carry out a (creative) plan for reaching a solution and check its validity.**
Subset 1 L6_4.1 **Problem framing**	K6_4.1 Organise knowledge of physics principles and theories in a scheme that includes procedures and conditions for their application.	S6_4.1 Categorise problems and situations based on physics principles rather than objects and surface features; apply known procedures and schemata to frame a problem.	C6_4.1 Identify the deep structure of a problem or situation, put it in a physical framework, and identify common structures in different problems.
Subset 2 L6_4.2 **Analytical thinking**	K6_4.2 Recall physics concepts and laws relevant for a problem as well as standard tools and strategies for representing a problem in terms of these concepts.	S6_4.2 Perform a qualitative analysis of a problem before writing equations, recognise the sub-problems or tasks, extract data and unknowns, represent a problem in a convenient way including modelling it with physical concepts, principles and equations, and devise a plan for its solution.	C6_4.2 Address problem situations analytically, recognising the different elements and tasks, and identify a way of modelling a problem as well as a strategy to tackle it.
Subset 3 L6_4.3 **Solution procedure and execution**	K6_4.3 Recall standard mathematical (analytical and numerical) tools relevant for the problem as well as the rules and procedures to use them.	S6_4.3 Execute the devised plan and apply the appropriate mathematical tools to reach the solution of the problem.	C6_4.3 Carry out a plan identifying the best tools to fulfil it.
Subset 4 L6_2.4 **Validation of results**	K6_4.4 Recall some standard criteria for stating the validity of a result.	S6_4.4 Apply standard criteria to check the validity of the solution and/or intermediate outcomes, e.g. evaluating the expected order of magnitude and units.	C6_4.4 Evaluate a process and its results, admitting the possibility of mistakes.

Subset 5 L6_4.5 **Creative and innovative thinking**	K6_4.5 Organise knowledge of physics in a way that facilitates links between different concepts and ideas.	S6_4.5 Reflect on own solution to a problem and compare it with others' solutions; acknowledge alternative ways to look at a same problem.	S6_4.5 Devise creative ways to address a problem, issue or task, and to exit critical issues or stuck situations.

Dimension 5: Scientific culture			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_5. Level descriptor Scientific culture	**K6_5** **Describe the main traits of the historical and epistemological development of physics and relate them to changes and/or issues in technology, society, and the rules of the scientific community.**	**S6_5** **Select with guidance and use sources of information on the history and current development of physics and on epistemology, and analyse some relevant examples also in relation to technological and societal issues.**	**C6_5** **Identify some common ideas and approaches in different areas of science also in relation to its historical and epistemological evolution, and evaluate the influence of science on technology and society in some relevant cases.**
Subset 1 L6_5.1 **History of physics**	K6_5.1 Recall the main traits of the historical evolution of physics, also in relation to technological and societal changes.	S6_5.1 Select with guidance and use sources of information on the history of physics, and analyse some relevant examples also in relation to technological and societal issues.	C6_5.1 Identify some common ideas and approaches in different areas of physics with reference to its history and evaluate the influence of physics on technology and society in some relevant cases.
Subset 2 L6_5.2 **Epistemology**	K6_5.2 Outline the dominant epistemological schemes that have influenced the development of physics theories.	S6_5.2 Utilise the epistemological schemes shared by the scientific community to address problems and issues in physics.	C6_5.2 Adopt an epistemological perspective in addressing scientific problems.
Subset 3 L6_5.3 **Sources of scientific information**	K6_5.3 Name the procedures used by the scientific community to validate scientific works and describe the criteria for selecting reliable scientific information from libraries or the Internet.	S6_5.3 Search for and use scientific information from technical literature under supervision, and duly cite it when necessary.	C6_5.3 Identify reliable sources of information concerning scientific issues.

Dimension 6: Work ethic and integrity			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_6. Level descriptor Work ethic and integrity	**K6_6** **State general ethical principles, norms, values, and standards relevant to the work of a physicist, as well as some examples when physics influences health, environment, politics and/or society.**	**S6_6** **Apply general ethical rules and rules of scientific conduct to the assigned tasks.**	**C6_6** **Make decisions in line with ethical norms and with regard to civic responsibility, and contribute to local communities and organisations according to own competence.**
Subset 1 L6_6.1	K6_6.1	S6_6.1	C6_6.1

Ethical rules in the profession	Recall the ethical rules and standards applied in the profession.	Apply general principles, norms, values and professional standards to the assigned tasks.	Contribute to promoting and defending general ethical principles, norms, values and professional standards.
Subset 2 L6_6.2 **Awareness of professional actions impact**	K6_6.2 Recall some examples when your actions as a physicist affect health, environment and/or society.	S6_6.2 Acknowledge the consequences of own professional actions and estimate the impact of the main technological applications of physics on individuals, environment and society.	C6_6.2 Accept accountability for own professional actions and make decisions in line with the ethical norms and societal implications.
Subset 3 L6_6.3 **Governance and decision making**	K6_6.3 Recall some examples when physics theories and results affect (political) decisions and policymaking.	S6_6.3 Conduct informed processes of decision making on the assigned tasks.	C6_6.3 Contribute to and with communities and (political) organisations with own competence.

Dimension 7: Communication			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_7. Level descriptor Communication	**K6_7** **Describe different methods and tools of communication.**	**S6_7** **Present complex information in a concise manner orally and in writing.**	**C6_7** **Evaluate scientific material, communicate it orally and in writing in language appropriate for the audience.**
Subset 1 L6_7.1 **Information sources**	K6_7.1 Describe the main features of the processes of information and communication.	S6_7.1 Evaluate the way in which sources of evidence, data, and expert opinions are used in various media.	C6_7.1 Actively contribute to societal debates using reliable data and information sources.
Subset 2 L6_7.2 **Data representation**	K6_7.2 Describe different representations of data (words, graphs, tables, animations, etc.)	S6_7.2 Use different representation of data.	C6_7.2 Compare and identify the appropriate representation of data for presentations to peer groups.
Subset 3 L6_7.3 **Means of communication**	K6_7.3 Describe and explain the role of different means of communication (scientific magazines, books, newspapers, videos, web, etc.)	S6_7.3 Produce simple scientific reports and oral presentations, using appropriate technical language.	C6_7.3 Identify and choose the appropriate writing or oral style according to the context and communicative goals (laboratory report, dissertation, scientific articles, etc.)
Subset 4 L6_7.4 **Technical English**	K6_7.4 Demonstrate a working knowledge the English language at the level necessary for basic physics communication.	S6_7.4 Read, speak and write in technical English.	C6_7.4 Study and communicate specific physics topics in technical English (minimum B1 level of Common European Framework of Reference for Languages).

Dimension 8: Project Management and Teamwork			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_8. Level descriptor Project Management and Teamwork	**K6_8 Describe strategies for project work and demonstrate attitude to work collaboratively.**	**S6_8 Organize and complete a simple project individually or in team.**	**C6_8 Identify and implement an appropriate strategy to carry out a simple individual or group project, collaborate constructively, exercise some initiative and acknowledge accountability for the assigned tasks.**
Subset 1 L6_8.1 **Project management tools**	K6_8.1 Recall some strategies for planning, organising, checking progress, and evaluating results of a project.	S6_8.1 Use appropriate tools, set targets, and organise work to meet deadlines.	C6_8.1 Take responsibility for contributing in a simple individual or group project.
Subset 3 L6_8.2 **Teamwork**	K6_8.2 Describe and characterise the different components of an effective teamwork.	K6_8.2 Listen, share opinions and respectfully participate in conversation and/or discussion activities, and use (receive and give) feedback.	K6_8.2 Identify own and others' competences and roles with respect to teamwork, contribute constructively and respectfully in a group, and take responsibility for own task(s).
Subset 2 L6_8.2 **Organisations, societies and cultures**	K6_8.3 Recognise the main differences in and between individuals, organisations, societies and cultures.	S6_8.3 Analyse some relevant issues and/or potential conflicts in and between individuals, organisations, societies and (work) cultures.	C6_8.3 Identify best practices and interventions in the case of tensions and conflicts.

Dimension 9: Professional development			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_9. Level descriptor Professional development	**K6_9. Identify relevant competences needed for pursuing further studies (career goals), as well as personal strengths, weaknesses and attitudes.**	**S6_9 Organise own study and/or learning process, using different kinds of learning materials; evaluate personal work and search for information and support.**	**C6_9 Enter new fields of study through a positive attitude, evaluate own personal and professional competences and take responsibility for own learning.**
Subset 1 L6_9.1 **Professional requirements**	K6_9.1 Identify relevant competences and qualifications needed for pursuing further studies (career goals).	S6_9.1 Search for the necessary information and support for pursuing further studies (career).	C6_9.1 Manage learning tasks independently and take responsibility for own learning.
Subset 2 L6_9.2 **Personal capacities and attitudes**	K6_9.2 Identify own strengths and weaknesses, knowledge, skills, and attitudes and their impact on further studies.	S6_9.2 Reflect on own approach to learning, performing tasks and assignments and how to improve.	C6_9.2 Identify gaps in personal knowledge, skills and competences and undertake appropriate actions to improve personal competences.

Assessment Reference Framework for Physics – Second Cycle / LEVEL 7 (EQF)

Dimension 1: Theories and models			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_1. Level descriptor Theories and models	**K7_1 Describe the concepts, laws, models, theories and limitations of classical physics and those of at least one of the specialised cores of modern physics, as well as their application across a wide range of real-life situations and different disciplines.**	**S7_1 Use concepts, laws and theories from different domains of physics to model, analyse and explain a wide range of physical phenomena and observations.**	**C7_1 Identify relevant theories and models required to interpret phenomena, observations, and real-life situations, also in the context of a different discipline, integrating concepts from different domains of classical and modern physics and recognising the limitations of the different theories and models.**
Subset 1 L7_1.1 **Theories and phenomena**	K7_1.1 Name, describe and explain the laws, theories, phenomena and limitations in the different domains of classical physics and at least one of the specialised cores of modern physics.	S7_1.1 Use physics theories and models from different domains of classical and modern physics to describe a complex physical system, to explain observations and make predictions.	C7_1.1 Identify relevant physics theories and models that are required to understand a phenomenon or observation, integrating concepts from different domains of physics and recognising the limitations of the different theories and models.
Subset 2 L7_1.2 **Applications of theories and models**	K7_1.2 Describe and explain how classical and modern physics are used across different real-life applications, also in the context of a different discipline.	S7_1.2 Apply elements of classical and/or modern physics to explain different real-life applications, also in the context of a different discipline.	C7_1.2 Identify which models and theories of classical and modern physics are relevant in different real-life problems, also in the context of a different discipline.

Dimension 2: Mathematical methods			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_2. Level descriptor Mathematical methods	**K7_2 Name and describe standard and advanced mathematical (analytical and numerical) tools and methods and their application in the context of physics theories.**	**S7_2 Apply standard and advanced mathematical (analytical and numerical) tools and methods to solve problems in physics.**	**C7_2 Identify, adapt, integrate and employ both standard and advanced mathematical (analytical and numerical) tools and methods to solve problems and model situations in a variety of contexts.**
Subset 1 L7_2.1 **Mathematical tools**	K7_2.1 Name and describe standard and advanced mathematical tools and their application in the context of physics theories.	S7_2.1 Apply standard and advanced mathematical tools to model and solve complex problems in physics and to model physical phenomena.	C7_2.1 Identify, interpret, employ and justify the choice of the appropriate mathematical tool(s) to model, represent, and/or solve a problem in a wide range of situations, including real-life contexts.

Subset 2 L7_2.2 **Computational tools**	K6_2.2 Name and describe a wide range of computational tools and methods used in physics and the advanced features of at least one programming language.	S7_2.2 Use advanced computational tools (software, programming language) and methods to model and solve problems in physics.	C7_2.2 Evaluate and employ advanced computational tools and methods to model, represent, and/or solve a problem in a wide range of situations, including real-life contexts.

Dimension 3: Experimental design and scientific investigation			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_3. Level descriptor Experimental design and scientific investigation	**K7_3** **Describe standard and advanced experimental methods, instrumentation, techniques, theories and regulations used in experimental physics.**	**S7_3** **Design a complete physics experiment, using standard and advanced instrumentation safely and applying a wide range of methods, techniques and theories for data collection, analysis and reporting.**	**C7_3** **Set up and carry out scientific investigations independently and safely.**
Subset 1 L7_3.1 **Experimental design and methodology**	K7_3.1 Name and describe basic and advanced aspects of a scientific investigation as well as the physical quantities involved in a situation, and describe the inherent physical models or theories.	S7_3.1 Formulate predictions from hypotheses and devise an experimental plan to test them, also using modelling tools to design/model the experiment when necessary, and estimate the nature and order of magnitude of the results of an experiment.	C7_3.1 Conduct investigations independently, identifying the relevant theoretical framework and the process(es) required to obtain consistent results.
Assessment approaches	Require reference to relevant physical models in the lab report.	Articulated group report containing hypotheses, predictions, and plans. Group observation and interactions during the lab sessions.	Group/individual report describing and justifying hypotheses, predictions, expected outcomes, choices, reference to theoretical frameworks and to literature.
Learning approaches	Historical and literature readings, including recent literature, and discussion with peers.	Design a complex testing experiment for a known physics equation/model, working in small groups. Practice using different modelling tools and software. Receive/give feedback	Engage with complex, open-ended experiments whose goals are drawn from recent scientific literature (e.g. reproduce research results or test them in a new context). Students are free to choose the timing, materials, procedures, setup, analysis methods and priorities.
Teaching approaches	Presentation of case studies and classroom demonstrations. Provide literature/historical readings, highlighting the links between theory and experiment, and prompt reflection.	Provide minimally scaffolded materials and encourage interactions within/between groups. Provide relevant literature/references and comment on them.	Provide students with relevant literature. Encourage peer interaction and comparison of different strategies. Highlight critical points and provide feedback.

		Prompt reflection on the links between theory and experiment, also highlighting the role of simulations and comparing independent methods to test a theory. Provide feedback.	
Subset 1 L7_3.2 I**nstrumentation**	K7_3.2 Name and describe standard and some examples of advanced instrumentation, its characteristics and specifications.	S7_3.2 Set up different experimental arrangements, including some examples of non-standard/ complex ones; identify the specifications of advanced instrumentation, use it and apply complex experimental procedures to gather data.	C7_3.2 Identify, arrange and employ advanced instrumentation to carry out an investigation, also in some complex situations and evaluate the correctness and significance of the measurement process and of the obtained data.
Assessment approaches	Require setup description and reference to used instrumentation, including advanced one, and its specifications in the lab report.	Require a description of the data collection procedure used in the experiment in the report and verify its consistence. Group observation and interactions during the lab sessions.	Evaluate the consistence and appropriateness of the chosen instrumentation/procedures in an individual report or a group report with individual reflections.
Learning approaches	Observation of classroom demonstrations focussed on advanced instrumentation. Historical readings. Visits to museums and research centres	Set up complex experiments with given equipment and discuss the chosen arrangement with peers. Receive/give feedback.	Choose the instrumentation and process for a self-designed experiment based on literature and discussion with peers/instructor/technician.
Teaching approaches	Presentation of case studies and classroom demonstrations focussed on advanced instrumentation. Use of informal environments (museums, laboratories, research centres).	Demonstrate use of non-standard equipment. Formulate questions to help students reflect on the relationship between equipment and experiment. Provide feedback.	Provide relevant literature/references and comment on them. Provide feedback.
Subset 2 L7_3.3 **Data analysis**	K7_3.3 Name and describe basic and advanced methods and techniques for the processing of experimental data.	S7_3.3 Organise and analyse experimental data (including big data) using a variety of tools and techniques including basic and advanced software, identify sources of uncertainty and correctly apply them to the measurements, critically evaluate the reliability of experimental results and relate them to the initial hypotheses.	C7_3.3 Process complex sets of experimental data, evaluate the reliability of the results, draw sensible conclusions and use them to reformulate the hypotheses if necessary.

Assessment approaches	Require reference and justification of the chosen data processing techniques in the report.	Require reflection on the reliability and significance of results in the lab report and individually in an oral exam.	Require a critical discussion about the quality and significance of data and results, together with possible explanations of unexpected results, and a comparison with literature if applicable.
Learning approaches	Observation of classroom demonstrations focussed on advanced data processing techniques. Study of recent literature Peer discussion	Collect and analyse data of from a variety of given sources (including big data), working in small groups. Compare the outcomes with simulations. Meta-cognitive reflection on the relationship between hypotheses, predictions and outcomes. Receive/give feedback.	Choose priorities and procedure for a self-designed experiment upon literature reading and discussion. Compare the outcomes with simulations. Guided meta-cognitive reflection (e.g. judging the agreement between prediction and outcomes).
Teaching approaches	Presentation of case studies and classroom demonstrations focussed on advanced data processing techniques.	Set up a variety of experimental situations providing minimally scaffolded materials about data analysis, but interact constantly with groups during the experiments to prompt reflection on key or critical aspects. Provide feedback.	Provide relevant literature/references and comment on them. Encourage students to compare their work with literature. Provide questions for meta-cognitive reflection.
Subset 4 L7_3.4 **Experiment documentation**	K7_3.4 Describe a wide range of methods for recording the details of an experimental activity, storing and representing data (tables, different kinds of graphs, words, equations).	S7_3.4 Keep a record of the details and steps of an experiment, including the acquisition of data, also in complex experimental situations; use different representations to display data and results and write a complete and accurate laboratory report.	C7_3.4 Identify the appropriate method(s) to report on an investigation, communicate the results and debate on its outcomes.
Assessment approaches	Require fluent use of different methods for documenting an experiment.	Require a reasonable and correct logical structuring in complex reports and verify the presence of all the steps and relevant details. Require accuracy s and completeness of the documentation. Require different forms of presentation, e.g. seminar or talk besides the written report.	Require a presentation of an investigation in the form students prefer, followed by a debate.

Learning approaches	Advanced literature and historical readings, including recent ones and those using non-standard methods. Discussion with peers.	Hand in a draft report and receive instructor/peer feedback. Self-assessment (e.g. by comparison with exemplars or peers).	Guided meta-cognitive reflection (e.g. on the purpose of a lab and its relevance for current physics knowledge) Peer discussion/group work.
Teaching approaches	Provide literature/historical readings. Demonstrate how to refer to relevant literature and sources.	Provide feedback on draft reports. Classroom demonstrations on how to use different representations to display data.	Provide questions for meta-cognitive reflection. Provide opportunities to communicate the results to others.
Subset 5 L7 _3.5 **Safety**	K7_3.5 Describe the safety issues, equipment, procedures, behaviour, persons-in-charge and regulations of a specialised physics/science laboratory.	S7_3.5 Follow the safety regulations and procedures of a specialised physics/science laboratory, including using specialised protection equipment.	C7_3.5 Evaluate risk factors in an experimental environment, gather information about safety regulations in a working environment and operate accordingly, including the choice and use of appropriate protection equipment.
Assessment approaches	Require a reference to safety in the report. Require a specific exam on safety.	Observation of individual/group work.	Discuss the meaning and implication of safety regulations either orally or in the reports.
Learning approaches	Make individual experience of a specialised laboratory and interact with persons-in-charge. Follow specific safety courses.	Regular use of protection equipment, including specialised one	Reflect with peers/instructor about risk factors each time a new working environment/setup is introduced, including the use of appropriate protection equipment
Teaching approaches	Provide specific instructions, also with the help of a specialised technician. Discuss specific regulations.	Display use of both standard and specialised protection equipment. Give feedback and advice.	Promote reflection about safety regulations each time a new working environment is introduced.

Dimension 4: Problem solving			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_4. Level descriptor Problem solving	**K7_4** **Link concepts and laws from various domains of physics with advanced strategies, procedures, tools and criteria for framing, representing, solving and validating the results of a problem.**	**S7_4** **Categorise problems based on physical principles, including complex problems, context-rich problems, and problems derived from unfamiliar contexts; analyse a complex problem, recognise its structure and devise a creative plan**	**C7_4** **Address complex problems and situations from the point of view of physics, identifying the laws and concepts that apply even in unfamiliar situations, devise and carry out a creative plan for reaching a solution and**

		for its solution, execute the devised plan and check for its validity.	**check its validity.**
Subset 1 L7_4.1 **Problem framing**	K7_4.1 Organise knowledge of physics principles and theories from different domains of physics in an articulated scheme that includes procedures and conditions for their application.	S7_4.1 Categorise problems and situations based on physics principles, including complex problems, context-rich problems, and problems derived from unfamiliar contexts; apply different procedures and schemata to frame a problem.	C7_4.1 Identify the deep structure of a complex and/or unfamiliar problem or situation, put it in a physical framework, identify common structures in problems drawn from different contexts, and generalise key features, approaches and solution methods.
Subset 2 L7_4.2 **Analytical thinking**	K7_4.2 Recall physics concepts and laws from different domains of physics relevant for a problem as well as advanced tools and strategies for representing a problem in terms of these concepts.	S7_4.2 Perform a complete analysis of a complex problem, break it down into smaller problems or tasks, extract relevant data and unknowns, represent a complex problem in a convenient way including modelling it with physical concepts, principles and equations, and devise a plan for its solution.	C7_4.2 Address problem situations analytically, recognising the phases or work packages of a problem and logically connecting them, and identify the best way of modelling a problem as well as the best strategy to tackle it.
Subset 3 L7_4.3 **Solution procedure and execution**	K7_4.3 Recall mathematical, (analytical and numerical) and/or technological tools relevant for the problem as well as the rules and procedures to use them.	S7_4.3 Execute the devised plan and flexibly and jointly apply different mathematical, numerical and/or technological tools to reach the solution of the problem, writing own code if necessary.	C7_4.3 Carry out a complex plan, which includes integration of different tools and phases, demonstrating perseverance and resilience in challenging situations.
Subset 4 L6_2.4 **Validation of results**	K6_4.4 Recall some standard criteria for stating the validity of a result.	S6_4.4 Apply standard criteria to check the validity of the solution and/or intermediate outcomes, e.g. evaluating the expected order of magnitude and units.	C6_4.4 Evaluate a process and its results, admitting the possibility of mistakes.
Subset 5 L6_4.5 **Creative and innovative thinking**	K6_4.5 Organise knowledge of physics in a way that facilitates links between different concepts and ideas.	S6_4.5 Reflect on own solution to a problem and compare it with others' solutions; acknowledge alternative ways to look at a same problem.	S6_4.5 Devise creative ways to address a problem, issue or task, and to exit critical issues or stuck situations.

Dimension 5: Scientific culture			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_5. Level descriptor Scientific culture	**K7_5** **Recall focused historical and epistemological facts on the conceptual development of physics theories and relate them to changes and/or issues in technology, society, and the rules of the scientific community.**	**S7_5** **Select and use different sources of information on the history, epistemology and current development of physics, and analyse different examples also in relation to technological and societal issues.**	**C7_5** **Identify common ideas and approaches in different areas of science also in relation to its historical and epistemological evolution, and address scientific, technological and societal issues with an informed scientific, historical and epistemological approach.**

Subset 1 L7_5.1 **History of physics**	K7_5.1 Reconstruct the historical evolution of physics, also in relation to technological and societal changes.	S7_5.1 Select independently and use different sources of information on the history of physics, and analyse different examples and case studies also in relation to technological and societal issues.	C7_5.1 Identify common ideas and approaches in different areas of physics with reference to its history and debate on the influence of physics on technology and society in the present and in the past.
Subset 2 L7_5.2 **Epistemology**	K7_5.2 Describe different epistemological schemes that have influenced the development of physics theories and scientific theories in general.	S7_5.2 Utilise the epistemological schemes shared by the scientific community to address problems and issues in science and to assess the rigorousness of a scientific approach.	C7_5.2 Adopt an epistemological perspective in addressing scientific, technological and societal issues.
Subset 3 L7_5.3 **Sources of scientific information**	K7_5.3 Describe the procedures used by the scientific community to validate scientific works and describe the criteria for selecting reliable scientific information from libraries, databases, the Internet as well as any other source.	S7_5.3 Independently search for, evaluate, review, and use scientific information from a variety of sources, duly cite it when necessary, and assess the scientific value of a piece of information.	C7_5.3 Identify and manage relevant and reliable sources of information concerning scientific issues, and debate on them.

Dimension 6: Work ethic and integrity			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_6. Level descriptor **Work ethic and integrity**	**K7_6** **State general and specific ethical principles, norms, values, and standards relevant to the work of a physicist, and illustrate different examples when physics influences health, environment, politics and/or society.**	**S7_6** **Apply agreed ethical rules and rules of scientific conduct to behaviour in the profession.**	**C7_6** **Make decisions in line with ethical norms also in research environments and take responsibility for them, and actively contribute to local, national and international communities and (political) organisations according to own competence.**
Subset 1 L7_6.1 **Ethical rules in the profession**	K7_6.1 Recall general and profession-specific ethical principles, norms, values and standards.	S7_6.1 Apply principles, norms, values and standards to behaviour in the profession, both from a personal and a professional standpoint.	C7_6.1 Actively contribute to upholding, promoting and defending general and profession-specific specific ethical principles, norms, values and standards.
Subset 2 L7_6.2 **Awareness of professional actions impact**	K7_6.2 Illustrate different situations when your actions as a physicist affect health, environment and/or society.	S7_6.2 Acknowledge the consequences of own actions and estimate the impact of both established and new technological applications of physics on individuals, environment and society.	C7_6.2 Take responsibility for own professional actions and make decisions in line with the ethical norms and societal implications.

Subset 3 L7_6.3 **Governance and decision making**	K7_6.3 Illustrate different examples when physics theories and results affect (political) decisions and policy making.	S7_6.3 Conduct informed processes of decision making in the profession.	C7_6.3 Actively contribute to and with local, national and international communities and (political) organisations.

Dimension 7: Communication			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_7. Level descriptor Communication	**K7_7** **Describe the different channels and tools of communication and their limitations.**	**S7_7** **Communicate effectively to present complex information in a concise manner orally and in writing and using ICT and technical language appropriate for the audience.**	**C7_7** **Evaluate scientific material and communicate it to a variety of audiences to inform, influence and debate using various techniques and technical language appropriate for the audience.**
Subset 1 L7_7.1 **Information sources**	K7_7.1 Describe the process by which information is communicated and the purposes of that communication.	S7_7.1 Critically evaluate the use and misuse of evidence, data, expert opinion in various media.	C7_7.1 Actively contribute to societal debates using reliable data and information based on reliable sources and informed judgements.
Subset 2 L7_7.2 **Data representation**	K7_7.2 Describe different representations of data (words, graphs, tables, animations).	S7_7.2 Use different representations of data.	C7_7.2 Compare and appraise the appropriate representation of data and construct a logical argument or presentation based upon it.
Subset 3 L7_7.3 **Means of communication**	K7_7.3 Identify and describe the role of different means of communication (scientific magazines, books, newspapers, video, web, etc.).	S7_7.3 Distinguish among different communication channels, produce simple scientific reports and oral presentations, using technical language appropriate for the audience.	C7_7.3 Identify and use the appropriate level, writing or oral style according to the context and communicative goals (laboratory report, dissertation, popular article, ...), using reliable sources.
Subset 4 L7 _7.4 **Technical English**	K7_7.4 Use the English language at the level necessary for physics communication.	S7_7.4 Read, speak, write and participate in discussions fluently in technical English.	C7_7.4 Study and communicate specific physics topics in technical English (minimum B2 level of Common European Framework of Reference for Languages), differentiating the language according to the audience and purpose of the communication.

Dimension 8: Project Management and Teamwork			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_8. Level descriptor Project Management and Teamwork	**K7_8 Describe different project management tools.**	**S7_8 Engage productively in an individual or group project.**	**C7_8 Identify and implement an appropriate strategy to carry out an articulated individual or group project, collaborate constructively, perform leading and/or supervisory functions when needed, and take responsibility for the assigned tasks.**
Subset 1 L7_8.1 **Project management tools**	K7_8.1 Describe different project management tools for planning, organising, checking progress, and evaluating the results of a project.	S7_8.1 Use appropriate project management tools, set targets and priorities, evaluate project outcomes, and organise work to meet deadlines.	C7_8.1 Take responsibility for managing individual or group projects working independently.
Subset 2 L7_8.2 **Teamwork**	K7_8.2 Frame own and others' personal competences, viewpoints and strengths/weaknesses with respect to teamwork.	S7_8.2 Listen, share opinions and respectfully participate in conversation and/or discussion activities, use (receive and give) feedback, and take direction when appropriate.	C7_8.2 Identify own and others' competences, roles, strengths and weaknesses with respect to teamwork, contribute constructively and respectfully in a structured team across disciplines, and take responsibility for own task(s), including leading.
Subset 3 L7_8.3 **Organisations, societies and cultures**	K7_8.3 Recognise differences among individuals, organisations, societies and (work) cultures.	S7_8.3 Analyse and address issues and/or potential conflicts in and between individuals, organisations, societies and (work) cultures.	C7_8.3 Operate in a diverse group, organisation, society and/or (work) culture, identify appropriate interventions in the case of tensions or conflicts and actively engage to solve them.

Dimension 9: Professional development			
	Knowledge	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L7_9. Level descriptor Professional development	**K7_9 Identify relevant competences needed for continuing academic/professional development, as well as personal strengths, weaknesses and attitudes.**	**S7_9 Organise own study and/or learning process, using different kinds of learning materials; link personal strengths and weaknesses to learning goals and search for learning/career development opportunities.**	**C7_9 Enter new fields/environments of study or work through a positive attitude, evaluate own personal and professional competences and take responsibility for continuing academic/professional development, also in unfamiliar contexts**
Subset 1 L7_9.1 **Professional requirements**	K7_9.1	S7_9.1	C7_9.1 Manage learning tasks independently, professionally and ethically, take responsibility

	Identify relevant competences and qualifications needed for continuing academic/professional development.	Use different tools (ICT, literature search, etc.) for gaining new knowledge and skills, pursue further career, and gather information.	for own academic/professional development also in unfamiliar learning contexts, acknowledge relevant issues and societal changes and take action to adapt to them.
Subset 2 L7_9.2 **Personal capacities and attitudes**	K7_9.2 Identify own strengths and weaknesses, knowledge, skills, and attitudes and their impact on further career.	S7_9.2 Reflect on own knowledge, skills and attitudes, set appropriate learning goals and strategies and search for the necessary learning/training opportunities.	C7_9.2 Identify gaps in personal knowledge, skills and competences and undertake appropriate actions to adapt to changes in the professional career.

5. Subject specific examples of 'Good Practices' in Learning, Teaching and Assessment

Introduction

One of the aims of the CALOHEE project was to underpin the Subject Area Qualifications Frameworks and related Assessment Reference Frameworks to identify appropriate methods/methodologies, approaches and/or techniques for learning, teaching and assessment to achieve the defined descriptors and sub-descriptors. This to give effective and helpful ways forward for making the change from expert-driven education towards student-centred education.

The initial idea was to link aligned modes of learning, teaching and assessment directly to the dimensions and sub-dimensions / subsets. This approach has been applied by the SAGs of Civil Engineering and Nursing, both covering regulated professions, as well as Physics for one of the dimensions identified. These subject areas have also identified a number of approaches focussing on a particular (sub-)dimension / (sub-)descriptor. These are presented in this section.

History and Teacher Education preferred a different approach. In the case of Teacher Education the choice was made to develop a step by step approach covering all sub-dimensions/subsets and sub-descriptor for one dimension 'Learner empowerment, potential and creativity' for the first cycle / level 6 EQF. This dimension is perceived as one of the most essential ones in its framework. History made the choice to develop one dimension, number 2 'Text and Context' for the first cycle and one subset 3 of the dimension 'Theories and Concepts', at bachelor and master and subset 3 'Working with data produced by other disciplines or in other national contexts' of dimension 4 'Interdisciplinarity' at bachelor level. The subject area group of physics have identified a number of 'good practices' which have been included in its publication *Tuning Guidelines and Reference Points for the Design and Delivery of Degree Programme in Physics*, but lacked time to develop these in more detail. Finally, Physics has identified one dimension to serve as a means to illustrate 'good practice'. This is dimension 3, *Experimental design and scientific investigation*, and covers both the first and second cycle / levels 6 and 7 of the EQF.

It is hoped and expected that the users of this publication will find inspiration in all the 'examples of good practice' presented here; an example developed for one discipline may also be useful for another.

5.1 Civil Engineering

The Subject Area Group of Civil Engineering followed a double policy. As stated, it linked one-to-one modes of learning, teaching and assessment (LTA) to the different (sub)dimensions / (sub-)descriptors. These modes were the outcome of the inventory of the CALOHEE questionnaire on assessment and on desktop research. The selection of modes for each of the (sub-)descriptors was the result of intense debate and exchange of opinions. The appropriate assessments methods were found by using the model *Alignment of Learning Outcomes and Assessment* (ALOA) using the webtool *Time to Assess Learning Outcomes in E-learning* (TALOE) which makes a proposal for each sub-descriptor formulated as a learning outcome statement: http://taloetool.up.pt.

The second policy was to identify examples of 'good practices' focussing on particular (sub)dimensions / (sub-)descriptors in more detail. Included here is one example proposed by Thibaut Skrzypek (École des Ponts ParisTech), member of the subject area group for Civil Engineering. The example of 'good practice' combines the dimension 6'Decision making' and dimension 7 'team-work' and for the second cycle (bachelor) / level 7 EQF. For this dimension the following descriptors were defined:

Decision making

K7_6 Demonstrate critical awareness of the key aspects of professional, ethical and social responsibilities linked to management of work contexts, decision making and judgment formulation in civil engineering subject area.	**S7_6** Manage work contexts in civil engineering subject area and within broader or multidisciplinary contexts that may be unpredictable and require new strategic approaches, take decisions and formulate judgments.	**C7_6** Identify and justify appropriate and relevant strategic approaches and analyse professional, ethical and social responsibilities linked to the management of work contexts in civil engineering subject area and within broader or multidisciplinary contexts, taking coherent decisions and formulating coherent judgments.
K7_6.1 Describe and explain key aspects of professional, ethical and social responsibilities linked to management, decision making and judgment formulation of work contexts in civil engineering subject area.	S7_6.1 Manage work contexts in civil engineering subject area and within broader or multidisciplinary contexts that may be unpredictable and require new strategic approaches, identify, locate, obtain, organize and evaluate information and data, take decisions and formulate judgments.	C7_6.1 Identify and justify appropriate and relevant strategic approaches to manage work contexts in civil engineering subject area and within broader or multidisciplinary contexts, identify and analyse situations involving multiple conflicting professional, ethical and social interests to determine an appropriate course of action, take coherent decisions and formulate coherent judgments also with incomplete or limited information and data.

Teamwork

K7_7 Demonstrate knowledge and understanding of functioning methods and management strategies of teams that may be composed of different disciplines and levels and awareness of leadership responsibilities.	**S7_7** Function effectively in national and international contexts as member/leader of teams that may be composed of different disciplines and levels meeting deliverable, schedule and budget requirements.	**C7_7** Identify and justify appropriate and relevant functioning methods and management strategies of teams that may be composed of different disciplines and levels and elements of successful teamwork.
K7_7.1 Define and describe key characteristics and functioning methods of effective teams that may be composed of different disciplines and levels.	S7_7.1 Function effectively as a member of teams that may be composed of different disciplines and levels contributing to meet deliverable, schedule and budget requirements.	C7_7.1 Identify and justify appropriate and relevant functioning methods of teams that may be composed of different disciplines and levels and analyse factors affecting the ability to function effectively and to meet deliverable, schedule and budget requirements.

The 'example of good practice' offers a learning and teaching method to develop named. 'A game to understand challenges in a crisis situation and cooperation between stakeholders', based on a publication from the "pédagothèque de l'ENPC" (https://pedagotheque.enpc.fr/2016/11/04/un-jeu-pour-comprendre-les-enjeux-en-situation-de-crise-et-les-ajustements-de-la-cooperation-entre-les-acteurs/).

Summary
Through a course given as part of a Specialist Master's degree ("Mastère Spécialisé") in urban railway engineering in an engineering school, the École Nationale des Ponts et Chaussées (ENPC) on crisis management, a day of crisis management exercise was set up since 2009 in ENPC classrooms.
This day presents a real pedagogical interest for the students thanks to a scenario. This is a train derailment at a site located at the entrance to an average city. The freight train carries dangerous materials and derails at an hour of great affluence. The day of crisis is anchored in a one-week course devoted entirely to crisis management, and is the acme of it. This is a derailment of a freight train carrying propane wagons.
This exercise requires, in order to approach as closely as possible a real situation, an important framework with very varied stakeholders, coming from very different horizons.

1. Aim of the exercise

The aim of the exercise is - beyond the application of the theoretical knowledge on railway operations and operational management in disturbed situations - to train students to improve their individual and collective behaviour under stress and face the media pressure. Another objective is to learn the care of travellers and customers during a crisis of great extent (called "Corporate crisis"). For the overwhelming majority of the students who follow the programme, they are engineers, and therefore more familiar with technological responses than with managerial know-how. The "crisis management" module is, in this sense, one of the few dedicated to the human factor. Finally, this exercise illustrates the complexity underlying the problems of the operational management of disturbed situations. It also brings to light the limits of a supposed-deductive approach, usually dominant in higher French academic education.

2. The pedagogical integration of the course

This course takes place at the end of the year, while the majority of the lessons on safety are at the beginning of the year. The first introductory safety course (Walter Schön, UTC professor) includes a course on safety management delivered by Hubert Blanc (EPSF: French institution for railway safety) and several courses on safety definitions and demonstrations.

THE COURSES UPSTREAM:
1. A first sequence is based on the viewing of an episode of an American series “West Wing” on a major crisis of a nuclear power plant in California where the leak of a reactor occurs. We see the President of the United States and his advisers gathered to deal with the crisis, take decisions to evacuate the population and intervene with nuclear experts, all in a pre-electoral context that gives communication a major weight.
This film allows students to grasp, as the events unfold, the intense temporal succession and the multiplicity of stakeholders. After the viewing of the episode, we ask them to trace the chronology of the events, to identify the decisions, to call them "good or bad", to identify the objectives of the different groups of stakeholders and their respective stakes.
As Salem Brahimi wrote in an article devoted to the crisis in cinema, the series "West Wing sticks to the historical reality of crisis management, magnifies its characters by brilliant dialogues but succeeds in instilling a sense of complexity of the crisis thanks to a character who constantly reminds us that nothing is ever clear in the crisis ... " And it is of course a destabilizing situation for students that they will live in a quasi-real situation during the crisis exercise!

2. Catherine Piednoël, specialized journalist, teaches crisis communication. She teaches students how to build a press release, make situation points, prepare language elements and do a breathless interview. It also teaches them the basic rules of communication in crisis management: trust - consideration of victims - empathy - coherence - partnership logic - thanks - surveys, etc. To communicate with action verbs and "zero jargon" and put into practice the flowing rule: short, concise, clear and concrete!

3. Pascale Rieu, in charge of the pole of exercises and experience feedback in the Directorate of Civil Security of the French Ministry of the Interior, presents the provisions of the ORSEC (“Organisation des Secours”) plan whose main objective is to prepare in advance an organization solid and roamed to respond urgently to events.

4. One of the educational biases being the comparative approach, a three-hour sequence is devoted to the presentation of the procedures implemented by each company based on their duplicate benchmark by the RATP (Parisian urban transportation company) and the SNCF (French railway national company) provided by Emmanuel Teboul and Pascal Halko.

5. The last sequence relates to the return of experience of the Eurotunnel crisis of 19 December 2009. Several Eurostar found themselves stranded under the tunnel following damage to equipment due to snow with hundreds of passengers on board. The REX puts a focus on the "Disney train" where the difficulties were concentrated (many young children returning from a stay at Disneyland Paris, English

travellers and French commercial agents following an English agents strike, proximity of Christmas with lots of suitcases containing gifts that travellers did not want to get rid of, etc.)

3. Educational mechanism

The means necessary for these 5 hours of exercise: 3 rooms, maps of the sites (station, agglomeration, region and national), a team of animators. The exercise requires an upstream preparation with a distribution of the different roles to each student according to their profile, skills, etc. Particular attention is paid to the choice of the technical director and the strategic director. Each student wears a badge with his function, his room and knows the telephone numbers of the other actors of the game.

THE EQUIPMENT:
Usually this type of training dedicated to professionals is carried out within the companies which have in their premises the dedicated installations that they use; none of this exists at the École des Ponts, where 3 computing rooms are requisitioned. The computer services department of ENPC gives about 20 telephones and internet access (students are not allowed to use their laptop). All rooms are equipped with large whiteboards and several paperboards.

THE FRAMEWORK:
These 5 hours of exercise require considerable supervision. The module manager is an expert in crisis management who has trained many SNCF managers. In the animation room, are simulated more than fifteen actors played by at least 6 animators: a representative of local elected representatives, The Civil Protection Department, a journalist, several speakers from the Operational Centre for Infrastructure, train drivers, the customer relation department of the Dijon station, the SNCF Presidency, the Minister of Transportation, etc.

The organization of the exercise revolves around the relationships between three groups of actors divided into three rooms, which communicate between them only by telephone or by means of an intermediary (fax, email, tweet, etc.):

1. Technical crisis room with the technical director and all the activities (regional trains, Freight, train circulation and maintenance, and the meeting secretary)
2. Strategic room (also known as communication room or corporate room) with the crisis manager - responsible for security and safety - institutional relations, communication - responsible for communication etc.
3. Animation room with the teacher and the animators. The crisis leader who is the local incident leader is next to the public security representative.

THE SCENARIO:
1. A freight train of 17 Total cars carrying propane gas derailed at Dijon station at 9:47.
2. The Local Incident Correspondent (CIL) is promptly notified by the Exercise Director that there is a serious incident but no more information and that he must go to the site (in the animation room). More than a dozen trains are impacted. The director of the technical room is also informed of the incident by the COGC (operational centre for circulation management) of Dijon.
3. The students (except CIL) are distributed in the other 2 rooms. From this moment on, a series of information is sent to the CIL or to the Operational Centre by the facilitators, who play alternatively the drivers of the stopped trains, the traffic operations centre, etc.
4. At 11:40 a gas leak is detected in one of the damaged tank wagons. It is at this point that the organization switches with the setting up by the firemen of a perimeter of safety ... No train no longer circulates, trams are stopped ... The Plan Orsec (rescue organisation) is triggered soon after by the Prefect who takes the direction of rescue operations. The Prime Minister travels with the regional prefect...
5. The exercise ends after a press conference - 5 hours after the start. A one-hour debriefing session ends the day.

This exercise brings students to three points of operational exploitation:

1. The first is information management since facilitators literally drown students under phone calls or written information. As the two rooms can only communicate with each other over the telephone, an imbalance is rapidly established between the crisis room, which has a crucial need for concrete information to inform and communicate. And the technical room alone in contact with the place of the accident - too busy to manage the avalanche of information received by the animation room and the multitude of operational decisions to be taken in a very short time (to evaluate the risk of explosion, to identify impacted trains, stop (or not) traffic, evacuate travellers, find alternative buses, transportation plan to set up, etc.). In addition, the students were instructed to make situations points to maintain control over the exercise and to work collectively. The two rooms can become so fierce that sometimes the exercise had to be suspended for a moment.
2. The second apprenticeship concerns the care of travellers, with very varied expectations. For example, taking over an 88-year-old man who broke his collarbone at the Beaune station; Of a pregnant woman of 8 months and a half in an arrested regional train ... The director of the mayor's office is worried about several classes of children on school trip, and awaited by their parents, etc. In the second part of the exercise, travellers descend onto the lanes.
3. The third apprenticeship is the construction of a transport plan (for D + 1) in particular for Burgundy regional trains because many travellers are students who pass baccalaureate examinations. In some years, students too concentrated on the emptying of gas tanks or the search for lifting gear or replacement coaches, either fail to do so or fail to adopt a constructive common position.

4. Main lessons

Some quotes from post-exercise debriefing sessions of the 2016 and 2014 class.

• *"CIL (local incident correspondent) is very lonely on the ground. In addition, he receives injunctions all the time; they make very violent remarks. He gets screwed! "*
• *"The fact that there is no relationship between the technical room and the Com room is very disturbing. So it was really difficult to build a common strategy»*
• *"I had no comprehensive and clear information on the position of all the trains and yet I had to make decisions to establish a transport plan"*
• *"During the exercise of the crisis, one learns more about oneself than during tens of hours of course"*
• *"At first the crisis is manageable but very quickly we lose ground - it is a real job of resistance to stress"*
• *"We did not have directories up to date, some phone numbers were wrong!"*
• *"I remember that it is always necessary to have a paper and a pen to take notes including on site"*

WHAT DO THE STUDENTS LEARN ABOUT THE PROFESSIONAL ASPECTS OF THE CRISIS?

1. In decision-making, there is no "absolute rationality" in a crisis situation. A crisis manager who takes his responsibilities and who often has to decide with his team between two bad solutions based on piecemeal information is needed. He musts weigh the risks, reflects, implements the decision and its consequences (the "So what"). It is not enough to apply standards or norms. You also need to know how to make a decision and apply it once it's taken, and sometimes it's harder than to make the decision; changing transportation plans during a crisis can be catastrophic, especially for travellers. But you must always have 2 scenarios - work on both plan A and plan B - and work on the 2 concomitantly (example of the diesel locomotive expected to do the lift during the derailment that breaks down).

2. Uncertainty: In crisis, we never have exhaustive information about the situation; Uncertainty and lack of information must be managed. Students are taught, for example, to tell journalists even if it is difficult - that "we do not have the information".

3. The posture of questioning is vital. It is necessary to constantly reformulate the raw information transmitted by the site in particular. In crisis, there is a distortion of information; Hence the necessity of always recalculating the facts and having the interlocutor to repeat the information given by telephone in particular.

4. Anticipation. One of the biggest difficulties in crisis management is time management. "Crisis management means taking precedence over events". We go into crisis management mode when we decide to take charge of the events: it is not when we are in panic: We must not let ourselves be driven by events. Crisis management; It is also knowing how to anticipate and keep one's common sense. This is especially true for the media, there is a need to communicate quickly and take the lead on the media: the first tweets in the exercise are launched 10 minutes after the incident.

5. A rigorous school: in crisis management, it is necessary to establish an exact chronology of the facts and to learn to hold a "handrail" to share the information between the different stakeholders. It is a new exercise for students.

6. The primacy of organizational robustness over technology. There is no "deus ex machina" that can take charge of a complex crisis situation. Technology, especially with new media, remains a tool for decision-making. SNCF and RATP developed robust transport plans in limited numbers that all the players (from the crisis manager to the local agents) know perfectly.

7. Pressure and stress. Human limits are reached very quickly; it is unthinkable to handle two crises at the same time. Often, during a crisis, there are clashes; the crisis is often violent! The crisis, as Salem Brahami writes, "is first of all a train of emotions"

8. Some crisis communication rules: never lie when you give information to travellers, do not discard, never justify yourself.

9. The complexity of the stakeholders' game: the objectives diverge, are not reconcilable; It is necessary to reconcile different interests: national interest vs the interest of the regions (Burgundy); Those of the Infrastructure Manager (restoring the tracks to resume circulations) and those of the Railway Company (taking care of passengers). As an illustration, a facilitator playing the role of the train conductor refuses to extend his service and exercises his right of withdrawal even if several hundred passengers are blocked.

5. Teaching feedback

Teachers know that game is one of the most effective methods of learning; and this applies to safety learning in a crisis situation. Thanks to a simulation, this day presents a real pedagogical interest; it asks for behavioural know-how, particularly in terms of communication, decision-making and coordination.
1. Referring to an article by the CEFES of the University of Montreal: the exercise of crisis as practiced at the Ecole des Ponts is clearly a simulation and not a simple role play.
Simulation is defined as "a reproduction of a situation that constitutes a simplified but correct model of a reality" (Chamberland, Lavoie and Marquis 2000, p.81). This pedagogical method aims to recreate a situation representing the reality in an objective way and to which the student could be confronted. .... In a simulation, the student plays his own role by projecting himself into a realistic professional situation, while in a role-playing game he plays a role or a character. The exercise was designed to be as close as possible to a real situation. The scenario is quite plausible. The exercise is starting at 10 am and ending at 3 pm; there is no lunch break and the students are not warned. They do not know the place or the incident before the beginning of the exercise.
2. This pedagogical practice is time-consuming and requires a consistent teaching team as described - and therefore financial means (this course is the most expensive of the programme except the study trip) - "The time available represents an important challenge. In most cases, the teacher covers the three phases (preparation, delivery and activity feedback) during the same session. This choice limits the number of objectives and requires good coaching. "
3. Philippe Meirieu correctly points out that "when students are made to work as a group," we encounter a pitfall which is the division of labour ... The students divide the work between the missions of designers, performers, Unemployed, and do not learn much ".

In the crisis management exercise, by allocating roles upstream of the exercise (and in an authoritarian way) by the pedagogical managers and by the strong obligation of collective production, no student is in a situation of unemployed "underground passenger". The counterparty, however, is that the group of students cannot exceed twenty.
4. Finally, one of the basic pedagogical option of this exercise is the belief that students will learn more in a destabilizing posture: destabilization of the posture of students who practice the lessons of their teachers but also Destabilization in relation to their posture of engineer (confirmed or future) who apply after the analysis of a given problem, procedures, corrective actions conforming to referential or other normative system.
During the exercise, the students do not implement the actions described in the repositories, whether SNCF, RATP or Plan Orsec (presented at the beginning of the module): they must "invent" and not apply ... It demands Adaptability to an unprecedented situation (definition of the crisis par excellence), "getting wet" and taking collective decisions in a stressful situation.

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5.2 Teacher Education

Aligning Approaches to Learning, Teaching and Assessment in Teacher Education by applying the CALOHEE Assessment Reference Framework

The Qualifications Reference Frameworks and its related Assessment Reference Frameworks as proposed in Section 4 needs to be tailored towards each individual degree programme in terms of profile and related learning outcomes, followed by implementation. The success of the implementation stage – and, thus, of the whole endeavour of improving preparation of future teachers – depends on the use of appropriate combination of learning experiences, assessment approaches and teacher support/interventions, fully aligned with the intended learning outcomes. This section seeks to inspire such better practice, to stimulate thinking and encourage discussion about how student achievement of the proposed meta-profile components can best be promoted in various contexts.

By means of example, one possible sequence of learning, teaching and assessment activities is proposed for Dimension 3 – cycle 1 (bachelor) / level 6 EQF 'Learner empowerment, potential and creativity' and its sub-dimensions or subsets, respectively (1) Learner self-esteem and confidence; (2) Learner motivation and resilience; (3) Learner creativity and mastery of tools; (4) Tutoring. This example was prepared by Julia M. González Ferreras and Maria Yarosh and has been taken from the *Guidelines and Reference Points for the Design and Delivery of Degree Programmes in Teacher Education- Edition 2018.*

Empowering learners, developing their creativity and helping them reach their full(est) potential has always been important. However, now that we strive for making learner-centred, competence-based education reality, these elements have become key.

The possible sequence of learning experiences, assessment practices and teacher interventions, is presented here subset by subset. In each subset, we describe the learning, teaching and assessment activities related to the knowledge descriptor first; those associated with the skills descriptor second; and those contributing to the achievement of the autonomy and responsibility (wider competences) descriptor third. An attempt has been made to show a variety of methods and to demonstrate how the level of required students' autonomy can be gradually increased. Knowledge- and skills-related activities start the developmental processes, while those linked to the autonomy and responsibility (wider competences) permit to integrate the different elements and ensure that students are ready to perform the activities expected of them in the world "beyond academia". The sequences proposed can take more or less time, depending on the students' needs and the course/module configuration.

Subset 1 L6_3.1 **Learner self-esteem and confidence**	K6_3.1 Advanced knowledge of how to raise learner self-esteem and confidence	S6_3.1 Ability to support learners in identifying own strengths and setting goals to build on these	C6_3.1 Capacity and commitment to create situations and climates in which learners increase their self-esteem and confidence

Knowledge: **K6_3.1 Advanced knowledge of how to raise learner self-esteem and confidence.**

The objective is to assure that the themes of self-esteem and confidence are well understood and can be handled creatively by the student teachers.[28] This deep understanding of the self-esteem and confidence,

[28] The following terms will be used throughout this section: (1) student teachers/students – students enrolled in teacher education degrees and preparing to become school teachers; (2) university teacher – academic working on the teacher education programme; (3) school teacher(s) – teachers working at schools and acting as internship supervisors or supervisors of shorter teaching interventions of student teachers; (4) learners/ school children and adolescents – school-age children and adolescents whom student teachers are preparing to teach or encounter in school during their internship / shorter teaching intervention periods.

as well as of the processes that permit to raise learners' self-esteem and competence are achieved through developing: (1) an understanding of the literature that exists in relation to the two issues – the different theories and academic approaches and (2) the capacity of understanding what different schools of thought can offer in relation to these two critical elements in the empowerment of the learner.

With the general logic of complexity increasing not only horizontally within subsets, but also vertically across subsets, university teacher is invited to model good practice in constructing advanced knowledge and show students how they can approach any concept they want to learn more about. Therefore, the first step could be for the university teacher to present to the students the different sources that can be consulted in order to learn about development of self-esteem and confidence in children and adolescents. Care should be given to bring qualitatively different sources – sources from different époques, cultures or regions, schools of thought, etc. The outcome of this presentation could be a "map" that groups different sources according to key parameters (which this time were identified by the university teacher).

As a second step, students in small groups could explore the "cluster" of sources assigned to them and prepare posters where they show what "their" sources say about the key questions (again, this time, identified by the teacher or in a teacher-led discussion in the whole-class session where the sources were first presented to the students). A poster-presentation session could follow, where small groups present their posters and explore those of others. University teacher also "visits" all the posters, providing feedback comments on each, and rounds-up the session with a whole-class feedback dialogue, where any misconceptions are clarified and any important gaps in the general picture "filled" or at least signalled for students to "fill" by further document exploration.

The third step, which permits summative assessment of the students' knowledge, consists of students developing individual summaries of what they learned from all the posters in terms of how schoolchildren's self-esteem and confidence can be raised.

Skills: **S6_3.1 Ability to support learners in identifying own strengths and potentialities to build on these.**

The aim of this learning sequence is to be able to discover at different levels (own level and that of learners) the experiential impact of having own strengths recognized by oneself and by others and the observation of this impact on the learners. This is complemented by the knowledge of the different processes and strategies of identifying and building on these resources, strengths and capacities.

Here one possible suggestion is to let student teachers start with identifying their own strengths and potentialities, in order to next move to doing the same for children of the age groups they are preparing to work with. Thus, the first step is for students to work in pairs with someone they know well and engage in a dialogue where they explain what strengths and potentialities they perceive in themselves and in each other and how they became aware of these; after which both discuss how they can build on own strengths. Next, groups of four could be formed, where each pair shares with the other a summary of their initial dialogue and their reflections on the process. This sharing could be followed up by a whole-class discussion, where all the groups report on the lessons learned in this exercise, on the strategies used and on how they think the same can be done with/among the children or adolescents.

University teacher could facilitate this discussion, helping students to become aware, for example, of key differences between them and the school children/adolescents and possible consequences, of the importance of focusing on strengths rather than on weaknesses, etc. University teacher's role is to help students (1) realize how important it is for children/adolescents to identify own strengths and potentialities and (2) understand what is transversal and what is age-specific in how this can be done. Additionally, university teacher can direct students to sources where they can get more ideas on how they can reach similar aims when working with children/adolescents.

The second – intermediate – step is for students to prepare for the similar exercise with school children/adolescents. Working in small groups (perhaps the same groups of four as in step one exercise),

students could suggest different ways in which they can help a class of children identify own strengths and potentialities. Next, they share their proposals online and give/receive peer-feedback on feasibility of their plans, with the aim of improving these and identifying any overlooked aspects. University teacher's role can be to intervene with Socratic questions in order to help students plan for any "unexpected situations" and develop "plans B" if some of their ideas do not work as expected (and also draw their attention to any overlooked aspects, if applicable).

The third step is for every small group of four to implement their planned activities with a class of children/adolescents. Before the actual session, "final" proposals (revised in the light of feedback from peers and the university teacher, as well as the insights gained from looking at other teams' proposals) need to be presented to the schoolteacher working with the children in question and negotiated with him/her (approved or adjusted slightly in the light of his/her feedback). After the session (or perhaps a number of smaller sessions – this depends on the plan of each group), students should ask the school teacher for further feedback (for a small session where the schoolteacher and student teachers can discuss the implementation of the planned activities).

Finally, students in small groups prepare a reflective note, which includes a revised plan with justifications for changes, and share these notes with the whole class, after which the whole class can "vote" the most effective strategies they have discovered.

In a subsequent internship period students should come back to this point and implement certain activities/actions on helping learners become aware of own strengths and potentialities.

Autonomy and Responsibility (Wider Competences): **C6_3.1 Capacity and commitment to create situations and climates in which learners increase self-steam and confidence.**

The learning sequence here should aim to help student teachers integrate the knowledge and skills element of this subset: develop commitment to create an atmosphere for the learners where confidence and trust in own abilities and strengths can grow. Student teachers need to learn how to apply their knowledge and skills appropriately in different contexts and be ready to accept the responsibility required. For this, it is suggested that they focus on achieving the autonomy and responsibility (wider competences) during (a longer) internship period. Some concrete elements of this learning sequence could be as follows:

- ✓ Joint preparation of an assessment rubric for autonomy and responsibility (wider competences), based on insights gained from reading different authors and from the experience gained during short internship work
- ✓ Writing a structured reflective diary on experiences related to autonomy and responsibility (wider competences) in question gained (both intentionally and un-intentionally) during internship period(s)
- ✓ Self-assessment backed up by evidence of students' choice to document their progress towards the key elements of the rubric
- ✓ Contrasting self-assessment and observations recorded in the diary with the school teacher(s) acting as internship supervisor/tutor in order to enrich own perceptions and learn to evaluate monitor the impact of the strategies used and the level of the transformation achieved with a higher degree of objectivity

Subset 2 L6_3.2 **Learner motivation and resilience**	K6_3.2 Advanced knowledge on building motivation and developing resilience	S6_3.2 Ability to support learners in building motivation and developing resilience	C6_3.2 Capacity and commitment to motivate, inspire learners and support their empowerment creating situations where they can find their own ways of development and strengthening

Knowledge: **K6_3.2 Advanced knowledge on building motivation and developing resilience**

Following the general principle of helping students to gradually become more autonomous and self-regulated learners, Subset 2 knowledge-related learning and teaching activities could give more responsibility to the students than Subset 1 knowledge-building activities. Thus, this time students themselves could be asked to look for authors and sources that can help them construct knowledge on building motivation and developing resilience among the age groups they are preparing to teach. This first step of identifying relevant sources and theories/findings can be done outside the classroom in small groups, who then come together (in a face-to-face or online synchronous session) to collate their work. Each group should clearly state what questions their sources address and how they can help someone interested in understanding ways of building motivation and developing resilience. During the whole-class discussion all sources identified should be grouped in terms of their similarity or complementarity and one common list of key sources should be agreed. University teacher's role could be to facilitate this discussion, helping students to properly group different sources, and to ensure that no key names/sources are missing from this joint list. University teacher's interventions would constitute formative feedback for the students.

During the same whole-class session (or a subsequent one) students can also agree on the common list of specific questions they want to find answers to in order to understand *how motivation can be built and resilience developed*. University teacher can contribute to this discussion eliciting some specific questions he/she knows are crucial but students might overlook at this stage.

Next, the sources/authors from the joint list can be distributed among the same small groups and each small group would engage with theirs to prepare a presentation on how "their" sources/authors respond to the specific questions formulated in the whole-class session.

In the next whole-class session, small groups can make oral presentations, so that everyone in the class can learn what the different sources have to contribute (jig-saw principle). One person in each group can be nominated to comment on communalities and differences between presentation N and presentation N+1, thus helping everyone in the class to create links: the person from group who presents first (presentation 1) would comment on similarities and differences between presentations 2 and 1, the person from group 2 – on similarities and differences between presentations 3 & 2. The person from the "last group" would compare their own presentation with the one of the very first group.

Everyone in the class and the university teacher can be listening with the summative assessment task in mind (see below) and asking questions when anything is not clear (thus also providing informal feedback to the groups).

Summative assessment task can consist in small groups preparing handouts with key points on building motivation and developing resilience. These should reflect contributions of all the small groups and explicitly indicate which points all authors/theories/sources seem to agree on and points where different opinions co-exist. The target audience of these handouts could be practicing (school) teachers. In this case, student groups can be asked to obtain feedback on the usefulness of these handouts from at least 3 school teachers and introduce any revisions necessary. University teacher's feedback should be focused on how accurately different authors/theories/sources are represented and on identification of conceptual confusions/misunderstandings, if any.

Skills: **S6_3.2 Ability to support learners in building motivation and developing resilience**

While in Subset 1 students' skills comprise rather "punctual" actions, here it is important that student teachers learn to accompany school children in the process of building motivation and developing resilience. Therefore, the learning process can be divided into three stages: (1) preparatory stage, (2) practice stage, (3) reflection stage.

The preparatory stage can consist of:

- an individual reflection on own experience (each student can reflect on how he/she has experienced the two processes, on enablers, obstacles and means to overcome obstacles);
- a focus group discussion with school teachers to learn about any know-how they have developed and found useful; and
- a small session with school children, where students will learn about the children's perspective and use different activities to do so (for example, focus groups and sessions with children conducted by students in small groups of 2-3 persons).

The preparatory phase can culminate in a whole-class session where all experiences are shared and a joint list of "tips" and strategies for the practice stage is prepared.

The practice stage can form part of an internship period and consist in accompanying 3 children for at least one month, trying to help them build motivation and develop resilience. Reflective journal kept during the internship period will include notes on this process, along other elements.

The reflection stage can permit students to capitalise on their experience and obtain more systematic feedback on their current level of skill development (assessment). Students can be guided to:

- self-assess their efforts (going back to respective sections of their reflective journals and preparing a final reflective self-assessment statement);
- obtain feedback from their internship supervisor (the person who saw them work with the three children);
- obtain children's feedback (for example, as part of a children's reflective activity at the end of the period, or in the form of small interviews conducted by another student)
- prepare a revised plan of action: what they would like to do next time (which elements could be kept and what needs probably to be done differently).

These four elements could be presented either in writing, or as an audio file, or as a web-based material that combines written and oral elements.

Autonomy and Responsibility ('wider competences'): **C6_3.2 Capacity and commitment to motivate, inspire learners and support their empowerment creating situations where they can find their own ways of development and strengthening**

As mentioned above, all wider-competences in this dimension probably need to be developed and assessed during internship period(s). As mentioned in Subset 1, prior to or early on during (the longer) internship period, students can be involved in designing a rubric to monitor the development of autonomy and responsibility (wider competences); they could be asked to keep a reflective journal during the whole internship period; and self-assessment needs to be complemented with feedback from internship supervisors based in schools, and, at least in some cases, – by peer-assessment (student teachers observing other student teachers and giving each other constructive formative feedback).

Subset 3 L6_3.3 **Learner creativity and mastery of tools**	K6_3.3 Advanced knowledge of tools necessary for learners to develop their full potential (using multiple learning styles) and enhance their creativity	S6_3.3 Ability to select and use tools necessary for each learner to develop their full potential and enhance creativity	C6_3.3 Capacity and commitment to facilitate climates where learners can enhance their creativity and try out new tools

Knowledge: **K6_3.3 Advanced knowledge of tools necessary for learners to develop their full potential (using multiple learning styles) and enhance their creativity**

The objective of this learning sequence is to advance knowledge and understanding of the different approaches and theory of multiple intelligences and multiple learning styles including the role of emotional intelligence, personalized education and the auto-regulation and their possibilities to enhance motivation and creativity.

It is suggested that student teachers start with reflecting on their own experience – on how they learn and what/who and how helped them to develop their potential and creativity (step 1). Individual reflection can be shared in small groups in order to identify common themes, as well as contrasting experiences. Together, in their small groups, students can formulate questions and hypotheses about tools necessary for learners to develop their full potential and enhance their creativity. These will be used for "interrogating" literature in step 2. University teacher can facilitate sharing of these questions and hypotheses in a whole-class format and guide the class to, first, formulate all the questions he/she considers key for students to explore (informal feedback), and then organise these into a limited number of major questions with their respective sub-questions and related hypotheses.

The second step could consist in students exploring literature in order to look for answers to the questions formulated at step 1 and to see whether "hypotheses" students formulated on the basis of their own experience are supported by research findings. Students could also be instructed to look for ways (activities, "tests") to help learners become aware of how different learning styles and learning itself can be, how multi-faceted human intelligence is and how important it is to value different types of learning and strive to develop as a whole-person. This step can be done in the same small groups in which students worked in step 1.

At step 3, whole-class sessions can be organised where each key question and hypothesis will be addressed, one by one, with one of the groups opening the discussion and the other groups adding to it (for each question/hypothesis a different group will open the floor). The outcome could be an integrated map of the state-of-the art of research on this topic. University teacher can break the literature exploration task into stages (one per major question identified) and organise a whole-session discussions at the end of each stage. This will permit students to enhance their explorations of question 2 in the light of feedback exchanges during discussion session 1, etc.

A possible assessment task could be for each small group to create video recording on each major question (video essay) and upload it to YouTube. These video-essays could be aimed at children of the age students are preparing to teach. Students can then use these materials when working with children in school (S6_3.3 Skills) and obtain feedback from the children on the clarity and usefulness of the resources they created. University teacher's feedback is likely to be necessary to make students aware of the points only few groups covered in their "essays" or draw students' attention to the points none of the groups covered.

Skills: **S6_3.3 Ability to select and use tools necessary for each learner to develop their full potential and enhance creativity**

The objective of this learning sequence is to develop the capacity of the student teachers to be able to choose and implement different systems and instruments and to be able to discover in which way and measure the creativity of the learner is awaken and stimulated in accordance with own capacities.

These skills could be developed during the internship periods or during a series of visits to a school centre, during which student teachers interact with school teachers and school children/adolescents. More specifically, the following can be done:

- ✓ First, students can select validated tests on multiple styles of learning and organise activities for school learners to take these (with previous approval and under supervision of the current teacher);
- ✓ Then, students can analyse the results with the current teacher, discussing the different types of strengths in relation to creativity and different elements both in the line of knowledge as well as in relation to attitudes to learning;
- ✓ Next, students can plan some activities to develop different types of learning from linguistic to mathematical, to artistic, technological, intra-personal, social, of auto-regulation…. and obtain the current teacher approval (possibly with initial formative feedback and requirements/suggestions to adjust certain elements first);
- ✓ Finally, students can follow up on some of the children/ adolescents (3 per student), evaluating the results in terms of growth in creativity and personal growth and further supporting these developments.

Assessment (both formative and summative) in this case can be best done by school teacher, with whom student teachers work throughout this process and who can observe student teachers "in action". Additionally, students can be invited to observe other students and provide peer-feedback. Finally, self-assessment, used continuously through the process, can help students better develop their skills. If you wish to use self-assessment as part of the summative assessment, students can be asked to prepare a number of evidences – accounts of what they did with school children that demonstrate their level of skill acquisition – which students will then need to validate by asking school teachers who supervised them to endorse (or challenge) these, as well as add more/different evidence. This "dialogue" around students' skills and evidence will also be a valuable learning experience for the students.

Autonomy and Responsibility (wider competence): **C6_3.3 Capacity and commitment to facilitate climates where learners can enhance their creativity and try out new tools**

The objective of this learning sequence relates to developing and measuring the combination of capacity and attitude-commitment to implement the development of contexts where the learners feel free, inspired and motivated to try and experiment new ideas, new instruments and methods they have learned in order to discover new ways and to stimulate innovation and creativity.

Learning strategy: This can be started with sporadic activities first, well programmed and selected to really carry it out during the long internship period.

- ✓ Prepare process for systematic development of context and systems for personalized education.
- ✓ Understanding of capacities both of knowledge, capacities and attitudes of the students in the class. Critical selection of tests of multiple learning styles and discussion in the class and with the tutors and current teachers.
- ✓ Implementation of the tests in the classroom and guided analysis
- ✓ Plan for following up each the students and adaptation of the programmed activities according to outcomes and how the learning should progress
- ✓ Have systematic records and evidences of progress
- ✓ Prepare a revised plan for a systematic introduction of contexts of diverse learning.

Subset 4 L6_3.4 **Tutoring**	K6_3.4 Knowledge of school counselling processes and of how to give advice to children and adolescents (and their families/guardians) to	S6_3.4 Ability to identify the needs and accompany learners towards the development of own resources; directing learners (and their families/ guardians) to other	C6_3.4 Capacity and commitment to ensuring that learners (and/or their families/guardians) receive necessary accompaniment and counselling in a timely manner

	develop learners' own resources	professionals when necessary	

Knowledge: **K6_3.4 Knowledge of school counselling processes and of how to give advice to children and adolescents (and their families/guardians) to develop learners' own resources**

To gain knowledge of school counselling processes and of how to give advice to children and adolescents (and their families/guardians) in order to help learners develop their own resources, student teachers can pay a number of visits to three different schools, where they conduct short interviews with school teachers and school counsellors to find out how the collaboration between school teachers and school counsellors is organised and how school teachers perform learners' needs analysis, accompany learners towards the development of own resources and in which cases school teachers refer learners (and their families/guardians) to other professionals. This can be done before the first internship period (and will also help students decide which school they prefer to have their internship in) or during one of the internship periods with one of the centres being the student internship centre. In this latter case, the other two visits can be combined with peer-observation sessions in order to give their peer student teachers feedback on certain aspects of their performance.

A whole-class session should probably precede these visits in order to permit students to develop common interview scripts; while a follow-up session can permit students to share their findings and insights.

In order to receive formative feedback, students can be required to share the outcomes of every visit online (findings and reflections on the process of interviewing) and comment on each other's entries. University teacher can also comment on these intermediate entries, perhaps drawing students' attention to underexplored aspects or any misconceptions and misinterpretations.

Summative assessment can be done through asking students (in small groups) to create a memo/ a web-page with advice for novel teachers on what can be done to accompany learners towards the development of own resources and when to direct learners to other professionals. Students could also be invited to observe common patters between "primary data" from different centres and situate these within a general picture by searching for best practice accounts in the literature/online. To continue working towards this element of the their profile, students can also be asked to ace as "assessors" of their own memo/ web-page once they move to the learning activities related to developing Subset 4 skills. In this case, they can be asked to (1) reflect on their own original memos/web-pages, (2) give feedback on the initial memos/web-pages of other small groups, and (3) revise their own original products, justifying the changes introduced.

Skills: **S6_3.4 Ability to identify the needs and accompany learners towards the development of own resources; directing learners (and their families/ guardians) to other professionals when necessary**

These skills will probably need to be developed in schools, during internship periods. As part of internship periods, students can need to accompany 3 learners identified as in need of help by the school teacher (or identified by the student teacher (intern) and "approved" by the school teacher) and hold at least 4 sessions with each of the identified learners. Student teachers will be conducting the sessions, while school teachers will be there to observe and complement the analysis, as well as to revise the student teacher's plan of actions before this is put in practice. Thus, experienced school teachers will be constantly providing formative feedback to the student teachers. As in all other cases, reflective journal and feedback from the accompanying experienced school teacher will be the two key elements of assessment.

Autonomy and Responsibility (wider competences): **C6_3.4 Capacity and commitment to ensuring that learners (and/or their families/guardians) receive necessary accompaniment and counselling in a timely manner**

As already mentioned, all wider-competences in this dimension might best be developed and assessed during the longer (final) internship period. Each wider competence should probably be reflected in the rubric designed to monitor and assess the internship period; while students (through reflective journal and self-assessment) and internship supervisors (through formative feedback and summative report) will be conducting assessment during and at the end of this learning period.

5.3 History

Aligning Approaches to Learning Teaching and Assessment in History by applying the CALOHEE Assessment Reference Framework

The Subject Area Group of History has selected a certain number of sub-dimensions / subsets for exemplification, choos3ing among those directly connected to the specific concerns described in the introduction of the Assessment Reference Framework included in section 4.

3.a Ability to access and use sources appropriately

The Assessment items relative to these competences are included under the second dimension, "Texts and contexts". Normally they will be addressed gradually in a number of course components, but organized in such a way as to ensure that by the end of the cycle all have been covered.

For simplicity we exemplify here using the dimension 2 'Text and Context' of the first cycle (bachelor) /EQF Level 6. This dimension contains the following subsets or sub-dimensions: (1) Source identification; (2) Source retrieval; (3) Source analysis and (4) Contextualization of source production and transmission. These subsets are organized in a logical order that represents progression on a scale of complexity of the competences to be acquired: identifying, retrieving, analysing and contextualizing the sources used.

However, in concrete learning/teaching and assessment situations, several or all of these levels will be explored in their connection to the topics of several course units, rather than in most cases learned, taught and assessed separately. This means that the following activities will be distributed in different course units, and built up though the 3-year programme.

Let us consider them subset by subset.

Dimension 2 Text and Context - Subset 1

Subset 1 L6_2.1 Source identification	K6_2.1 Demonstrate knowledge of the main types of sources used for historical study (including oral history sources, statistical data, material evidence, etc.) and how and why they were produced.	S6_2.1 Identify, with guidance, the appropriate type of sources for a given purpose	C6_2.1 Draw on a plurality of sources when addressing a particular problem

The first approach to original sources will be through a presentation guided by the teacher, who will give an overview, accompanied by visual examples (projected or in handouts), of the main types of sources used in research on the chronological period that the programme centres on. Working in groups, or individually, the students will identify, among those presented, the most useful types of sources to address different problems: for example, the reconstruction and interpretation of a significant political event, a military campaign, a demographic crisis, a social-economic structure, the effects on a group or class of individuals of the changes experienced in a certain period. Assessment can be done on the basis of the appropriateness of the choice made by each student or group, and how well it is justified.

At a later stage in the course of study, for example for a final Bachelor's paper, the student will address individually in a written or oral work, the description and analysis of a relevant historical problem, showing his/her ability to locate and utilise different sources.

Good practice: in some degree courses, seminars on the sources used to investigate other historical periods are organized. This stimulates the learner's understanding of the various ways sources can be used and increases their creativity in devising ways of developing topics linked to their own period.

Dimension 2 Text and Context - Subset 2:

Subset 2 L6_2.2 Source retrieval	K6_2.2 Demonstrate knowledge of where and how historical data and sources can be accessed (archives, libraries, internet, repositories, etc.)	S6_2.2 Use inventories, catalogues, electronic resources and the like as appropriate to locate needed data and source material	C6_2.2 Retrieve the relevant sources and data and organize them to address problems

Assessment of this subset can be achieved through tests, on paper or preferably on-line, in which the students demonstrate their ability to retrieve the sources dealt with in the various courses comprised by the programme, and also to show that they know how to go beyond what has been presented in classwork (lectures or seminars) in order to identify a broader corpus of documents or relevant bibliography. Learning, with an initial input from the teacher, can be individual or in a group, based on problems and structured feedback (thus a form of ongoing control). The final learning and assessment of the competence level ("Retrieve the relevant sources and data and organize them to address problems") can be the object of exercises leading to short papers, and towards the end of the cycle the selection and retrieval of the sources to be used for a final paper.

Dimension 2 Text and Context - Subset 3:

Subset 3 L6_2.3 source analysis	K6_2.3 Demonstrate knowledge of the methodology of source analysis: how to read and understand a text, written or of another kind.	S6_2.3 Analyse texts of different kinds and evaluate their relevance with respect to a specific inquiry	C6_2.3 Critique groups of sources and evaluate their usefulness for addressing a specific problem.

This subset is closely related to the following one. However, in subset 3 the focus is on the intensive analysis of the text itself, whereas the following subset emphasizes its contextualization. An effective initial learning method will be a teacher-led seminar-type group, where students read selected texts out loud, bit by bit, by turn and try to explain it in other words, thus learning to understand them precisely, identifying the writer's point of view, and narrative strategy (in the case of an extended text, diplomatic or personal correspondence etc.), or in the case e.g. of fiscal, administrative or judiciary documents, learning to understand them from a technical point of view, and hence to evaluate what conclusions can be drawn from them, in conjunction with other documents from the same or from another source.

Such activities may also comprise (as appropriate to the period studied) learning palaeography, unfamiliar scripts and formats. The third column, I.6_2.3.c, indicates the ability to evaluate a group or type of sources critically will be the final stage in the learning strategy. A written presentation of the sources chosen as a basis for the final paper will be required as a preliminary phase in planning the final paper, and will be presented to the teacher for evaluation.

Dimension 2 Text and Context - Subset 4:

Subset 4 L6_2.4 Contextualization of source production and transmission	K6_2.4 Demonstrate sensitivity to how the context (institutional, technical, archaeological and so forth) has determined the	S6_2.4 Identify the context in which specific sources were created,	C6_2.4 Present a set of data critically, describing the sources and the context of their production, selection and preservation.

	formation and preservation of the sources available today	disseminated and preserved	

Once again, this subset will be learned in varying contexts, according to the chronological period, the geographic or the thematic areas dealt with in the degree programme and the single course units. In all cases the learners will be asked to illustrate not only a set of relevant documentary sources, mapping what exists and what can be used to address the problems dealt with in the course, but also the process by which they have been preserved, and what, as a result, is likely not to have left traces in the documentary record.

Learning will require the study of histories of the archives or repositories used to understand the conditions of creation and conservation of the relevant sources; practical work and individual study with initial guidance by the teacher can form the basis for a short report or presentation on a particular archive or group of archaeological items; in the final Bachelor's paper the explanation of the sources used should be illustrated in such a way as to show knowledge of how, why, where and to what extent they have been preserved.

3.b National view points and narratives

The realization that History as a discipline is in fact largely shaped by national interests, debate and priorities is central to all the work of the Tuning and CALOHEE History SAGs. In spite of this, or rather because of it, there is no single set of descriptors, sub-descriptors and learning outcomes in the Assessment Reference Framework that deals with ways of facilitating students' knowledge of the very different views of the past cultivated in other countries.

However, the History SAGs consider it fundamental to expose students to this understanding in a dynamic and effective way, creating learning environments which will lead them to question the status quo and use the insight that comes from a transnational or broader view. This task, in our view, should inform the entire structure of a History degree programme, and hence be assessed, as well as developed, in many of the planned learning and teaching activities.

Here we will give examples relating to the subset 3 of 'Theories and Concepts', at BA and at MA level, and Interdisciplinarity at BA level.

DIMENSION 3 'THEORIES AND CONCEPTS'			
Level 6	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider competences)*
Subset 3 L6_3.3 Periodization and other national and historiographical frameworks	K6_3.3 Describe existing periodizations of history, their multiplicity and their dependence on specific national traditions, ideological frameworks and historical debate	S6_3.3 Identify critical and methodological approaches to questions of periodization and national traditions	C6_3.3 Connect explanations of historical and societal issues and processes to the conceptual and value frameworks in which they have developed.
Level 7	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider competences)*
Subset 3 L7_3.3	K7_3.3	S7_3.3 Explain and apply	C7_3.3 Critically investigate how

Periodization and other national and historiographical frameworks	Clarify and illustrate how even the very definition of a historical problem depends on/reveals a specific theoretical or historiographical framework, taking into account the multiplicity and diversity of periodisation systems and of national traditions.	critical and methodological approaches to questions of periodization and national traditions.	explanations on societal issues and processes have been formed and reconstruct the conceptual and value frameworks in which they have been developed.

The levels of knowledge, skills and competences to be assessed at the Bachelor or Master level are clearly different, but closely related, and will be built in different contexts during the first and second cycle programme. As can be seen, there is a clear progression from the most evident manifestations of national difference (chronology) to more sophisticated understanding about why certain readings of history (and types of historical analysis) prevail in different national contexts. The highest level of competence is the demonstrable ability by the end of the second cycle to investigate (posing appropriate questions) why certain historiographical issues have been seen as particularly crucial in specific societies.

In our view, although courses can easily be designed to develop these subsets and test them, the most effective way of triggering this understanding and ensuring that it is interiorized is through student mobility, accompanied and supported by appropriate preparation and readings. As good practice, we highly recommend individual mobility to a university in another country whenever possible, accompanied by 'internationalization at home', that is carefully organised collaborative learning experiences with incoming mobile students and professors, and returning outgoing mobile students and professors.

For example, an international workshop or collaborative module can be organised, where students from different countries share their basic knowledge of their own histories, highlighting initially the macroscopic differences in periodization (when does Modern History begin? When does Contemporary History begin? How long did the Middle Ages last? What happened in Ancient times? Is it worth studying?), in the identification of key players and the space given to outside countries (what is known in Lithuania about Portugal, and vice versa? What do Danes know about modern Greece? What do Greek students know about Denmark?). Even in the absence of incoming international students, a kind of international role-play can be organised, tasking each student or groups of students with studying a different country using general historical texts or textbooks published in that country; the students can prepare oral presentations, with power point and illustrations, pretending to come from those countries. The presentations themselves and the quality of the discussion can be assessed, their complexity depending on the stage of studies at which the workshops are introduced.

A further subset which is related to understanding the separateness of existing national narratives and the heuristic potential that connecting them can provide, is subset 3, Level 6, of the 'Interdisciplinarity' dimension:

DIMENSION 4 'INTERDISCIPLINARITY'			
Level 6	*Knowledge*	*Skills*	*Competences*
Subset 3 L6_4.3 Working with data produced by other disciplines or in other national contexts	K6_4.3 Specify what information can be obtained and evaluated by using selected methods of other human and social sciences or	S6_4.3 Use properly information received, employing methods from other human and social sciences and from other countries to	C6_4.3 Recognize and describe the possibilities of an interdisciplinary and/or transnational approach to gathering data and evaluating it.

	using other national perspectives.	address issues in the history domain.	

In this case national differences are only one of the aspects addressed in order to develop the student's ability to move beyond simplistic views of national or local history, exploring different tools. With regard to differences in national perspectives, individual students or groups of students can be asked to take a significant process or event (e.g. the Norman conquest(s); the Hanse; the colonization of the Americas; the French Revolution, the expansion of the Ottoman empire; the Opium Wars...), looking first at broadly accepted interpretations in their own country and then comparing these with those in the historiography of another country. The results can be presented to the other students as 'different' perspectives, at the first stage; the quality of the presentation and discussion to be assessed. At a higher stage, in planning for example the final Bachelor paper, the student – where appropriate – should introduce comparative or international aspects in the data gathered and the approach used.

4. Conclusion

With the preceding discussion and these brief examples we hope to have begun to convey the interest and the potential power of the CALOHEE History Assessment Reference Framework, not only for designing assessment strategies, but also for evaluating and enhancing programme design and delivery in any context.

Certainly no university will use our Assessment Reference Framework as a recipe to be followed slavishly: first of all, because its high level of abstraction means that it must be used as a kind of warp on which to weave the actual content, in terms of knowledge and skills, which are needed and appropriate to a specific degree course.

Nonetheless, we are confident that using this Assessment Reference Framework will help educators involved in course design and delivery to ensure that the essential features of an up-to-date degree programme are present, and indeed to approach the possibility of designing and implementing enhanced degree programmes with a new level of enthusiasm and creativity.

5.4 Nursing

Aligning Approaches to Learning Teaching and Assessment in Nursing by applying the CALOHEE Assessment Reference Framework

As in the case of Civil Engineering the Subject Area Group of Nursing applied a double policy. As stated, it linked one-to-one modes of learning, teaching and assessment (LTA) to the different (sub)dimensions / (sub-)descriptors. These modes were the outcome of the inventory of the CALOHEE questionnaire on assessment and on desktop research. The selection of modes for each of the (sub-) descriptors was the result of intense debate and exchange of opinions.

The second policy was to identify examples of 'good practices' focussing on particular (sub)dimensions / (sub-)descriptors in more detail. Included here is three examples suggested by the Faculty of Health Science of Semmelweis University.

The examples presented here are meant to show different approaches to achieve the learning outcomes for dimension 2 of the Assessment Reference Framework for Nursing, Nursing practice and Clinical decision making, sub-dimension / subset 1 'Perform comprehensive and systematic assessment' (regarding patients).

Dimension 2: Nursing practice and clinical decision making			
Level 6	*Knowledge*	*Skills*	*Autonomy and Responsibility (Wider Competences)*
L6_2. Level descriptor	**K6_2** **The principles, concepts, practises and procedures that underpin the practice and decision making of daily nursing practice.**	**S6_2** **The ability to make, and enact, clinical decisions within their Scope of Practice.** **The ability to fulfil the Scope of Practice articulated at national and European level.** **The ability to be a reflective practitioner.**	**C6_2** **Can reflect upon societal and population health and social needs, contributing as appropriate to policy making. Familiar with cultural competence. Has technical skills that can be utilised in the public space**
Subset 1 L6_2.1 Perform comprehensive and systematic assessments	K6_2.1 Knowledgeable about frameworks/tools used for assessment of, physical, social, cultural, psychological, spiritual and environment factors.	S6_2.1 Demonstrates the ability to undertake comprehensive and systematic assessments using the tools/frameworks appropriate to the patient/client taking into account relevant physical, social, cultural, psychological, and spiritual and environment factors.	C6_2.1 Demonstrates the ability to recognize and interpret signs of normal and changing health/ ill health, distress, or disability in the person (assessment/diagnosis).Demonstrates the ability to undertake an effective risk assessment and take appropriate actions.
Learning approaches	Theoretical and/or clinical.	Theoretical, clinical and reflection.	Theoretical, clinical and reflection.
Teaching approaches	Exposure to varied clinical/ professional practice.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or case study of health care systems and populations.
Assessment approaches	Theoretical and/or clinical assessment of knowledge and understanding of professional, ethical, regulatory and legal nursing codes. MSQ/OSCE case report, round table discussion.	Theoretical and/or clinical assessment of skills to respond appropriately and effectively to professional, moral, ethical and/or legal dilemmas and issues in day-to-day practice. Case study, report, practical demonstration simulation, clinical placement.	Theoretical and/or clinical assessment of ability to recognize and challenge current systems/policies in order to meet population/patient needs. Simulation, clinical placement, case study, patients report, problem solving discussion

	Exemplar – indicators, suggestions Demonstrates knowledge of types of assessment frameworks/tools that can be used to holistically explore and understand the patient/client's needs. Is aware of different tools and methods of collect information.	**Exemplar – indicators, suggestions** Demonstrates the relevant clinical, cognitive and communication skills that are required to holistically assess the patient/client's needs.	**Exemplar – indicators, suggestions** Demonstrates the ability to recognise and interpret changing trends and distress, disability, or other critical situation and based on local policies and professional standards, can correctly identify the steps to take.

Level 7	***Knowledge***	***Skills***	***Autonomy and Responsibility (Wider Competences)***
Subset 1 L7_2.1 Perform comprehensive and systematic assessments	K7_2.1 Has profound knowledge about frameworks/tools used for assessment of, physical, social, cultural, psychological, spiritual and environment factors.	S7_2.1 Demonstrates the ability to undertake advanced and systematic assessments in complex cases taking into account using the tools/frameworks appropriate to the patient/client taking into account relevant physical, social, cultural, psychological, spiritual and environment factors. Based on profound knowledge based and/ or clinical experience, can anticipate complications, outcomes etc.	C7_2.1 Demonstrates the ability to recognize and interpret signs of normal and changing health/ ill health, distress, or disability in the person (assessment/diagnosis). Demonstrates the ability to undertake an effective risk assessment and take appropriate actions safely and efficiently.
Learning	Theoretical and/or clinical.	Theoretical, clinical and reflection.	Theoretical, clinical and reflection.
Teaching	Exposure to varied clinical/ professional practice.	Exposure to clinical practice and/or case study.	Exposure to clinical practice and/or case study of health care systems and populations.
Assessment approaches	MCQ/OSCE, reflective essay, leading case study conference/round table (e.g. for nurse students) **Exemplar – indicators, suggestions** MA: Capacity to critically evaluate appropriate tools, frameworks and the relevant aspects of the patient. Demonstrates the ways to explore the different aspects, having influences to nursing, they are coming from patient's, physical, social, cultural, psychological, spiritual and environmental factors.	Practical exam, debate, thesis work, project work, hospital leadership training **Exemplar – indicators, suggestions** MA: Demonstrates the relevant clinical, analytical and communication skills that are required to holistically assess the patient/client's needs in a variety of clinical contexts (e.g. primary, secondary and tertiary care and in different environmental situation, e.g. socioeconomically influencing factors). Can adapt the assessment tools/approach as appropriate.	Problem solving discussion. essay, thesis work, project work, teaching lesson, short paper for stakeholders, clients **Exemplar – indicators, suggestions** MA: Identifies the need for and (where appropriate) implements monitoring and early warning tools. Liaises with relevant services (based on local policies and professional standards) in order to both plan ahead and react to changing clinical situations.

Example 1

Learning (approach)

Step 1: Becoming acquainted with basic literature about assessment frameworks and tools,

Step 2: Becoming acquainted with theoretical frameworks employed at definition of standards, and applying criteria influenced by physical, social, cultural, psychological, spiritual and environment factors.

Step 3: Understanding the importance and the responsibility of assessment process to repair/develop/promote patient's health status in different health care situation. Making decisions and debate to find the optimal decisions. Prepare critical analysis to find the optimal way. Demonstrate standards and criteria based on evidences.

Step 4: Selecting and processing and presenting, reporting systematic and comprehensive (normal-adequate-sick status) health assessment taking into consideration the factor influenced the given situation

Teaching (format)

Step 1: Learning about the key literature by outlining, analyzing, discussing the main texts, and demonstrating in the practice in the nursing laboratory (practicing room). Stimulate the students to earn theoretical knowledge and practical, motoric skills. Theoretical and practical small group lessons advised. Possible blended learning also.

Step 2: Learning about the key literature by outlining, analyzing, discussing the main texts, and demonstrating in the practice in the nursing laboratory (practicing room). Stimulate the students to develop theoretical knowledge and practical, motoric skills. Using interactive format: practical lessons: Stimulate the students by case studies to give answers, select and use assessment ways, give discussion, debating. The lessons leaded and moderated by questions of teacher, who step to step refer to bridge between theory and practice.

Step 3: Introduction by teacher in practice by selected case studies in laboratory environment. Practice oriented seminar to analyze situation, refer the theoretical knowledge, the literature and evidences of profession. The students work in small groups, prepare a short paper, do project work and/ or portfolio in a selected topic / case from list (list of cases, situation descriptions) given by teacher/ exercise book. The small group projects will be presented by the students (oral or written), and will be discussed briefly in the end of the lesson. Then the student will process the given assessment with the doll or moulage.

Step 4: As step 3 SIMLAB in individual and or par work (using prepared scenarios), representing different roles in the team, self-evaluation and debriefing at the end of lessons. The teacher generate discussion and debate, pro and contra.

Step 5: As step 4 in real time clinical environment (patient's ward) in par and / or individual, supervising by clinical nurse mentor. The student prepares a report, including an individual case study, and evaluates own experiences by formative (question list- coming from teacher) and summative form both.

Assessment (approach)

Step 1: Application of formative and summative assessment. Knowledge and understanding of key literature. Combination of periodical (diagnostic) assessment and final examination at the end of the course at the end of the semester.

Step 2: Application of formative and summative assessment. Knowledge of and insight in the literature to analysing and discussing the main text (theoretical) and demonstrate the cognitive and motoric skills in the practice: demonstrate nursing activities and making decisions in nursing lab (Training level 1)

Step 3: Assessment based on a range of activities and knowledge of and insight in the literature on different special fields of health care (level of health care and profile of health care).
Activities are active participation in understanding, analysing and debating different case situation with different patient and nursing problem. (Case situation presented by teacher or by exercise book or sheets. Based on theoretical studies (step 1, 2, 3 LA) and practical experiences

(step2 LA) student step to step create nursing diagnosis and makes decision to challenge solution. Assessment is combination of continuous and end semester/end course final examination. Format is short paper, report, demonstration, debate, presentation. (Training level 2)

Step 4: As Step 3, but in Simlab by presentation of different selected scenarios. More and more comprehensive answer for the challenge, by the steps of Nursing Process (based on theoretical studies step 1,2,3, LA and practical experiences step 2,3) , It means , that the assessment refers to learning outputs are defining the „wider competencies" like communication, team work a.s.o . Assessment is combination of continuous and end semester/end course final examination. Teacher and student group give continuous feedback for whole team and for individual students both and there is a practical final exam (Training level 3)*

Step 5: Assessment based on a range of activities in real time clinical environment, and knowledge of and insight in the literature on different special fields of health care (level of health care and profile of health care both)
Assessment is combination of continuous and end semester/end course final evaluation. Teacher and student group give continuous feedback for whole team and for individual students both (Training level 4)

Step 6: Internship training in ward. Assessment is a combination of continuous and end semester/end course final evaluation. Teacher and student give continuous feedback (Training level 5)

Steps of Practical education in Nursing at SU-FHSc Bp

Training level	**Training content**	**Learning output**	**Teaching type**	**Assessment**
1	Nursing procedures are **introduced by a university teacher assisted by a demonstrator.** Students can observe not only entire activity, but also its component parts augmented by a teacher commentary and student/teacher interaction. Exercises are shown a couple of times, in order to enable the students to learn the entire task.	Define, declare, count, recognize Can identify normal therapeutic range of common drugs	Traditional training room in school and Simlab	Demonstration, and practical exam
2	The student **practices individual elements** of the skill. The teacher and the demonstrator are **continuously supervising** to work, and supply them with **support** and information or help **executing of nursing** procedure if needed.	Formulate knowledge in own words, explain, account for, show differences. E.g.: Able to recognize the difference between diuretics that are potassium sparing and those that are no.	Small group training in hospital teaching patient room	Practical exam and project work, group discussion, feedback from hospital tutors and school teacher
3	The student **can complete the activities, skill or tasks in their entiret**y. Minimal supervision should be required for safe, effective performance. Student should now be able **to outline the indications and contraindications of single nursing procedures, the equipment** needed for the intervention, the somatic and psychic preparation of the patient and the execution of the activity**. Student should be enable to manage a practical example within the practice room and be examined in this context.**	Demonstrate, explain, make use of knowledge E.g. Knowledge of action of steroids enables student to explain to patient the importance of glucose monitoring while on this drugs.	Small group training in hospital ward, shadowing in hospital and several community services and Simlab training	Case study, project work, debriefing practical exam, group discussion, feedback from hospital tutors and school teacher
4	During gained clinical nursing practice, students are enabled to learn, practice, check and evaluate nursing procedures in	Find parts in a whole and connections, discern,	Pair training, shadowing in hospital and	Debriefing, practical exam, project work,

	real-life situations. The leader of the practice is present at every activity of the student.	criticize, and make comparison. Review a patient's health status and medication regime and can explain the rationale behind the medication therapy for this particular patient.	outpatient and community services	self-evaluation, feedback from hospital tutors and school teacher
5	This last stage leads to the final exam. Students are capable of the **independent works**, although they are supervised and evaluated. The activities are executed with maximum precision, students are aware of their competences and the methods to avert the possible complications, thus the leader of the practice can entrust to the students the organization of the daily routine and **individually performing patient-care in vivo as well**.	Draw conclusions, defend and make decisions Realizes patient is in pain, reviews medication chart and following patient assessment and dialogue, chooses appropriate medication from prescription list. Suggests change in therapy following evaluation of effectiveness.	Internship in hospital and in community services	Closing practical exam

Example 2

Assessment in SIMLAB at SU-FHSc (with contribution Eszter Borjan RN, MW. MSc, PhD in Nursing

Past practice showed that the introduction of an effective, objective evaluation method in nursing and midwifery specializations had become increasingly urgent. The instrument developed and used originally proved not to be completely objective, because its validity and reliability were not sufficiently verified. In a more detailed study of the literature, the "Creighton Simulation Evaluation Instrument" (CSEI), developed by Creighton University, USA, was identified as the most suitable practice at the Faculty of Health Science Semmelweis University.

We were granted permission from the developers of the device in the summer of 2013 and started using it in our practice after translating it into Hungarian. The use of the audio-visual system (METI Vision) was previously only possible (based on the needs of the lecturer), and was used to support the application of C-SEI as an important instrument when evaluating students

Structure of simulation exercises

The clock begins with a description of the case and begins with an anamnesis. If necessary (especially at lower knowledge levels) briefly new theoretical knowledge can be transferred in the introductory part of the practice. You have to be convinced of the students' knowledge, striving to correct them. Then the case is presented at one or more stages. The students are responsible for patient monitoring, recognition of state changes, execution of interventions and activities within competence, and asking for help for the patient as needed. For larger student numbers, this phase is grouped.

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Activities beyond the competence cannot be allowed even in a simulation environment. Medical instructions and interventions are defined in the PNCI (Program for Nursing Curriculum Integration) program package, so there is no need for a physician who is physically instructed during the simulation, although the effectiveness of the simulation can be increased in many ways. At the next stage, the groups change places, which will allow you to refer to the "patient". Communication between team members is based on the previously described SBAR method. Communicating with the patient - although limited to achieve it - is also a requirement during the exercises. Writing information in writing, measuring parameters, interventions made, continuous documentation of medication is mandatory for all students, just like real clinical practice. This, on the one hand, helps to continuously monitor the patient's change in state of health and, on the other hand, acquires a good command of the documentation and can be the basis of a case report. The documentation used in simulation exercises has been specifically designed for this purpose.

"Patient" test results (e.g. lab tests, imaging procedures) are provided to a large screen projector. Their analysis and evaluation is also a part of student tasks. At the end of the exercise, a group discussion (debriefing) takes place with the tutor. The most important educational objectives, aspects, their implementation, the course of the simulation, the outcomes, the strengths and weaknesses of the students, the practical applicability of the simulation and the deviations from the real situation are reviewed. Questions that are raised by the students will also be clarified at this time. The instructor must make sure that the goal is achieved, the students understand and apply the lessons learned. At the end of this exercise, you have to spend time on this stage and you cannot miss the simulation. The effectiveness of the simulation exercises can be enhanced by the combined analysis of the recording made by the audio-visual system (METI Vision) with the lecturer or the students. It can be used to monitor student behaviour while observing student behaviour. It can provide useful information for both trainers and students. Can be used to evaluate classroom work or exam status. In our practice, both application modes are used and accepted.

Simulation is a student-centred educational strategy, so the role of the instructor is management, continuous monitoring, support for students, and intervention only when needed. The dominant role of the tutor with increasing students' knowledge levels is decreasing. At the lowest level of knowledge (novice), management is a continuous and crucial role in controlling technical skills. At a higher level (optimal case) it is only necessary to intervene in decision situations.

Evaluation of student work

Evaluation of student work is carried out in three phases:
- continuous practice (individual / group)
- at the end of the practice, after-discussion - debriefing (group)
- at the end of the courses (individual)

At the end of the course students are evaluated as follows: The student will receive a written record of the "patient" in writing. Before starting the exam, we will set the stage of our scenario and, if necessary, modify the parameters. The student is responsible for identifying "patient", evaluating the collected information, evaluating the measured parameters, documenting the diagnosis of abnormal parameters, as well as determining the other causes. This is done taking into account the students' current level of knowledge.

In the course of the evaluation, we aim to evaluate the current level of knowledge besides the regular monitoring of patient observation and nursing tasks, as well as the evaluation of critical thinking ability and adequate position recognition. In order to accomplish this, the examiner instructs the students to ask questions and evaluate their answers after observing the practical activity. This was previously done using a scorecard compiled by a team of simulator instructors. Although the test was considered to be a good tool for testing, it was important for us to introduce a more objective and appropriate means of reliability to our practice.

We asked for the Creighton Simulation Evaluation Instrument (C-SEI), developed by Creighton University, School of Nursing (USA) in the summer of 2013. The 2013/2014 academic year introduces

the tool for evaluating simulation tests for nursing and midwifery students. For a detailed description of the measuring instrument, Test method description. In a test situation, 2-3 pupils usually experience "patient" at the same time, but students are evaluated individually in each case, not in a group. When using METI Vision, reviewing and analysing the recordings helps instructors to get a better rating

Characteristics of the Measurements: Using the Creighton Simulation Evaluation Instrument (C-SEI), students evaluate the performance of 22 criteria. The 22 considerations within subgroup 4 (Observation, Communication, Critical Thinking, Technical Skills) are displayed. The behaviour of students is 0 (does not show competence) or 1 (competency) points that can be evaluated by points. The measuring instrument can be applied to any level of knowledge of a student because the (still) non-expected competence can be omitted from the measurement ("not applicable"). In the same way, you can skip the behaviour that is not applied in the scenario, evaluate the task. In addition to the meter, the developers developed a so-called discussion sheet, which allows the trainers to discuss the minimum behaviour and activities expected of the students. The main advantages of the measuring instrument are the following:
• Provides an objective, clear assessment option
• Participation in the required education program encourages the trainees to take a uniform view of the student's assessment
• The two-stage scale clearly identifies the student's behaviour
• Applicable at any level of knowledge
• Applicable to any scenario. The minimum total achievable performance is set at 75%. (Based on the recommendation of the developer of the measuring device.) (Todd et al. 2008, Parsons et al., 2012). The score of the student is divided by the number of points that can be earned so that we can get the student's performance as a percentage

Example 3

Internationalisation at SU-FHSc (Semmelweis University, Faculty of Health Sciences)

International collaboration will play a key role in improving health care and addressing critical issues in the field of nursing and the nursing workforce to improve global health by preparing nurses with a global perspective to provide culturally:

1. prepare a culturally competent international nursing workforce and globalize the nursing workforce through educational experiences.

2. Create mechanisms for the exchange of undergraduate students majoring in nursing.

3. Develop a dual-degree model to facilitate the growth of the nursing workforce by developing international nursing leadership with a global, trans-cultural perspective. 4. Share evidence-based practice standards for education that cross international boundaries.

The number of people working in the caring system is decreasing steadily at an international level. Migration shows an increasing tendency at the moment. The improvement of the theoretical and practical skills concerning the profession, as well as the focal point of the improvement must be shifted to the global characteristics in parallel with the local characteristics. The social environment and the global challenges cannot be without the improvement of those professional competencies by which experts will find secure solutions and answers that can be interpreted and assessed to the incoherence generated by the structures having differing levels and characteristics. In addition to improving professional competencies, it is inevitable to be culturally competent and have a command of the language, as well as to be able to communicate with the target groups about professional issues in order to satisfy the requirements set by the international mobility

Teaching – Learning approach:

- Multinational communication
- Ability to develop social and cultural flexibility
- To open eye to explore different cultures

- To learn the own values in comparing with different cultures
- to learn to harmonize international and local standards of your profession in the practice
- To develop solidarity

Possible teaching –learning methods in Nursing BSc/MSc education at SU-FHSc:
- Internationalisation at home school (internationals aspects of profession, format international teaching-learning groups at home, teaching-learning on foreign language in our practice)
- Mobility program for students and teachers (short course – as COHEHRE ICHCI program, full semester abroad - as Erasmus, Erasmus + program)
- Dual Degree (www.se-etk.hu/TCN)
- Of campus education (SU program in Lugano)

Assessment approach:

International co-operation requires the coordination of different educational cultures with regard to assessment. This does not mean the necessity of new methods and the changing of goals, but rather the formal support (format international teaching-learning groups at SU) and non-formal support of the student (self-organized student groups – e.g. :the conscious involvement of the students union at SU).

In addition to formal learning, informal support programs also play a prominent role. It is very important to keep on communicating and keeping in touch with those who are involved in the practice. E.g. at SU-FHSc there is weekly "Coffee-club" – organized by Office of Intern. Student's Affairs, where students and teachers have informal meeting to discuss the current challenges. It operates as a basis of developing networking.

Applied tools of assessment in internationalisation are regulated in a Memorandum of Understanding, which should be renewed from time to time:

The most essential items in our practice:
- Process of mutual credit transfer (in harmony of local credit regulation, creditor are involved and in communication between institutions)
- Formal Learning Agreement
- Formal Learning Transcript
- Diploma Supplement
- Continuous interaction in details of training programme between the partner courses, between the teachers of courses
- Harmonize the teaching –learning schedule

5.5 Physics

Aligning Approaches to Learning Teaching and Assessment in Physics by applying the CALOHEE Assessment Reference Framework

In addition to the approaches for assessment, learning and teaching with respect to dimension 3, which are included in the Assessment Reference Framework presented in chapter 3, the Subject Area Group of Physics has also selected an example of 'good practice' to articulate these in more detail. The example covers both the first and second cycle, the EQF levels 6 and 7.

Dimension 3 'Experimental design and scientific investigation'			
Level	*Knowledge descriptor*	*Skills descriptor*	*Autonomy and Responsibility (Wider Competences) descriptor*
Level 6 EQF	Describe standard methods, instrumentation, techniques, theories and regulations used in experimental physics.	Design a simple experimental investigation, using standard instrumentation and follow guidelines, and apply basic methods, techniques and theories for data collection, analysis and reporting.	Set up and carry out simple scientific investigations safely under supervision.
Level 7 EQF	Describe standard and advanced experimental methods, instrumentation, techniques, theories and regulations used in experimental physics.	Design a complete physics experiment, using standard and advanced instrumentation safely and applying a wide range of methods, techniques and theories for data collection, analysis and reporting.	Set up and carry out scientific investigations independently and safely.

Here below we report an example of how we can articulate an approach to Learning, Teaching and Assessment aimed at guiding the students in reaching the knowledge, skills and (wider) competence described in *Dimension 3: Experimental design and scientific investigation* of Physics. However, some of the competences developed by this approach also apply transversally to other dimensions, such as *Problem solving* (Dimension 4) and *Project management and Teamwork* (Dimension 8).
The approach is articulated in three steps, reflecting a possible progression in line with the outlined learning outcomes for Levels 6 and 7 EQF. The first step is developed as part of a first-cycle programme (Level 6 EQF) an can be viewed as an introductory step; the second step can apply both to the second part of the first cycle and to the first part of the second cycle; step three is positioned in the second cycle (Level 7 EQF).

The "good or interesting practice" described her is inspired by research-based experiences such as that of Etkina et al. (2010), which integrates the concepts of interpretive knowing (developing a "scientific" way of looking at conceptual and experimental problems), cognitive apprenticeship (an approach where learning is supported by means of modelling, coaching, and scaffolding) and formative assessment.

Learning (approach)

First step: Students engage with simple, mainly close-ended experiments, working in small groups. These experiments are typically aimed at learning procedures, to get acquainted to the lab environment (including safety regulations), develop dexterity with lab equipment, and test simple hypotheses drawn from established laws and theories of physics. Students also assist to classroom demonstrations and read case studies of scientific development by experimentation. A reference manual and/or lecture notes for statistics, data handling and theories of measurement is suggested as theoretical reference.

Second step: Students engage with more complex experiments, working in small groups. Some open-endedness is introduced, e.g. in the choice of experiment details, methods, processes, and data analysis tools; students are provided with hints and guidance to find useful information, software, and study material. The experiments are typically aimed at observing simple applications of physics models and theories in real-life contexts. Students engage in discussions (with peers and/or instructor) about the physical framework, experimental design, mathematics procedures, assumptions, and uncertainties in the data. Learning about experimental physics is complemented by visits to museums, laboratories and research centres where students directly engage with the tools, regulations, procedures, and historical and epistemological facts about experimental research in physics. During the bachelor thesis, students are typically confronted with an unfamiliar problem to which they must apply known tools and methods, or new tools (e.g. software, programming language) under guidance.

Third step: Students engage with complex, open-ended experiments, working in small groups. The goals of these experiments are often drawn from recent scientific literature (e.g. reproduce research results or test them in a new context). Students are free to choose the timing, materials, procedures, setup, analysis methods and priorities. Simulations are often used to model, visualise or optimise a problem. Students have access to and are encouraged to use scientific papers to guide their work. Students also participate to seminars by scholars as well as fellow students or PhD students, and visit research centres or laboratories. Advanced aspects of physical investigation are developed during the master thesis, when students are typically introduced to specialised laboratories, sometimes in an interdisciplinary context, and are required to actively engage with a genuine research problem and report about their findings.

Teaching (format)

First step: During the lab session, the instructor interacts with each small group to discuss the details of the experiment. Small-group tutoring is facilitated by the presence of a laboratory assistant. Coaching is also achieved by the careful selection and organisation of the tasks students have to accomplish, and the preparation of laboratory handouts that emphasise reflection and metacognition rather than the procedures (minds-on approach), and facilitate learning by scaffolding of knowledge. Classroom demonstrations are led with direct interaction/involvement of the students, are preceded by a meaningful introduction and followed by active discussion. In these sessions, the instructor demonstrates scientific reasoning, constructs representations, and devises mathematical/statistical procedures. Peer interaction during and outside lab sessions is encouraged and facilitated by online learning environments.

Second step: During the lab session, the instructor interacts with each small group to discuss the details of the experiment, give hints and/or prompt reflection on critical aspects. Small-group tutoring is facilitated by the presence of a laboratory assistant. Handouts are constructed in order to promote reflection and metacognition and enable scaffolding of knowledge, but with a less-structured format that the first step in order to encourage students' initiative. Lab sessions are accompanied by follow-up activities like aimed at building connections with in-lab practices, theory and out-of-classroom experiences. Peer interaction during and outside lab sessions is encouraged and facilitated by online learning environments.

Third step: During the lab session, the instructor interacts with each small group to discuss the experimental design, setup and outcomes, give hints and/or prompt reflection on critical aspects, and debate on the physics of the experiment. The instructor provides minimally scaffolded material; prompting about the experiment is mainly done by reading of relevant scientific papers proposed by the

instructor and free search for references and other sources. Students are encouraged to interact with their peers during the projects, inside and outside the lab, to share ideas, strategies, difficulties and good practices.

Assessment (approach)

First step: Students write and/or present a group laboratory report on a weekly basis and receive feedback; assessment rubrics are shared with students to promote self-evaluation and guide inquiry tasks. Peer-review of draft reports of fellow students and subsequent revision is also adopted. The final individual grade is decided by an overall discussion of all the reports with the instructor.

Second step: Students write and/or present a group laboratory report for each project and receive feedback; assessment rubrics are shared with students to promote self-evaluation. Peer-review of draft reports of fellow students and subsequent revision is also adopted. During the lab activity and/or the final exam, the instructor may challenge the students with hints and questions about changing some aspects of the experiment or its validity in another context, to promote deeper understanding of both the physics and the experimental setup. The final individual grade is decided by an overall individual discussion of the reports with the instructor.

Third step: Students write and/or present an articulated group laboratory report for their project(s), which includes details on the experimental design process, critical discussion of the outcomes, and relevant literature references. During the lab activity, the instructor gives feedback on students' ongoing work. Students also receive feedback from their peers during the lab sessions by comparing strategies, methods, and results, and revise their plan after feedback if necessary. Project report(s) are assessed using rubrics that are shared with students to promote self-assessment. The final individual grade is decided by an individual discussion about the whole project with the instructor.

Etkina, E. (2010). Design and Reflection Help Students Develop Scientific Abilities: Learning in Introductory Physics Laboratories. J. Learn. Sci. (2010) 19:1, 54-98

Appendices

1. Members of the CALOHEE Management Team, CALOHEE Management Committee and Subject Area Groups (Inner - & Outer Circle)
2. CALOHEE partnership: Universities, University Networks and European Higher Education Organisations
3. Members of the CALOHEE Advisory Board
4. Members of the CALOHEE Quality Assurance Board

Appendix 1 Members of the CALOHEE Project Team, CALOHEE Management Committee and Subject Area Groups

Project Team

University of Groningen	Robert Wagenaar	Overall project coordinator
University of Groningen	Ingrid van der Meer	Project manager
University of Deusto	Pablo Beneitone	Project team member
Educational Testing Service (ETS), Princeton	Thomas Van Essen	Project team member
Educational Testing Service (ETS Global, Amsterdam)	Maria Victoria Calabrese	Project team member

Management Committee

Members of the Project team plus:

University of Porto	Alfredo Soeiro	Co-Coordinator Civil Engineering Group
University of Genova	Alfredo Squarzoni	Co-Coordinator Civil Engineering Group
European Students' Union	Yolanda Trujillo (2017-2018) Gramoz Shpendi (2016-2017)	Student representative Civil Engineering Group Student representative Civil Engineering Group
Board European Students of Technology	Cristian Garcia Alonso	Student representative Civil Engineering Group
Education for an Interdependent World	Julia Gonzalez Ferreras	Co-Coordinator Teacher Education Group
University of Deusto, International Tuning Academy	Maria Yarosh	Co-Coordinator Teacher Education Group
European Students' Union	Melanie Frölich	Student representative Teacher Education Group
University of Pisa	Ann Katherine Isaacs	Co-Coordinator History Group
University of Iceland	Gudmundur Halfdanarson	Co-Coordinator History Group
European Students' Union	Lea Meister	Student representative History Group
University of Southampton	Mary Gobbi	Co-Coordinator Nursing Group
University of Tampere	Marja Kaunonen	Co-Coordinator Nursing Group
University of Padova	Ornella Pantano	Co-Coordinator Physics Group
University of Granada	Fernando Cornet	Co-Coordinator Civil Engineering Group
European Students' Union	Adam Harchi	Student representative Physics Group

Subject Area Groups – Inner Circle

	HEI	Representative
	CIVIL ENGINEERING	
	Universidade do Porto	Alfredo Soeiro (co-coordinator)
2.	Università degli Studi di Genova	Alfredo Squarzoni (co-coordinator)
3.	TTK University of Applied Sciences	Karin Lellep
4.	Waterford Institute of Technology	Ken Thomas
5.	University of Sheffield	Rachel Horn
6.	University Polytehnica of Bucharest	Diana Robescu
7.	University of Salerno	Paolo Villani
8.	Université Paris Est- Ecole des Ponts Paris Tech	Thibaut Skrzypek
1.	Aalto University School of Engineering	Juha Paavola Vincent Kuo
10.	University of Minho	Rui Antonio Rodrigues Ramos
11.	University of Architecture, Civil Engineering and Geodesy (UACEG, Sofia)	Fantina Rangelova
12.	Aristotle University of Thessaloniki	Nikolaos Theodossiou
13.	Middle East Technical University, Ankara	Irem Dikmen Toker Asli Akcamete Güngör
14.	Université Catholique de Louvain-la-Neuve	Sandra Soares-Frazao
15.	European Students' Union	Yolanda Trujillo
16.	Board European Students of Technology	Cristian García Alonso

	HEI	Representative
	TEACHER EDUCATION	
1.	Education for an Interdependent World (EDIW)	Julia González Ferreras (co-coordinator)
2.	International Tuning Academy, University of Deusto, Bilbao	Maria Yarosh (co-coordinator)
3.	Banku Augstskola School of Business and Finance	Liga Peiseniece
4.	University of Warsaw	Jacek Romaniuk Elzbieta Sielanko-Byford
5.	University of Salamanca	Ana B. Sanchez-Garcia Purificacion Galindo-Vallardón
6.	Université de Nice Sophia-Antipolis	Christophe Bansart
7.	University of Szeged	Gyöngyver Molnar
8.	Utrecht University	Jan van Tartwijk Bert Slof
9.	Cukurova University	Hatice Sofu
10.	Dublin City University	Zita Lysaght Pia O'Farrell
11.	Humboldt University Berlin	Hans Anand Pant Katja Eilerts Martin Guljamow
12.	Johannes Gutenberg University Mainz	Olga Troitschanskaia
13.	University of Padova	Anna Serbati
14.	Ovidius University of Constanta	Rodica Gabriela Enache

15.	Vilniaus Kolegija University of Applied Sciences	Lina Peciuliene
16.	Ghent University	Ruben VanderLinde Hanne Tack
17.	European Students' Union	Melanie Fröhlich

	HEI	**Representative**
	HISTORY	
1.	Università di Pisa	Ann Katherine Isaacs (co-coordinator)
2.	University of Iceland	Gudmundur Halfdanarson (co-coordinator)
3	Vilnius University	Loreta Skurvydaite
4.	Ruhr-Universität Bochum	Michael Wala
5.	NUI Galway	Steven G.Ellis
6.	University of Bialystok	Halina Parafianowicz
7.	Universidad Autonoma de Madrid	James S. Amelang Darina Martykanova Juan Pan-Montojo Gonzalez
8.	Aristotle University of Thessaloniki	Iakovos Michailidis
9.	University of Oulu	Maija Kallinen
10.	University of Bologna	Carla Salvaterra
11.	Universität Salzburg	Ewald Hiebl Georg Stöger
12.	Karadeniz Technical University	Kenan Inan
13.	Babes-Bolyai University	Lavinia Costea
14.	Queen's University Belfast	Katy Turton
15.	University of Groningen	Janny de Jong
16.	European Students' Union	Lea Meister

	HEI	**Representative**
	NURSING	
1.	University of Southampton	Mary Gobbi (co-coordinator)
2.	University of Tampere	Marja Kaunonen (co-coordinator)
3.	Alice Salomon Hochschule Berlin	Ingrid Kollak
4.	Semmelweis University	Sándor Hollos
5.	Centre of Excellence for Nursing Scholarship of Ipasvi Rome	Ausilia Pulimeno Maria Grazia De Marinis Anna Marchetti Alessandro Stievano
6.	University of Ljubljana	Manca Pajnic Ljubisa Paden
7.	Lithuanian University of Health Sciences	Jovita Demskyte
8.	Artesis Plantijn Hogeschool Antwerpen	Katharine Meier
9.	King's College London	Louise Barriball
10.	University College Dublin	Ann Donohoe
11.	Hanze University of Applied Sciences	Maarten M. Kaaijk
12.	Universitat de Barcelona	M. Teresa Icart Isern
13	University of Malta	Roberta Sammut

		Maria Cassar
14.	University of Southern Denmark	Birte Østergaard Dorthe Nielsen
15.	European Students' Union	Ian McCready

	HEI	**Representative**
	PHYSICS	
1.	Università degli Studi di Padova	Ornella Pantano (co-coordinator)
2.	Universidad de Granada	Fernando Cornet (co-coordinator)
3.	Alexandro Ioan Cuza University of Iasi	Sebastian Popescu
4.	Eötvos Loránd University	István Groma
5.	Radboud University Nijmegen	Hay Geurts
6.	King's College London	Peter Main
7.	Ghent University	Katrien Strubbe
8.	University of Potsdam	Andreas Borowski David Buschhüter
9.	University of Patras	Evangelos E. Vitoratos
10.	Higher Institute of Technology, Sligo	Eileen Armstrong
11.	Utrecht University	Gerard T. Barkema
12.	University of Helsinki	Ismo Koponen Inkeri Kontro
13.	Coimbra University	Maria-José Barata Marques de Almeida
14.	University of Copenhagen	Ian Bearden
15.	Université Paris-Sud	Pierre Désesquelles
16.	European Students' Union	Adam Harchi

Subject Area Groups – Outer Circle

	HEI	Contact Person
	CIVIL ENGINEERING	
1.	Université Libre de Bruxelles	Philippe Bouillard
2.	University of Applied Sciences, Winterthur	Christoph Gemperle
3.	University of Seville Higher Technical School of Engineering	Federico Cuest Rojo
4.	ESTP Paris	Sophie-Caroline Huisman
5.	University of Croatia	Ivan Gabrijel
6.	Higher Institute of Technology, Sligo	Patrick Naughton
7.	University of Padova	Andrea Giordano
8.	University of Roma Tre	Andrea Benedetto
9.	University of Trieste	Raffaela Cefalo
10.	Porto School of Engineering	Ricardo Manuel Pereira dos Santos
11.	Ovidius University of Constanta	Gabriela Draghici
12.	Technical University of Civil Engineering	Anton Valentin Camil
13.	Tomsk Polytechnic University	Yuri P. Pokholkov
14.	Loughborough University	Mahroo Eftekhari

	HEI	Contact Person
	TEACHER EDUCATION	
1.	Freie Universitaet Berlin and Humboldt Universitaet Berlin	Dirk Krueger (FU Berlin); Anette Upmeier zu Belzen (HU Berlin)
2.	University of Vigo	Maria Isabel Doval Ruiz
3.	Hellenic American College	Christine Niakaris
4.	Eötvös Loránd University , Fac. Primary and Pre-school education	Angela Bajzath
5.	Eötvös Loránd University, Faculty of Education and Psychology Education Science Institute	Erika Köpp
6.	University of Roma Tre	Massimo Margottini
7.	University of Trieste	Elena Bortolotti
8.	University of Bologna	Elena Luppi
9.	Taraz University	Elmira Faizova
10.	Université du Luxembourg	Gilbert Busana
11.	Jagellonian University Krakow	Anna Sajdak
12.	Porto School of Engineering	Antonio Cardosa Costa, Maria João Monteiro Ferreira Viamonte Jose Carlos Lourenco Quadrado
13.	King's College London	Christopher Winch

	HEI	Contact person
	HISTORY	
1.	University of Graz	Karin Maria Schmidlechner-Lienhart
2.	Sofia University	Hristo Berov Maria Baramova
3.	University of Lausanne	Nathalie Janz
4.	Charles University Prague	Blanka Richova
5.	Tartu University	Eero Medijainen Andres Andresen
6.	University of Turku	Jarkko Keskinen
7.	Université Toulouse 2- Jean Jaurès	Laure Teulieres
8.	University of the Eagean	Ioannis Giannitsiotis (Yannis Yannitsiotis)
9.	University of Miskolc	Emóke Horváth
10.	Eötvös Loránd University	Gábor Boros
11.	University of Padova	Egidio Evetic
12.	Osaka University Japan	Toru Takenaka
13.	Vytautas Magnus University Kaunas	Sarunas Liekis
14.	University of Malta	Mark Aloisio
15.	Jagellonian University Krakow	Jakub Basista
16.	Alexandru Ioan Cuza University of Iasi	Alexandru-Florin Platon
17.	"Stefan cel Mare" University of Suceava	Stefan Purici
18.	Ovidius University of Constanta	Gabriel Stelian Manea
19.	State Academic University for the Humanities, Moscow	Denis-Fomin-Nilov
21.	University of Maribor	Matjaz Klemencic
22.	Matej Bel University	Patrik Kunec, PhD
23.	Pavol Jozef Safarik University in Kosice	Martin Pekár
24.	University of Southampton	Christopher Prior
25.	Northumbria University	Scott Burgess

	HEI	Contact Person
	NURSING	
1.	University of Lausanne	Nathalie Janz
2.	University of Szeged	Laszlo Papp
3.	Royal College of Surgeons in Ireland	Tom O'Connor
4.	Dublin City University	Mary Kelly
5.	University of Trieste	Michela Zanetti
6.	University of Bologna (Rimini campus)	Gianandrea Pasquinelli
7.	Jagellonian University Krakow	Agnieszka Gniadek
8.	Ovidius University of Constanta	Dan M. Iliescu
9.	Cukurova University	Evsen Nazik
10.	Northumbria University	Ann Macfadyen

	HEI	Contact Person
	PHYSICS	
1.	University of Roma Tre	Giovanni Stefani
2.	University of Trieste	Giorgio Pastore
3.	University of Bologna	Prof. Olivia Levrini
4.	Jagellonian University Krakow	Jerzy Zachorowski Leszek Hadasz
5.	Porto School of Engineering	Maria Neves Cabral da Silva Moreira Viegas
6.	Cukurova University	Aysel Kayis Topaksu

Appendix 2 CALOHEE partnership: Universities, University Networks and European Higher Education Organisations

Partner	Name of Partner institution/ organisation	Website
P1	University of Groningen (RUG)	https://www.rug.nl
P2	Universidad de Deusto (UD)	https://www.deusto.es
P3	Education for an Interdependent World (EDIW)	http://www.ediw.net/en
P4	Utrecht Network	http://www.utrecht-network.org
P5	University of Padova (UNIPD)	https://www.dei.unipd.it
P6	University of Granada (UGR)	https://www.ugr.es/en
P7	University of Iceland (HI)	https://english.hi.is
P8	University of Pisa (UNIPI)	https://www.unipi.it
P9	University of Southampton	https://www.southampton.ac.uk
P10	University of Tampere (UTA)	http://www2.uta.fi/en
P11	University of Porto (U.PORTO)	https://sigarra.up.pt/up/pt/web_base.gera_pagina?p_pagina=home
P12	University of Genova (UNIGE)	https://www.unige.it/en
P13	European Students' Union – National Unions of Students in Europe (ESU-ESIB)	https://www.esu-online.org
P14	European Network for Accreditation of Engineering Education (ENAEE)	http://www.enaee.eu
P15	European Consortium For Accreditation In Higher Education (ECA)	http://ecahe.eu
P16	European Association of Institutions in Higher Education (EURASHE)	https://www.eurashe.eu
P17	Compostela Group of Universities (CGU)	http://sgroup.be
P18	Network of Universities from the Capitals of Europe (UNICA)	http://www.unica-network.eu
P19	Santander Group- European Universities' Network (SGroup)	http://sgroup.be
P20	Coimbra Group (CG)	https://www.coimbra-group.eu

Appendix 3 Members of the CALOHEE Advisory Board

Organisation / institution	Website
Utrecht Network	http://www.utrecht-network.org
European Students' Union –National Unions of Students in Europe (ESU/ESIB)	https://www.esu-online.org
European Network for Accreditation of Engineering Education (ENAEE)	http://www.enaee.eu
European Consortium For Accreditation In Higher Education (ECA)	http://ecahe.eu
European Association of Institutions in Higher Education (EURASHE)	https://www.eurashe.eu
Compostela Group of Universities (CGU)	http://www2.usc.es/gcompostela/en/index.html
Network of Universities from the Capitals of Europe (UNICA)	http://www.unica-network.eu
Santander Group- European Universities' Network (SGroup)	http://sgroup.be
Coimbra Group (CG)	https://www.coimbra-group.eu
European University Association (EUA)	https://eua.eu
European Association for Quality Assurance in Higher Education (ENQA)	https://enqa.eu
European Network of Information Centres in the European Region (ENIC) – National Academic Recognition Information Centres in the European Union (NARIC)	http://enic-naric.net
European Association for International Education (EAIE)	https://www.eaie.org
Academic Cooperation Association (ACA)	http://www.aca-secretariat.be/index.php?id=9
U-Multirank	https://www.umultirank.org
Federal Institute for Vocational Education and Training (Germany; BiBB)	https://www.bibb.de/en

Appendix 4

Members of the CALOHEE Quality Assurance Board

Tim Birtwistle	Independent Higher Education Expert
Tomaz Dezelan	University of Ljubljana
Mark Frederiks	ECA; NVAO
Iring Wasser	ASIIN; EASPA

Contact

The Tuning Projects, including CALOHEE, are co-ordinated by the University of Deusto, Bilbao, Spain and the University of Groningen, The Netherlands.

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Visit the Tuning websites for more information:

- International Tuning Academy: http://tuningacademy.org
- Tuning Europe: http://www.unideusto.org/tuningeu/
- CALOHEE: https://www.calohee.eu