



# The Bologna Process and Finnish Universities of Applied Sciences

PARTICIPATION OF FINNISH UNIVERSITIES OF APPLIED  
SCIENCES IN THE EUROPEAN HIGHER EDUCATION AREA

The Final Report of the Project

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# 1 INTRODUCTION

The globalising economy entails the mobility of people and labour. As a further consequence, there is more and more competition for competent and educated people. A crucial success factor in this worldwide competition is an internationally competitive, high quality educational system. Especially during the past decades, Europe has systematically developed the activities and structures of its higher education in order to meet the future needs and challenges. The member states are committed to achieving the objectives and goals set by the Lisbon summit and making Europe the most competitive and dynamic knowledge-based economy in the world by the year 2010. (Council of European Union 2001; Liljander 2004: 16–18.)

The economic and political integration of Europe is a reflection of the globalisation of the world economy and it is affecting education even stronger than before. Along with integration, strong local cooperation and the role of higher education institutions (HEI's) in regional development are becoming important success factors. This thinking is premised on the idea that the competitiveness of areas and organisations rests on integrated local resources, confidential networked cooperation and efficient collaborative learning (Kanter 1997; Goddard 1999).

By enhancing integration and regional development, Europe aims at increasing its competitiveness among the other global players. The harmonisation of HEI's is considered a prerequisite for surviving and succeeding in the global educational market. The integration process of HEI's was triggered by the Bologna Declaration in 1999 (Table 1) with aims of creating a uniform and competitive European higher education area (EHEA) by the year 2010 (The European Higher Education Area 1999).

Table 1. The new signees of the Bologna process and the objectives set by the ministerial conferences (Kauko 2006, 116)

<b>Sorbonne 1998</b> (4 states)	France, Germany, Italy, the UK	<ul style="list-style-type: none"> <li>■ removing the obstacles to mobility</li> <li>■ two-cycle degree structure</li> <li>■ establishing a common system of credits</li> </ul>
<b>Bologna 1999</b> (29 states)	Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, the UK	<ul style="list-style-type: none"> <li>■ easily readable and comparable degrees</li> <li>■ two-cycle degree structure</li> <li>■ introducing the ECTS credit system</li> <li>■ promoting mobility</li> <li>■ European cooperation in quality assurance</li> </ul>
<b>Prague 2001</b> (33 states)	Croatia, Cyprus, Liechtenstein, Turkey	<ul style="list-style-type: none"> <li>■ lifelong learning</li> <li>■ participation of students and HEI's</li> <li>■ enhancing the attractiveness and competitiveness of EHEA</li> </ul>
<b>Berlin 2003</b> (40 states)	Albania, Andorra, Bosnia-Herzegovina, Macedonia, Russia, Serbia and Montenegro, Vatican	<ul style="list-style-type: none"> <li>■ including the third cycle (doctoral degrees) in the Bologna process</li> <li>■ synergy of the European Higher Education and Research Area</li> </ul>
<b>Bergen 2005</b> (45 states)	Armenia, Azerbaijan, Georgia, Moldova, Ukraine	<ul style="list-style-type: none"> <li>■ the social dimension</li> </ul>

The harmonisation and integration process actually started already from the Sorbonne Declaration in 1998, but only in Bologna the majority of European countries committed themselves into the common objectives. The process expanded and became more tangible in the follow-up communiqués of Prague (2001), Berlin (2003) and Bergen (2005). The Sorbonne-Bologna process was initiated and first undertaken by the traditional European universities. Professionally-oriented higher education was included first in the Prague ministerial communiqué, the declaration of which underlines the importance of including diverse HEI's and degree programmes in the EHEA.

In most European countries the policies and structures of higher education (HE) are affected by the same catalysts of change : the globalisation of economy and business, invention of new technologies, their impact on working methods, growing competence requirements of working life, scarcity of public resources and funds, increasing demands for efficiency, commercialisation of education, diversification of the educational supply, emphasised importance of quality assurance

and its reliability, and ever increasing competition for talented foreign students and researchers. Furthermore, the changes are directed by similar underlying trends. In Finland, as in almost all European countries, younger generations diminish while the ageing population grows in number. When the public expenses incurred by health care and social services surge, increased efficiency is demanded from the educational system, which in turn is manifested as attempts to shorten degree completion times, to recognise and accredit prior learning and to better respond to the educational needs and requirements of working life (Lehikoinen 2002, 345–346).

It has become evident that the structures, contents and implementation methods of higher education degrees have to be renewed in order to meet the challenges set by the changing operational environment. The Bologna process aims at harmonising degree structures, but at the same time the contents and implementation methods seem to diversify and differentiate. For the comparability of systems and degrees, it is important that the educational aims are defined and illustrated as concrete and comprehensible learning outcomes and competences. One of the objectives of the Bologna process is to enhance the competences and innovation required in working life and in its development. Therefore it is not enough to define merely the learning outcomes (competences), but also to change the pedagogical modes and methods so that the competences are resolutely developed in the teaching and learning practice.

In both sectors of the Finnish dual higher education system – at universities and at universities of applied sciences – the Bologna process has advanced in its special way and at its own pace. At the Finnish universities the process started from a memorandum published by the Ministry of Education in 2002, which discussed the implementation of a two-cycle degree structure. The starting point and guiding principle at the universities has been the renewal of degree structure compatible with a two-cycle system. An ongoing, extensive project financed by the Ministry of Education was set up to coordinate the renewal process.

The universities of applied sciences got off the ground much later. Juha-Pekka Liljander received an assignment from the Ministry of Education in June 2003 to evaluate the role and position of the Finnish universities of applied sciences (former polytechnics<sup>1</sup>) in the European

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<sup>1</sup> Finnish universities of applied sciences formerly used the name 'Polytechnic' in English. At the beginning of 2006, the Rectors' Conference ARENE ry recommended the use of the new English name. Due to this change, both names appear in this report.

Higher Education Area. In his report, Mr Liljander states that “*The position of universities in the new operative environment is getting clearer, but at polytechnics the assessment of the situation and rapid measures are required.*” (Liljander 2004, 12). As one of the most important questions Liljander (id.) raises the establishment and positioning of second-cycle polytechnic degrees to the same level with Master’s degrees. The relevant decree amendment was actually made in 2005 (A423/2005). Furthermore, Liljander considers the initiation of the ECTS system a challenge requiring rapid measures at universities of applied sciences.

Initiated by the Rectors’ Conference of Finnish Polytechnics ARENE ry (later called the Rectors’ Conference of Finnish Universities of Applied Sciences) a nationwide project was launched in spring 2004. The project entitled as ‘*Participation of Finnish Universities of Applied Sciences in the European Higher Education Area*’ (later called the ECTS project) was financed by the Ministry of Education. The project started in September 2004 and lasted until December 2006. At the initial phase, the project was managed by Matti Isokallio from Satakunta Polytechnic and from September 2005 by Pekka Auvinen from North Karelia Polytechnic. In the first half of 2005 also a research manager Juha-Pekka Liljander from Lahti Polytechnic was also employed in the project. The steering committee was chaired by rector Henrik Wolff from Arcada Polytechnic (Nylands svenska yrkeshögsskola). The other members of the steering committee were rector Mauri Panhelainen from Jyväskylän Polytechnic, manager of the student services office Ilkka Lähteenmäki from Turku Polytechnic, international relations manager Tarja Tuononen from North Karelia Polytechnic, secretary-general Petra Nysten (since 1 January 2006 Päivi Keränen) from the National Union of Finnish Polytechnic Students SAMOK, specialist Airi Jaro from the Trade Union of Education in Finland, principal lecturer Eila Okkonen (since 1 October 2006 principal lecturer Jarmo Levonen) from the National Programme for Professional Master’s Degree, counsellor of education Maija Innola from the Ministry of Education and secretary-general Kaj Malm (since 1 October 2006 Timo Luopajarvi) from the Rectors’ Conference of Finnish Polytechnics ARENE ry.

This final report presents and evaluates the rationale, practical measures and results of the ECTS project, as well as discusses some of the future challenges of the Finnish universities of applied sciences in the establishment of the European Higher Education Area (EHEA). The report has been a collaborative effort of the members of the steering committee, although the project managers Pekka Auvinen and Matti

Isokallio were the responsible authors. The report was translated into Swedish by Kerstin Stolt from Arcada University of Applied Sciences and into English by Kirsi-Marja Toivanen-Sevrjukova from North Karelia University of Applied Sciences.

The introduction of the report discusses the reasons for setting up the project and introduces the content of the following chapters. The second chapter deals with the general objectives of the European Higher Education Area and the situation of the Finnish universities of applied sciences pertaining to the objectives of the EHEA. The third chapter presents the goals, measures and timetable of the ECTS project. The results and outcomes of the project are discussed in Chapters 4, 5 and 6. The fourth chapter focuses on the introduction of the ECTS system at the universities of applied sciences. Chapter 5 compares the design of a learning-centred curriculum in comparison to a teaching-oriented one. The main emphasis of Chapter 6 is on the implementation and results of degree-specific competence analyses. The last chapter discusses the challenges of the universities of applied sciences in the near future and the measures that are required from them in order to participate in the establishment of the European Higher Education Area.

## 2 FINNISH UNIVERSITIES OF APPLIED SCIENCES AND THE ESTABLISHMENT OF THE EUROPEAN HIGHER EDUCATION AREA

The strategic objectives of the European Union pertaining to education also direct the decision making in Finnish educational policy. Traditionally the educational systems of the European member states have been created from the national starting points and relatively separately from each other. There is a will to maintain and respect that diversity also in the future. On the other hand, more cooperation and mobility is required so that the European citizens could make the best use of this diversity and that incompatible systems would not cause citizens excessive constraints. (Liljander 2004.) According to the Treaty establishing the European Community, educational jurisdiction belongs to the member states themselves and the Treaty prohibits the harmonisation of educational legislation of the member states.

As described in the introduction of this report, the aim of the Bologna process is to establish a coherent, compatible and attractive higher education area by 2010. The objectives include:

- having the world's best quality in education,
- Europe becoming the most popular destination for students and researchers,
- sufficiently compatible educational systems enabling intra-community mobility,
- better comparability, recognition and accreditation of degrees
- removing the obstacles to mobility and enhancing international cooperation and networking, and
- enabling lifelong learning for people of all ages.

The goals of the process for the coming few years contain the development of quality assurance systems in education, harmonisation of degree structures compatible with the two-cycle model and the improvement of the readability and comprehensibility of degree structures by using a common credit system (ECTS).

At the beginning of the Bologna process, the focus was on structural aspects, the harmonisation of degree structures and the establishment of the ECTS system. To increase the readability and comparability of degrees, a joint Diploma Supplement (DS) was introduced. In the past years the emphasis has shifted more towards quality assurance. The perspective has widened from the European higher education to encompass the integration of education and research, the attractiveness of European higher education, and global cooperation in education. The Bologna process has progressed somewhat differently in different member states. The joint credit system was introduced successfully throughout Europe, but a lot remains to be done in the harmonisation, readability and comparability of degree structures and systems.

The two-cycle degree structure was first introduced as a 3+2 system. Later it appeared that in practice the first-cycle degrees (e.g. the degrees awarded by Finnish universities of applied sciences and the Bachelor's degrees awarded by universities) varied in length between three to four years (180–240 ECTS), although the length of all second-cycle degrees were five years (300 ECTS). The two-cycle degree structure was implemented in Finnish HEI's in 2005. However, the contents and methods of the renewal process differed greatly at Finnish universities and universities of applied sciences.

At Finnish universities, the starting point for the process was the renewal of degree structures and contents with the help of the core content analysis. The renewal process was launched in 2003 and it was coordinated by a national project. Today Finnish universities have a two-cycle degree structure consistent with the 3+2 model, in which a three-year (180 ECTS) Bachelor's degree constitutes the first cycle and a two-year (120 ECTS) Master's degree the second cycle. The degree structure is integrated, which means that the student admitted to the first-cycle studies can continue his/her studies till the Master's degree without a separate application procedure.

At the universities of applied sciences the renewal process started in 2004. At the early stage, the Ministry of Education estimated that the change will be mainly mechanical and include only the transition to the ECTS credit system. There were no clear decisions made pertaining to degree structures, because the second-cycle polytechnic or professional Bachelor's degrees were established officially only in 2005. The adopted degree structure, however, basically follows the principles of the Bologna process. The first-cycle professional degrees are 3.5–4 years (210–240 ECTS), apart from few exceptions when the degree

takes 4.5 years (270 ECTS). The second-cycle professional degree is 60-90 ECTS. In between the degrees, the student is compelled to obtain relevant work experience in the field.

There are obvious differences in the degree structures between Finnish universities and universities of applied sciences. At universities of applied sciences, the student cannot automatically proceed to the second-cycle studies, but first has to acquire the minimum of three years of work experience. Another clear difference relates to student intake. The studies leading to the second-cycle degrees are not meant for everyone graduating with the first-cycle degree, as is the case with the university Master's degrees. The objective concerning the student intake is that 20% of the first-cycle graduates would take their second-cycle professional degree. The National Qualifications Framework for HE degrees illustrates the position of the degrees awarded by the universities of applied sciences as presented in Figure 1.

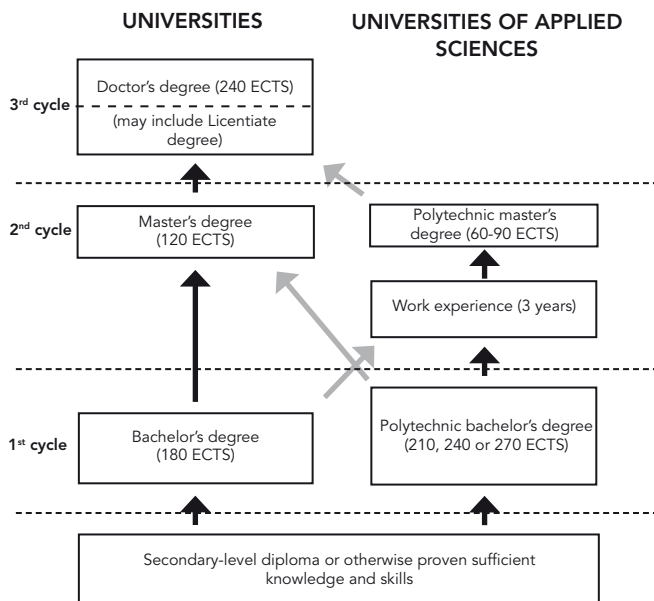


Figure 1. The position of the degrees awarded by the universities of applied sciences in the Finnish higher education system according to the draft of National Qualifications Framework (Opetusministeriö 2005a, 25).

Finland, like the other countries that are part of the Bologna process, is committed to establishing a National Qualifications Framework (NQF). In Finland the NQF design was started in May 2004 and the preliminary draft was made at the end of 2004 (Opetusministeriö 2005a). The proposal was circulated for comments among various stakeholders during the spring 2005. There was an intention to ratify the National Qualifications Framework in 2005. However, due to the incompleteness of the European Qualifications Framework (EQF), the follow-through of the National Qualification Framework was postponed until 2007, until the final decisions pertaining to the EQF have been made (European Commission 2006).

In the ministerial conference in November 2006 the proposal for the European Qualifications Framework was positively welcomed. The framework that was based on learning outcomes and competences was considered felicitous. The objectives of the framework are to enhance mobility of EU citizens and to promote lifelong learning e.g. by enabling definitions and comparability of qualifications and degrees and by effectively utilising the identification and validation of prior learning. The practical outcomes of the EQF and its influence on Finnish universities of applied sciences will be discussed in more detail in Chapters 6 and 7.

### 3 THE PROJECT 'PARTICIPATION OF FINNISH UNIVERSITIES OF APPLIED SCIENCES IN THE EUROPEAN HIGHER EDUCATION AREA'

The implementation of the project *Participation of Finnish Universities of Applied Sciences in the European Higher Education Area*, i.e. the ECTS project can be divided into two phases. The first phase (1 September 2004 – 31 July 2005) focused on the establishment of the ECTS credit system and the introduction of the Diploma Supplement (DS). The preparatory work for the National Qualifications Framework was also initiated. During the second phase of the project (1 August 2005 – 31 December 2006), the emphasis has been on supporting the universities of applied sciences in curriculum design and disseminating good practice among them. Furthermore, the degree programmes have defined subject-specific competences in national degree-specific groups. There has also been a follow-up on the implementation of the national recommendations given to the universities of applied sciences e.g. on the length of the academic year and extent of training periods (Table 2).

One of the project assignments has been to disseminate information on the establishment of the European Higher Education Area and to produce national proposals and recommendations for the Finnish universities of applied sciences. The principal partners of the project have included the ECTS coordinators and curriculum designers of the universities of applied sciences, representatives of student bodies, the chairpersons and members of field-specific groups established by ARENE ry and the network of the National Programme for Professional Master's Degrees. The project has produced two proposals pertaining to the establishment of ECTS credit system. The first proposals of 1 November 2004 includes recommendations for the length of the academic year, extent of (internship) training, the minimum extent of study units (i.e. courses) and the timetable in which the ECTS credit system is established (Appendix 1). The other proposal was given on 1 December 2005 and it includes the definitions for subject-specific and general competences as well as a matrix that is used as a curriculum



framework in the universities of applied sciences (Appendix 2). The following chapters describe the content of the proposals and evaluate their realisation in the universities of applied sciences.

## 4 INTRODUCING THE ECTS SYSTEM

As far as the Finnish universities of applied sciences are concerned, the transfer to the ECTS system was launched in May 2004 in a seminar organised by the Rectors' Conference ARENE ry. and the Finnish Ministry of Education. The Ministry of Education presented the timetable in which the transition to the new system was to take place. There was also a presentation on the corresponding process and the situation at the Finnish universities. The most important changes required by the transition as well as the idea about the cooperation between the different sectors were highlighted.

Before the first seminar, the universities of applied sciences had had an impression that the transition will be similar to that of the universities, i.e. there would be a core content analysis alongside the transition to the ECTS system, which was to take place by 1 August 2005. However, the proposal of the Ministry of Education on the transition in the universities of applied sciences differed from that of universities. In the universities of applied sciences the transition was supposed to be much faster. The Ministry of Education prepared a proposal for amending the relevant decree, which was accepted as such in summer 2004. According to the decree, the transition to the new system was to take place on 1 January 2005 and it should have been completed by 1 August 2005. The whole supply of education given in 2005 was to be measured in ECTS credits.

The amendment of the decree presented by the Ministry in the opening seminar was received with two kinds of reactions. The remaining half a year that was left was considered too short for implementing such a remarkable change. On the other hand, a half-a-year transition period was regarded as good, because then in autumn 2005 only one credit system would be applied. There was a great concern in the universities of applied sciences that a longer transition period could cause problems in the information systems. An idea of having two parallel credit systems for a long period was considered complicated.

## Recommendations

In its early stage the project targeted to the establishment of the ECTS credit system, securing the use of the Diploma Supplement and drafting and implementing the National Qualifications Framework for universities of applied sciences. One of the objectives of the project was to involve the key personnel of the universities in the upcoming change. ECTS coordinators were selected for each university of applied sciences and their task was to communicate and coordinate the change process in their institution. The ECTS project was not to impose any provisions or rigid norms to the institutions, but to support the universities of applied sciences in the participation of the EHEA by providing proposals and recommendations (see Appendices 1 and 2).

The Polytechnic Decree was altered and the new credit system was introduced as a means of measuring the extent of studies. In the ECTS system the student workload per each academic year is 1600 hours. Earlier the studies were scheduled for eight to nine months per year. The ECTS project recommended that the studies should be spread for 40 weeks per year, i.e. they would take ten months. The recommendation was sustained by the fact that the student workload per week was thus to be about 40 hours, which was considered to provide a possibility for deep learning and profound understanding (Karjalainen ym. 2003). Another argument for the prolongation of the academic year was based on the national requirements of making the graduation and teaching arrangements more effective, of lengthening the academic semesters and of dividing the studies evenly throughout the academic year (Opetusministeriö 2003, 34). However, teachers' contracts need to be considered when a longer academic year is applied, because in some collective agreements the working time per year can be shorter than 40 weeks. In these cases new solutions have to be invented so that the teachers will not have to teach for the whole academic year.

The length of the academic year was discussed with both units of student financial aid, one at the Ministry of Education and the other in the Social Insurance Institution of Finland. As a result of the negotiations, the authorities supplying the student financial aid concluded that it is crucial that the universities of applied sciences follow a uniform system and the same principles and that the length of the academic year does not vary in between different degree programmes or entrance groups. The recommendation does not state how those 40 weeks should be scheduled in the academic calendar. There were two options presented. The academic year could extend to a period

from the beginning of September until Midsummer, or from the early August until the end of May. The latter option was supported by the fact that it is the academic year of Finnish comprehensive and upper secondary schools. The first is compatible with other European countries, where August is a common holiday season.

In the old credit system in which study weeks were used as a measure, the Ministry of Education decided on the length of (internship) training separately for each degree programme. Despite national steering, the extent of training varied enormously between the polytechnics and degree programmes. The length of a training period was considered especially problematic in the fields of technology, communications and transport, in which the length of internships varied remarkably throughout the country and was often excessive in respect of student workload per allocated credits. The ECTS project recommended that the internships should be measured so that the credits were based on the actual workload. While preparing the recommendation, the ECTS project cooperated with another national project focusing on the development of training. Both projects shared a common view of the extent of training at universities of applied sciences.

At the initial stage of the project, an idea was brought up that the project should also give a recommendation for the minimum extent of study units. The recommendation was based on a principle of creating larger study modules and thus avoiding too atomistic and fragmented curricula. The project recommended for the use of 5 ECTS as the minimum size. This together with the previous recommendation supported the same idea of creating larger study modules and spreading the workload more evenly throughout the year, as well as dividing the academic year into two, four or six semesters, which would be 30, 15 or 10 ECTS respectively. Dividing the academic year into three semesters has not been brought up in the discussions among the universities of applied sciences.

Additionally, the ECTS project gave recommendations for the deadline of the transition to the ECTS credit system and for the principles how to mark the old and new credits in the transcripts of records, degree certificates, curricula and other relevant documentation. The first half of the year 2005 was allotted for the transition. Each university of applied sciences (i.e. polytechnic at that time) was to use only one system systematically in all its databases and printouts dealing with the studies and attainments of students.

## Implementation of the recommendations

The recommendations given by the ECTS project were presented in several seminars in autumn 2004. The first recommendation to be implemented was the transition to the ECTS credit system. Despite the fast schedule, 14 polytechnics started to use the new ECTS credit system already at the beginning of January 2005. The remaining 15 polytechnics introduced the ECTS credits by 1 August 2005.

The length and extent of training periods was a hard question in the fields of technology, communications and transport. The polytechnics made a decision on the length of training during the academic year 2004 – 2005 and in this respect the recommendations given by the project were implemented well. In slightly more than half of the polytechnics the decision was backdated to pertain to also those students who had started their studies before 1 August 2005. At present the extent of training is based on the same principles in all universities of applied sciences and in all degree programmes.

The extent of individual courses is a fundamental issue which defines how larger modules can be created and how the studies can be divided into periods or semesters. The recommendation pertaining to the minimum size of study units was the most unsatisfactorily implemented of the project recommendations. Some 20 per cent of the institutions apply the recommended minimum extent of 5 ECTS. In most universities of applied sciences the minimum length was decided to be 3 ECTS, which, however, also allows the creation of larger modules of 15 or 30 ECTS.

Although the recommendation concerning the length of the academic year and the period when teaching is provided differed from the former polytechnic practice, the universities of applied sciences introduced a 40-week-long academic year, regardless of a few exceptions. In some universities of applied sciences the shift has been only formal and in practice the academic year is shorter than 40 weeks. Much debate was caused by the collective bargaining agreements which do not allow teachers to work for 40 weeks per year. The recommendation was based on an idea that the full 40 weeks could be used for studies and that the students would be entitled to receive student financial aid for ten months per year.

The decisions pertaining to the 10-month-long academic year may look a whole lot different if the student financial aid is taken into account. When the student financial aid was observed, it appeared that only ten universities of applied sciences had evenly distributed their

supply of studies and the student financial aid for the full period of ten months. All measures should be taken to prevent a situation in which there is a conflict between the extent of the student's curricular studies and financial aid. There will be problems if the institution plans to supply studies for a period of ten months, but the period entitling the student to the financial aid is shorter.

One of the early objectives of the project was to involve students in the change process. However, there has been great variation in the student contribution. Students were estimated to participate actively only in every third university of applied sciences during the academic year 2004 – 2005. In other institutions the students were reported to participate less. In three universities of applied sciences the student contribution was considered low.

The Diploma Supplement (DS) is an appendix to the degree certificate that is especially designed for international use. It is a supplement collaboratively created by the European Union, European Council and UNESCO and it gives additional information on the studies, level of the qualification and the eligibility of the degree for further studies and working life. According to the Finnish legislation, the HEI's are obliged to provide a student with a diploma supplement. Earlier this supplement was given on request. The ECTS project supported the universities of applied sciences in the introduction of the DS.

The European Commission awards Diploma Supplement labels to the HEI's who have successfully introduced the supplement in their institution. Finnish institutions have received several of these labels. Until now the DS labels have been given to Arcada, Laurea, Haaga, and Stadia universities of applied sciences, and to the universities of applied sciences in Jyväskylä, Kajaani, Kymenlaakso, Mikkeli, North Karelia, Oulu, Pirkanmaa, Satakunta and Tampere; to HANKEN Swedish School of Economics and Business Administration, as well as to Oulu University, the University of Tampere and the university of Turku.

As a whole the recommendations presented by the ECTS project have been implemented well and according to the original proposals. The universities of applied sciences have harmoniously started to use the ECTS credit system as a basis of measuring the extent of studies.

## 5 TOWARDS LEARNING-CENTRED CURRICULA

During the past few years Finnish universities of applied sciences have started to make new openings in curriculum development. When the network of (polytechnic) institutions is now established, it is time to focus more on the development of contents and methods rather than organisational structures. The expansion in their sphere of activity and the integration with the EHEA have caused the universities of applied sciences to review and renew their curricula alongside with the establishment of the ECTS credit system. In Finland as in many other European countries, the Bologna process has been seen as a possibility to reform educational contents and pedagogical solutions (Tauch 2006, 11).

The Finnish HEI's started to use the ECTS credit system in 2005. The new system replaced the old, national system which used study weeks as a measure of HE studies. In essence, the establishment of the ECTS credit system entails a much more profound change than a mechanical conversion using a certain mathematical formula. The two most salient notions of the ECTS system are student workload and the definitions of learning outcomes and competences. In practice the ECTS system means a transfer to a student-centric approach where the focus of curriculum design is on learning rather than on teaching. (European Commission 2004.)

In the Finnish HEI's this new learner or learning-centred approach is a much greater challenge than the mere conversion of credits. The true application of the ECTS system requires quite a change in the curriculum development, but even more than that in the implementation practices pertaining to teaching arrangements, counselling and assessment. The guiding principle in teaching and learning should be the development of competences, not only supplying or taking the required number of courses for awarding or obtaining a degree.

The transfer to the joint ECTS system and a two-cycle degree structure in the European HEI's have a remarkable effect also on the curriculum design of the Finnish universities of applied sciences. The harmonisation of educational structures and learning outcomes aims at enhancing mobility not only within and between institutions, but

also in working life. The validation and transparency of degrees presupposes that the educational objectives and learning outcomes are closely related to the concrete competence needs of working life and to comprehensible competence descriptors. The degrees awarded by the Finnish universities of applied sciences should, therefore, be seen as part of the European HE system and as a stage on the continuum of lifelong learning.

Currently the curricular footing is moving from the atomistic *lehrplan* composed of disconnected subjects towards a holistic competence-based curriculum that takes into account and scaffolds the personal and professional growth. At the universities of applied sciences it entails the reinforcement of flexibility, integration of subjects, working life orientation and student-centeredness of the curricula. The foundation for the curriculum design is the learning process of a student, which is supported by learning situations that promote student activity and learning. Curriculum design is thus based on both the targeted learning outcomes (competences) and students' entrance level (Figure 2). The learning process is being constructed in between these two from the various learning and teaching situations, assignments, counselling and assessment. Learning processes involve both the individual and community and are affected by the teacher and the methods s/he uses. It is teachers' task to create learning environments and situations that support the successful learning of the individual student and student community.

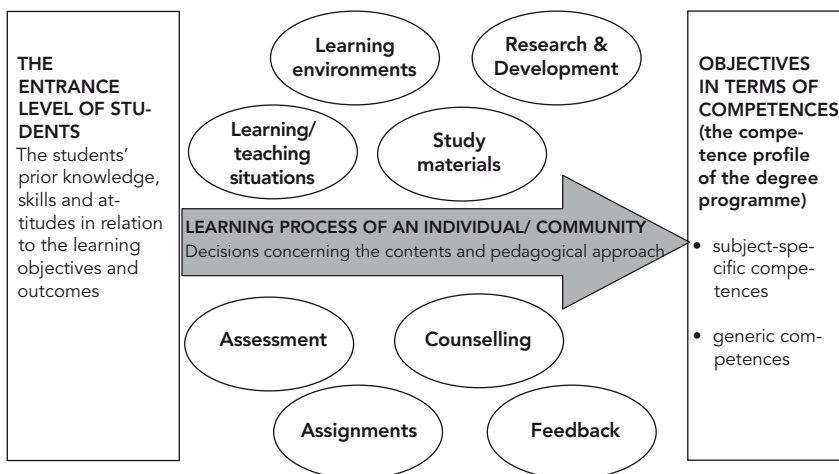


Figure 2. Planning learning processes (adapted from Koli & Silander 2002)

The competence-based curriculum is outlined by learning outcomes, i.e. core competences, to which the education aims at. The competences can form a thread throughout the programme or they can limit to a specific part of it. To ensure meaningful learning and a transparent curriculum it is important that the degree programme consists of large enough, working life oriented units and that the interconnected units form a continuum that smoothly flows from one year to another. In a fragmented, atomistic curriculum the student acquires separate, detached and easily forgettable elements of knowledge and skills, which s/he is not able to connect to his/her prior learning. In the curricular models that are based on separate subjects and disconnected courses, the holistic view on learning is of secondary importance. Consequently, the goal of studying is often seen as passing the required tests and courses.

It is especially important that student assessment and evaluation forms a consistent whole and supports the attainment of learning objectives and competences. A holistic assessment plan should be based on the competence requirements or profile of the whole programme. Assessment should not be targeted only to the subject-specific competences, but also to take into account the attainment of generic competences. At least once a year assessment should focus holistically on all learning outcomes, and not only outcomes, but also the learning processes. (Isaacs 2006, 16; Auvinen et al. 2005, 106.)

When renewing the curriculum, it should be deliberated what kind of a curriculum structure can be best applied in the degree programme considering the time and other resources available for studies and learning. The needs and requirements of cooperation within and between institutions should also be taken into account when deciding which structures and models are used. Too rigid, inflexible or fragmented curriculum structures complicate cooperation and integration. Furthermore, very different curriculum structures may completely prohibit interdisciplinary cooperation between different professional and study fields. One of the main goals of the establishment of the EHEA is to promote mobility and therefore the curricular choices should also cater for the needs of European and international cooperation. (Isaacs 2006, 7–8; Auvinen ym. 2005, 46.)

Competence descriptors do not yet guarantee that competences will be actually developed in the teaching and learning practice of a HEI. Additionally the curriculum should make the approximated learning process and steps visible and easily readable (see Appendix 2),

i.e. it should illustrate the students' learning pathways and professional development towards the learning outcomes of the degree. Competence-based curriculum is also sometimes referred to as a matrix model, because the learning outcomes and competences are illustrated in a grid, where the interconnection of units is clearly visible. The Finnish universities of applied sciences are recommended to use the matrix model illustrated in Table 3 as the curriculum outline.

Table 3. The matrix recommended for outlining a curriculum. (Wagenaar 2004; Tuning Methodology 2004)

		competence 1	competence 2	competence 3	competence 4	competence 5	competence 6	competence 7	competence 8	competence 9	competence 10
1st year Annual theme Learning outcomes	Unit A	x					x				
	Unit B	x									
	Unit C			x				x			
	Unit D					x			x		
	Unit E		x						x	x	
	Unit F	x			x						x
	Total of <b>60 cr</b>										
2nd year Annual theme Learning outcomes	Unit G	x			x						
	Unit H		x			x					
	Unit I		x	x				x			
	Unit J			x							
	Optional studies		x			x					
	Training (placement)		x	x					x		x
	Total of <b>60 cr</b>										
3rd year Annual theme Learning outcomes											
4th year Annual theme Learning outcomes											

X = competence is enhanced and assessed and it is set as the learning outcome and objective of the study unit. The competence is resolutely developed and assessed and it is also mentioned as one of the learning outcomes of this unit.

Furthermore, many Finnish universities of applied sciences have introduced annual themes and learning outcomes to their curriculum in order to structure the stages and process of professional growth and learning. The descriptions of annual themes should use brief and accurate language that is typical of the specific field. As the competence descriptors, the definitions of annual themes should be simple and easily comprehensible so that they can be memorised by heart and put into practice in teaching, learning and assessment. The annual themes can help the student to realise what type of competence and learning s/he is expected to demonstrate at the given stage of studies. They can also facilitate the teachers to focus on core competences and contents, as well as the other stakeholders, e.g. the training supervisors to see the different stages of learning. Annual learning outcomes provide annual themes with more depth, but without the themes the outcomes may remain vague or even inapplicable in practice. Annual themes are to illustrate the stages of professional growth rather than present the core content of the given year. (Auvinen et al. 2005, 88–91.)

Tight integration with the EHEA will open new possibilities for curriculum design, but it will also set new demands to the universities of applied sciences. The universities of applied sciences have in principle plenty of freedom to decide on their curricular contents, aims and pedagogical approaches. On the other hand, the Finnish HEI's are expected to increase and intensify their cooperation on regional, national and international levels. Therefore, the curricula should allow intra-institutional, national and international mobility and cooperation. (Isaacs 2006, 8). The factors affecting and defining the curriculum design seem to multiply in the future, while the role of the curriculum as a strategic tool will grow.

During the regional seminars organised by the ECTS project, a joint vision of curriculum work at the universities of applied sciences for 2010 was constructed. In dialogue the following description was developed:

*In 2010 the universities of applied sciences have a feasible and applicable curriculum that has been designed collaboratively. It supports the attainment of the strategic objectives of the institutions and targeted learning of all its stakeholders. The curriculum presents the approximated pathways of the students' progress and professional growth in a comprehensible and transparent way. The curriculum orientates to the future while catering for the needs and development of working life, the realistic evaluation of the students' entrance level and the requirements of international cooperation.*

The above vision is based on the learner and learning-centred approach, in which the learning processes and the stages of professional growth are clearly defined. The curriculum aims at supporting the students' targeted learning, but a well-designed curriculum will also provide for the competence development of teachers, partners and other stakeholders alongside their daily work. In practice this can lead to the formation of so-called *communities of practice*, where teachers and students cooperate very closely with working life. (See e.g. Barab & Duffy 2000; Kotila 2003: 18–20.)

The vision also emphasises the importance of the applicability and collaborative design process of the curriculum. The curriculum is considered one of the strategic tools in the universities of applied sciences. Important starting points for curriculum design are the requirements and development needs of working life, as well as the realistic evaluation of students' entrance level (see Figure 2). The curricula should also take into account the prerequisites of transparency, comprehensibility and mobility pertaining to the establishment of the EHEA and internationalisation as a whole.

The aim of the ECTS project has been to support the Finnish universities of applied sciences in the transition to student-centric and competence-based curricula that promote the establishment of the EHEA. In the recommendations, the universities of applied sciences are advised to present the learning outcomes and objectives as subject-specific and generic competences and to use a matrix as their curricular outline. Currently, the universities of applied sciences work actively on the implementation of these recommendations in their curriculum development.

## 6 COMPETENCE ANALYSES IN FINNISH UNIVERSITIES OF APPLIED SCIENCES

During the past years European HEI's have witnessed a great paradigm shift from a teaching-centred, input-oriented approach into a learning-centred and competence-based approach. Traditionally the objectives and learning attainments have been defined and foreign degrees validated on the basis of the course units, contents and duration of education. Lately it has, however, been acknowledged that it is the actual competences of an individual that matter, not the way in which s/he has accumulated his/her knowledge, skills or attitudes. Study programmes, learning pathways and pedagogical approaches and methods are means to attain the objectives, not the end itself. The most important objective is to have well-educated and balanced individuals, who can meet the needs of the surrounding society. (Bergan 2006, 20.)

The core competences can be defined on several levels and scales. According to Adam (2006, 3) the competence descriptors can be applied on three levels: 1) on a local scale, in an individual HEI to define the learning outcomes of the whole degree, part of the degree or just one unit, 2) on a national scale as a basis for the National Qualifications Framework or quality assurance, and 3) on an international/global scale to enhance accreditation, comparability and transparency. During the ECTS project the competences and contents were defined on the European and national scale, but also on the levels of degree programmes, study years and individual units (Table 4).

The analysis of core competences can start from a wider scale and proceed towards the definition of learning outcomes of individual study units. On the other hand, the core competences can also be determined on the basis of the core content analysis of separate study units and proceed the other way round towards a more holistic frame. The latter approach can, however, lead to teacher-centred and resource-driven orientation, which ignores the future and working life perspective. The competence analysis should be based on the present and future competence needs of working life, i.e. its justifications should be found outside HEI's.

On the European scale, the competences have been defined at differ-

Table 4. Different levels or scales of core competence and core content analyses applied in the ECTS project

<b>European/ international level</b>	Common European descriptors and categories illustrating the learning outcomes, core competences and contents at different reference levels of qualifications. <ul style="list-style-type: none"> <li>■ European Qualifications Framework (EQF)</li> <li>■ Dublin Descriptors</li> <li>■ Competence descriptors of the Tuning project</li> </ul>
<b>National level</b>	National definitions illustrating the degree structures, fields and degree programmes of HE <ul style="list-style-type: none"> <li>■ National Qualifications Framework (NQF) based on the EQF</li> <li>■ the degree programme structure for HEI's</li> </ul>
<b>Level of a degree programme</b>	The professional profile which combines the competences and learning outcomes of a degree <ul style="list-style-type: none"> <li>■ subject-specific and generic competences</li> <li>■ national recommendations that enhance readability of programmes in Europe and which the institutions apply and accommodate to their own profiles and emphases</li> </ul>
<b>Level of a study year</b>	annual themes and learning outcomes illustrating professional growth
<b>Study unit level</b>	<ul style="list-style-type: none"> <li>■ core content analysis</li> <li>■ workload analysis</li> </ul>

ent reference levels in the *European Qualifications Framework for lifelong learning (EQF)*. The EQF aims at assisting employers in different countries to recognise the competences acquired in multiple ways with the help of jointly agreed level descriptors. For individual citizens it can offer a means to acquire fair and commensurable validation for learning and competences throughout Europe. For the educational organisations the EQF provides a common frame for defining the learning outcomes of degrees. The competences of the graduates awarded with a first-cycle degree by the university of applied sciences are described on level 6 and of those with a second-cycle degree on level 7 on the eight-level scale of the EQF (see Appendix 3) (European Commission 2006.) The other competence descriptors for HE on the European scale are the three-level Dublin descriptors and the competence descriptors created for the core disciplines of universities during the Tuning project (González & Wagenaar 2003; 2005).

All European member states are to start the establishment of the National Qualifications Framework by 2007 as agreed in the Bergen communiqué in 2005 (Bologna Process/Bergen 2005, 2). In Finland the preparations started in May 2004 and the preliminary draft of the

NQF was completed at the end of the same year (Opetusministeriö 2005a). The draft describes the Finnish education system and the learning outcomes at different levels of education. As a whole, the draft gives a rather accurate illustration of the Finnish educational system. The learning outcomes of HE degrees (ibid. 28 – 29) are defined on the basis of the consultation version of the EQF. The level descriptors, as they are presented in the draft, give a very hazy and fragmented picture of the competences and learning outcomes in the Finnish HEI's and they do not give a solid basis for detailed competence descriptors of individual HEI's or degree programmes.

On the national level, competence descriptors are also determined by the decisions of the Ministry of Education on the programme structures. In the discussion on the structural development and profiling of the universities of applied sciences, a need for clearer structures, fewer programmes and larger units has been brought up (e.g. Opetusministeriö 2005b). Although the ECTS project did not focus on the structural development of degree programmes, several degree programmes having a similar programme profile have cooperated in the competence analysis. The collaborative competence analyses highlighted the similarities and at the same time confirmed the need for some structural development.

During the ECTS project, national recommendations for subject-specific and generic competences were made. The objective of this work has been to strengthen mutual understanding on the core competences of the graduates and to present the competences in a language and manner that would be comprehensible and transparent also on the European scale. On the other hand, the competence descriptors have to be defined in a rather general and non-specific way so that each institution can accommodate them to its own local needs and for its own strategic aims. (For further information, see Isaacs 2006, 7.)

There is no single (European) way to define the competences. In European states and HEI's several methods have been used. Also the concepts and terms used in the competence descriptors vary. (Adam 2006, 4–6.) This project decided to follow the model presented by the Tuning project and to divide the competences into subject-specific and generic competences (Tuning Methodology). Thus the learning outcomes are not divided similarly as in the EQF into knowledge, skills and competences, but here the competences are understood as wide-ranging combinations of know-how – composites of knowledge, skills and attitudes of an individual. Competences illustrate the person's

proficiency, capacity and ability to perform in professional tasks.

The motto for definitions was Albert Einstein's principle: *“Everything should be made as simple as possible, but not simpler.”* The aim was to create such a combination of competences that would be easy to comprehend, could be remembered by heart and which would truly direct and steer teaching and learning practices. It was recommended that the professional profile would not contain more than ten generic and subject-specific competences.

The subject-specific competences are the basis for the professional development of a student. Generic competences are shared by all degree programmes and lay the foundations for the participation and collaboration in working life and for the further development of professional knowledge and skills. Background material for definitions was derived from relevant legislation, European and Finnish competence descriptors, literature and studies on competences, as well as from the results of curriculum design at the universities of applied sciences. Competence definitions were made collaboratively by teachers, other staff, students and representatives of working life.

As a collaborative effort of a nationwide expert group, six generic competences were defined (Appendix 4).

- learning competence,
- ethical competence,
- communicative and social competence,
- development competence,
- organisational and societal competence, and
- internationalisation competence

The subject-specific competences, on the other hand, were defined in programme-specific groups, which were chaired by a coordinator appointed by the Rectors' Conference ARENE ry. For example, in the degree programme in wood technology the subject-specific competences include competences in materials, production engineering, production economics and development of wood products. Respectively, the core competences of physiotherapists consist of physiotherapeutic assessment and clinical reasoning, counselling and guidance competence, therapeutic competence, collaboration and social competence and technological competence. Some more examples of subject-specific competences are provided in Appendix 5. The definitions are presented also on the homepage of the ECS project at [www.pkamk.fi](http://www.pkamk.fi).

fi/ects. The competence descriptors for the second-cycle degrees of the universities of applied sciences will be made in 2007–2009 by the network of National Programme for Professional Master's Degrees with the help of financing received from the Ministry of Education.

Competences can also be understood as service pledges of HEI's, which give a promise on the quality of education and the level of graduating students. The professional competence profiles aim at assisting the student to see in practice what kind competences are required from him/her and how to self-evaluate his/her learning. The staff of HEI's can use the profile in decision making. The programme profile also helps teachers to focus their teaching on the development of core competences. For the representatives of working life and for other interest groups they display the abilities, knowledge and skills of the graduates with a HE degree. Competence profiles can also be of great importance in the recognitions and validation of prior learning. They underline the relevance of actual and concrete abilities and performance capacity of an individual instead of his/her formal qualifications, study attainments or methods.

Competence profiles are complex systems of abilities and capacities which enable us to meet the challenges and requirements of different domains of life. It is important that competences are not described as separate, independent elements, because it can lead to a far too fragmented, itemised and elaborate approach, complicated assessment procedures and to a behaviourist orientation focusing on end behaviour. On the contrary, competences should be defined as wide entities, which makes their comprehension and assessment concrete and feasible. (Keurulainen 2006, 223–224; Smith 2005.) This is the approach pursued in the project.

# 7 FUTURE CHALLENGES OF FINNISH UNIVERSITIES OF APPLIED SCIENCES IN THE ESTABLISHMENT OF THE EHEA

The ECTS project terminated at the end of 2006, but the implementation of the Bologna process will continue in the Finnish universities of applied sciences. The establishment of the EHEA presupposes certain changes in the educational system and structures and these changes have been reasonably well implemented in Finland. However, there is still a lot to be done until the new approach and principles have been internalised and truly understood. The main responsibility for the continuation and completion of the project measures rests with the board of ARENE ry. This chapter summarises the challenges of the universities of applied sciences in the establishment of the EHEA. Table 5 presents the measures that should be taken and the responsibilities of various actors and interest groups.

The Bologna process evolves and changes still. The Finnish institutions should try to contribute to and impact on the decision making, not just follow the development and implementation of the process. Finnish HEI's have many viable practices and solutions that could become best practices and be disseminated around Europe. The role and perspectives of professional HE should also be included in policy making. Furthermore, information dissemination and communication should be taken care of.

One of the attempts to strengthen the position of professionally-oriented higher education has been the BALAMA (The Bachelor for the Labour Market) project, which had participants from eight European countries (Austria, Denmark, Estonia, Finland, Germany, Iceland, the Netherlands and Switzerland). The aim of the project was to describe the systems, solutions, position and importance of professionally-oriented HE in the participating countries. The Finnish contribution to the project was made by the ECTS project. In the future the responsibility will be shifted to ARENE ry.

The establishment of the European Qualifications Framework (EQF) will be decided upon in 2007. The EQF is a recommendation or in-

Table 5. The challenges of the universities of applied sciences, and the measures and responsibilities in the establishment of the EHEA.

Challenges	Measures	Responsibilities
<b>Implementation of the Bologna process</b>	<p>Follow-up and active impacting on the process implementation</p> <p>Strengthening the role of professionally-oriented HE</p> <p>Dissemination of information</p> <p>Relations to the process of Finnish universities</p>	<ul style="list-style-type: none"> <li>■ The Ministry of Education</li> <li>■ ARENE ry</li> <li>■ universities of applied sciences</li> <li>■ SAMOK ry</li> <li>■ ARENE ry</li>   <li>■ The Ministry of Education</li> <li>■ The Bologna promoters in Finland</li> <li>■ ARENE ry/ rectors</li> <li>■ ARENE ry</li> </ul>
<b>Establishment of the EQF</b>	<p>Specification and establishment of the NFQ</p> <p>Comparison and equation of the degrees and competences of the universities of applied sciences with the EQF</p>	<ul style="list-style-type: none"> <li>■ The Ministry of Education</li>   <li>■ ARENE ry/rectors</li> </ul>
<b>Development of degree and programme structure</b>	<p>Reviewing the degree structure of the universities of applied sciences in relation to European models</p> <p>Reviewing the programme structure on the basis of the competence requirements and development needs of working life</p>	<ul style="list-style-type: none"> <li>■ The Ministry of Education</li> <li>■ ARENE ry/field-specific groups</li> <li>■ SAMOK ry</li>   <li>■ The Ministry of Education</li> <li>■ ARENE ry/field-specific groups</li> </ul>
<b>Follow-up of the implementation of the recommendations given by the ECTS project</b>	<p>Following-up and supporting the implementation of the recommendations</p> <p>Supporting the design and further development of learning-centred and competence-based curricula</p>	<ul style="list-style-type: none"> <li>■ ARENE ry/rectors</li>   <li>■ ARENE ry</li> <li>■ Persons in charge of curriculum design in HEI's</li> <li>■ Vocational teacher education units</li> <li>■ The National Programme for Professional Master's Degrees</li> </ul>
<b>Development of national quality assurance</b>	<p>Including the learning-centred and process-oriented approach in quality assurance at the national level</p>	<ul style="list-style-type: none"> <li>■ The Finnish Higher Education Evaluation Council (FINHEEC)</li> </ul>

strument that aims at enhancing the mobility and lifelong learning of EU citizens by facilitating the comparability and validation of degrees and education systems. The framework provides principles that can be used in competence descriptors in European HEI's. The proposal for the framework suggests that all national qualification systems would be linked to the EQF by 2009.

Furthermore, the degree and programme structures at universities of applied sciences require further development. The programme structure is reviewed as part of the structural development of HE in Finland. The performance agreements between the Ministry of Education and universities of applied sciences emphasise that the HE system should be reviewed as a whole (including both universities and universities of applied sciences) and that degree-awarding education should be assembled to larger, internationally competitive units. Many universities of applied sciences have organised their activity into units which are formed on the basis of competence requirements of working life. The programme structure should also be reviewed in the light of competence and development needs of working life. When defining the competence profiles it became apparent that several degree programmes have very similar profiles.

The clear difference between the degree structure of the universities of applied sciences and the Bologna model is the required three years of work experience between the first and second cycles. The other difference is that the second-cycle studies are carried out alongside work. These factors impede the international cooperation in the second-cycle degrees and prevent the universities of applied sciences to participate in the Erasmus Mundus programme. The mandatory three-year work experience also delays students' transfer to the second cycle studies and undermines the international attractiveness of programmes. New alternatives should be sought after so that the second-cycle degrees would not mean only part-time studying, and would enable international student exchange and mobility. By supplying high-quality, fulltime second-cycle studies, the universities of applied sciences would be able to attract more international exchange and degree students.

During the ECTS project the universities of applied sciences were given recommendations for implementing the ECTS system, competence analyses and learning-centred curriculum. At the end of the project it is important to take care of the follow-up and to support the HEI's in the implementation of the ECTS system.

The principles and criteria used in quality assurance on the national

level have a crucial role in the integration of Finnish HEI's with the EHEA. As a Finnish saying goes, what is assessed is also learned. It is very important that the competence-based and learning-centred approach is included in the assessment criteria of The Finnish Higher Education Evaluation Council (FINHEEC).

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## PROPOSALS AND RECOMMENDATIONS TO POLYTECHNICS ON TRANSITION TO THE ECTS CREDIT SYSTEM

1.11.2004 Matti Isokallio

### 1 Background and rationale of the proposals

The credit allocation in polytechnics studies will change, when the European Credit Transfer and Accumulation System (ECTS) will be introduced on 1 January 2005. All study units have to be recorded to the ECTS system by 1 August 2005 at the latest.

For this project a brief survey was made on the credit allocation systems in Norway and the Netherlands, who have already introduced the ECTS system. Information on the credit allocation and student workload has been provided by the ECTS SDS advisors of those countries. The questions of the survey related especially to the duration of studies, extent of training, length of the academic year and the policy decisions and practical solutions in Norway and the Netherlands.

### 2 Length of the academic year

The Polytechnic Decree stipulates that the annual student workload is 1 600 hours, which will accumulate 60 credits. The Decree will not actually change the present practice. In the current system, a credit (literal translation: credit week) is 40 hours of student work. Studies should be supplied so that a student has a possibility to graduate within the given time limit, which means on average the attainment of 40 credits per each academic year. The workload per year is thus 1 600 hours.

Despite the similar appearance, the Decree Amendment differs greatly in its approach. Workload is calculated from top to bottom. Year and annual workload are the starting points in credit allocation. The polytechnics have to consider how the annual student workload can be guaranteed as per to the Decree.

The State Council has also commented on HE studies in its White Paper of May 2004. The paper includes several points, but the following is presented about the length of the academic year: *“intensification of teaching arrangements in universities and polytechnics; prolongation of in-*

*tensive semesters and division of teaching and studies evenly throughout the calendar”.*

In credit allocation the new Polytechnic Decree follows the European ECTS system. The ECTS system was developed at the end of the 90s to enhance international student mobility. In the Bologna process ECTS is seen as one of the main implements and it has actually developed from its original use of being a credit converter to a complete system that is used to determine the duration of studies.

The main principles of the ECTS system are:

- Full time studies per year allot 60 ECTS credits; the annual student workload in Europe is 1500 – 1800 hours, which means that the attainment of one ECTS credit requires 25 – 30 hours of student work.
- The system is based on student workload, which should include all work that is required from a student for his/her studies and degree.

Universities have already done remarkable work in the credit system transfer. The University of Oulu has in many ways been a pacemaker by issuing several publications on student workload. The quote below is from a book called “Give Me Time to Think - Determining Student Workload in Higher Education”

*”The most common and actually the only true measure of work is an hour. The credit system is premised on a principle that the annual student workload is 1600 hours, which will be divided among the study units and modules as they require, but in such a way that all academic years require the same amount of work. The principle is actually the same that is used in determining the working time of the teaching staff. The students are thus treated fairly and on a par with teachers. Workload of both students and teachers is measured using the same calendar.*

*Pertaining to (the two) academic semesters, it should thus follow that on average a student can work for 800 hours per semester for his/her degree. In one academic month the studies should be realised so that students are occupied with their studies for 160 hours. The hours spent on studies constitute a calculatory five-day week including 40 hours of work. If a student works effectively for ten months per year, then the real working week will also be 40 hours. However, if a student works for nine months per year, the average number of hours per week is 44.” (unofficial translation from the Finnish version of the text)*

Additionally the publication relates student workload clearly with curriculum design.

*”The workload and credits should be in tune with the length of the academic year and teaching arrangements in such a way that the curricular units can be taken during the academic year they are assigned. If this is realised, also the graduation can take place within the theoretical time limit.*

*Workload and credit allotment should be systematic on the levels of academic years, semesters, weeks and study units. Therefore the curriculum should be made accurately, holistically and logically within the given timeframe. When analysing the student workload, it is also important to consider the timing of different courses and to make students’ timetable harmonious. Even the courses that are correctly balanced in terms of student workload are not functional if the courses overlap because of contradicting timetables and the student is unable to use the recommended time, or if a student takes courses in an impractical order.” (unofficial translation from the Finnish version of the text)*

For this project I made a survey on two countries who had already established the ECTS system, namely Norway and the Netherlands. Information on the credit allocation and student workload was provided by the ECTS advisors of those countries.

In the Netherlands the annual student workload was 1680 hours and the official length of the academic year 42 weeks. I practice the academic year is, however, 40 weeks. In Norway the student workload was reported to be 1600 (- 1800) hours and the academic year 40 weeks.

In the Decree on Student Financial Aid, the academic year entitling the student to the financial aid is said to be usually 9 months. It seems that when the credit system changes, the academic year entitling the student to the financial aid can be 10 months, which corresponds to the actual student workload per year. Polytechnics can within their own authority set the length of the academic year to be 10 months.

All previous facts show that there is pressure to redefine the length of the academic year in Finnish higher education institutions. To be able to fulfil the minimum determinations of the Decree, the student workload has to be reasonable and the academic year of sufficient length. In the decision making, the White Paper of the State Council on graduation within the time limits should also be considered. The ECTS system does not determine the annual student workload in a

strict manner so that it could be accommodated to various HEI's all having different backgrounds and distinct cultures. In order to truly integrate with the European Higher Education Area, polytechnics should apply a system that is compatible with the ECTS and comparable internationally. The Decree on student financial aid does not prohibit polytechnics to reconsider the length of the academic year.

Proposal:

*Polytechnics apply a 40-week-long academic year.*

### **3 Extent of training**

The new Decree is short and accurate. The annual workload of a student is on average 1600 hours. These 1600 hours must include all work that relates to his/her studies during the year.

In this point, it is impossible to bypass the content of training, although the proposal relates only to its extent. It should be referred to what the Polytechnic Decree states about training: *“Training aims at familiarising the student with the professional tasks that are essential in terms of his/her professional studies and at providing guidance and possibilities to apply knowledge and skills in working life.”* (unofficial translation)

In spring 2005 I made a small survey on training arrangements at polytechnics. In all fields but one, training of 20 credits meant 5 months of work. In the field of technology, communications and transport the length of training periods varied greatly between 5 to 12 months.

The principal rule is that the study fields do not have problems in allocating credits of training, but in the field of technology, communications and transport this problem is obvious. In the discussions there has been a great concern that the engineering students will not have enough work experience when they graduate if the length of training fundamentally changes. The change does not, however, imply or take a stand against students acquiring work experience through paid, e.g. summer jobs during their studies. On the contrary, accumulating work experience during studies is commendable and it follows the operational principles of polytechnics

At this point, however, a difference has to be made between the training that is part of a polytechnic degree and the student's work experience in general. Practical training is a compulsory part of the polytechnic degree and thus required for graduation. Polytechnics are accountable and have responsibilities that relate to the organisation of

placements. Acquisition of work experience, on the other hand, is the responsibility of a student and should depend on his/her own interest and initiative, although polytechnics can, if they wish, assist students to find employment.

When comparing the situation with those countries that had already established the ECTS system, it appeared that in Norway and the Netherlands two weeks of training entitled the student to 3 ECTS credits.

The ECTS system is based on analysing the student workload. The European system does not recognise unequal allocation of workload per credit, which is also against the principles of the Decree on student financial aid. The Decree is not adhered if the student is occupied in the activity that fulfils the criteria of degree studies, but is not entitled to receive credits. The extent of training is a question of equality and fair treatment of students, as well as of harmonised principles and practices between polytechnics.

The project cannot suggest anything that contradicts international agreements or legislation. Certain forms of education are regulated by the European legislation or other national agreements. The Polytechnic Act lists those fields that are focal in Finland: *“The education of nurses and midwives and maritime education have to fulfil the requirements imposed by European legislation. Additionally, maritime education has to take into account what has been internationally agreed on maritime training, certification and watchkeeping.”* (unofficial translation)

On the basis of equal and fair treatment, student workload and European transparency it can be concluded that the prevailing situation in credit allotment at polytechnics has to be reviewed. From the student perspective, especially the extent of training has to be harmonised so that the credits accord with the true student workload and progress of fulltime studies.

Proposal:

*Starting on 1 August 2005, polytechnics apply a system of credit allotment in training which entitles the student to a fair number of credits per actual workload. This principle is backdated to apply also to those students who have started their studies before 1 August 2006. If this proposal contradicts European legislation and/ or other international agreements, those are to be followed.*

## 4 The minimum extent of study units

The Polytechnic Decree does not take a stand on the size of individual study units. It only mentions that: *”Teaching has to be arranged in such a way that students can carry out their studies effectively and in a practical order.”* (unofficial translation)

The ECTS system has so far been a structural or contextual rather than contentual change agent. The ECTS system has incorporated some of the methodology and terminology of the Tuning project. The new ECTS User’s Guide includes a recommendation for the module structure and the minimum extent of study units, which should be 5 ECTS.

The publication *”Give me Time to Think”* illustrates clearly the connection between the course length and the curriculum: *”The length and extent of educational units functions better in such curricula, in which the academic year composes a harmonious whole. The more smaller courses the curriculum contains, the more obviously the extent of bigger modules will not succeed. The reason for this is that separate assignments of various courses overlap and pile up in the students’ calendar.”* (unofficial translation from the Finnish version of the text)

The Berlin communiqué states: *”Ministers encourage the member States to elaborate a framework of comparable and compatible qualifications for their higher education systems, which should seek to describe qualifications in terms of workload, level, learning outcomes, competences and profile.”*

Learning outcomes can be defined e.g. by describing what the student knows or is able to do after completing a course, study unit, module or a degree. The Berlin communiqué underlines the learning outcomes of qualifications and degrees. Describing the whole degree programme in terms of learning outcomes presupposes that there are descriptors of learning outcomes for all its courses and units. The reasoning has a built-in idea that learning outcomes are defined as sufficiently large entities.

Proposal:

*Polytechnics decide that*

- *the minimum course length is 5 ECTS.*
- *no decimals are used when course extent is expressed in ECTS credits.*

## 5 Transition timetable

The amendment to the Polytechnic Decree states that the ECTS transfer becomes effective on 1 January 2005. Additionally the amendment notes that the course length should be given in ECTS credits by 1 August 2005. In practice this means that the educational supply that is scheduled to begin in 2005 will be measured in ECTS credits and the whole supply will be entered to the system by 1 August 2005. There are two ways of transferring to the new system: 1) during the spring semester the new students will have their studies in ECTS credits and the other students in former credits (study weeks) or 2) the studies of all students are transferred to the ECTS system on 1 January 2005.

When either one of the above-mentioned options is implemented, it should be guaranteed that the studies of those student who have terminated their polytechnic studies (i.e. graduated or resigned students or those whose study right has expired) before 1 January will remain in the old credit system. Any study-related information or documentation that is sent to them (e.g. new certificates or transcripts of records) needs to be supplied in the former credits, i.e. study weeks. The student or graduate is entitled to receive documents that describe their studies in a way and form which was used at that time when the studies have been taken.

If there are only few degree programmes which admit new students in January, it is justifiable to transfer to the ECTS system only on 1 August 2005. It is rather easy to record the studies of a small group either manually or by having a separate register. If several programmes start in January or the polytechnic wants to transfer to the ECTS system only once, it is better to do it on 1 January 2005.

Transfer will be critical also for the student administration systems. The additional software that performs the credit transfer must also enable different options for different users. The administrator of the student administration system should be able to opt for which students and study programmes are transferred to the ECTS credit system. The software should enable specifying and separating of different options in relation to both time and status (e.g. a graduated or resigned student, a student registered as present).

### Alternative 1

The whole polytechnic will transfer to the ECTS system on 1 January 2005. This alternative is technically easier, because the change will take place immediately and be used for everybody. The drawback is that the

timetable is very tight and the decisions about the technical solution have to be made at once. Additionally the transfer needs to be informed and communicated to the students, staff and other stakeholders very fast. It is easier, however, to inform about a total but single change that would apply to the whole system than to make several announcements. The change in the information system is also challenging because it has to be implemented in a fast and secured way - the student administration system is crucial for the polytechnic operations and cannot be down for many days. However, this alternative is technically much easier, if only the suppliers of student administration software are able to build the necessary functions within the tight timeframe.

#### Alternative 2

Only the studies starting on 1 January are recorded in ECTS credits and the rest transfer to the ECTS credit system on 1 August 2005. This alternative gives more time to do the necessary changes. The students beginning their studies and the staff have to be informed of the change immediately. Supposedly many programmes of student administration can run two systems at the same time without major problems. At least Winha software enables this option. It is much safer to make changes to the student administration system during the summer months, when the possible problems can be solved without the pressures of the normal routines during the academic year. However, this alternative incurs much more manual work in the update of the student administration data. It would also require that the data of separate programmes and individual students is run through to make sure that correct credit system is applied in all cases and that the old and new credits are easily distinguishable.

Furthermore, the latter alternative causes other practical problems, which need to be solved when two systems are run at the same time. The main principle is that all documentation sent from the polytechnic uses one and only one credit system. This aims is important for the coherence and the uniformity of public image. In the internal use within the polytechnic two systems can be used in parallel.

It is natural that the old credits system is applied to those students graduating during the spring semester. If a graduating student has some courses which have been recorded in ECTS credits, those credits will be transferred to the old system. It does not seem probable that a student starting a study programme in January 2005 will actually graduate during the same spring. If this would happen, the graduating

student should have his/her degree certificate and related documents in ECTS credits.

A student resigning from the polytechnic can have a transcript of his/her record. If the student resigns during the spring semester 2005, there are two options. If the student has started his/her studies in former credits, s/he will receive a transcript which uses study weeks as units. A student, to whom ECTS credits have been applied, will receive a transcript with ECTS credits.

In both of the two alternatives presented above, the polytechnic has to make sure that the study attainments of those students whose studies have been terminated (i.e. graduated or resigned students or those whose study right has expired) before the transfer to the ECTS system will remain in the former system. Any study-related information or documents (e.g. certificates or transcripts of records) must be provided according to the former credit system. A student/ graduate is entitled to receive all documentation on the basis of the system that was used when his/her studies were conducted.

Proposal:

*Each polytechnic makes a decision which alternative they are going to use and starts immediate preparations for the transfer, as well as takes care of the relevant information and communication. Any documentation that is given to the student is based on one credit system only. The studies that have been terminated prior to the transfer are always presented in former credits.*

Participation of Universities of Applied Sciences  
in the European Higher Education Area

## **PROPOSAL FOR DEFINING SUBJECT-SPECIFIC COMPETENCES AND THEIR USE IN A CURRICULUM**

1.12.2005

### **1 ABOUT THE PROJECT**

*The Participation of Finnish Universities of Applied Sciences in the European Higher Education Area* (later called the ECTS project) is a project established by the Rectors' Conference of Finnish Polytechnics ARENE ry. and financed by the Finnish Ministry of Education. The aim of the project is to promote the integration of Finnish polytechnics (i.e. universities of applied sciences) into the European Higher Education Area (EHEA). The implementation of the project can be divided into to phases. During the first phase (1 September 2004 – 31 July 2005) the project focused on establishment of the ECTS credit system and the Diploma Supplement, as well as outlined the National Qualifications Framework (NQF).

During the second phase of the project (1 August 2005 – 31 December 2006) the emphasis will be on supporting the curriculum design at polytechnics, dissemination of good practice, programme-specific work, defining the subject-specific competences and following-up the implementation of the recommendations (pertaining to the length of the academic year, training, etc.).

### **2 ANALYSIS OF SUBJECT-SPECIFIC COMPETENCES AT POLYTECHNICS**

*Everything should be made as simple as possible, but not simpler.*  
Albert Einstein

The Rectors' Conference of Finnish Polytechnics ARENE ry. has commissioned field-specific teams to define subject-specific competences (i.e. do a competence analysis) by 31 March 2006. The results are to be submitted to Pekka Auvinen by email (pekka.auvinencp.fi).

The competence definitions are based on the proposal for the European Qualifications Framework (EQF), the draft for National

Qualifications Framework for Finnish HE and the results of the Tuning project. It is recommended that the following **principles of the Tuning project are applied: 1) competences are divided into subject-specific (professional) competences and generic competences and 2) a matrix (grid) is used as a curriculum outline.** Competences are understood as combinations of knowledge, practical and procedural skills and attitudes.

Definitions are made as follows:

### ■ **Subject-specific (professional) competences**

(definition of the term available further below)

- the aim is to describe a programme profile with the help of 3–6 subject-specific competences
- the competences are defined on the basis of national and international competence descriptors (e.g. the Tuning project) and work carried out at Finnish HEI's
- some subject-specific competences may be shared by several programmes of the same field
- competences should be clearly distinguishable from each other and assessable as learning outcomes
- competence titles and descriptors should be clearly phrased and readable (throughout Europe). The descriptors are produced in Finnish/ Swedish and English.
- the knowledge and skills of each competence are formulated briefly with a few sentences
- definitions are produced in programme-specific groups, which are coordinated by people responsible for the field of study
- definitions are produced collaboratively with all interest groups, i.e. teachers, students and representatives of working life

### ■ **Generic competences**

- generic competences are defined by a national expert group, which will be assembled by the end of 2005
- the aim is to create a set of 5–7 generic competences that can be shared by all degree programmes
- the definitions are founded on the Polytechnic Decree, the European and National Qualifications Frameworks, literature and studies on competences and work carried out at Finnish polytechnics

- generic competences should include self-regulation skills that are needed in professional development
- a similar formulation and wording as with subject-specific competences should be used

### ■ sample description

The use of the following concepts and terms is recommended:

Competence profile	Description of the competence
<i>(professional profile)</i> Degree programme in ...	(knowledge and skills)
<i>Subject-specific competences</i>	
■ competence 1	
■ competence 2	
■ competence 3	
■ competence 4	
■ competence 5	
<i>Generic competences</i>	
■ competence 6	
■ competence 7	
■ competence 8	
■ competence 9	
■ competence 10	

### Professional (competence) profile

A combination of subject-specific competences for a degree

### Competence

Competences are wide-ranging combinations of know-how – composites of knowledge, skills and attitudes possessed by an individual. Competences illustrate the person's proficiency, capacity and ability to perform in professional tasks. Education aims at enhancing the development of students' competences.

Competences can be categorised in different ways. In this context the division to subject-specific and generic competences is used. The development of competences can be influenced by pedagogical choices between different contents and methods.

The programme or professional profile consisting of the subject-specific competences sets the foundations for expertise and legitimates the identity and existence of the degree programme. Generic compe-

tences, on the other hand, are shared by various fields and professions, although their importance and emphases can vary in different professions and tasks. For example, internationalisation competence is one of the generic competences and should be possessed by all graduates, but in international business this competence is one of the core subject-specific competences. Generic competences lay a foundation for the person's participation and collaboration in working life as well as for his/her professional development.

### **Competence analysis**

Competence analysis means the identification and definition of core competences (learning outcomes) for the whole degree.

### **Core content analysis**

Core content analysis means the identification of the most important contents and objectives of a study unit, module or programme. It aims at helping teachers to perceive the hierarchies and connections between different knowledge elements and to set them in the right order and proportion in terms of students' entry level, duration of studies, degree requirements and curriculum. In order to create meaningful learning processes, it is necessary to review the results of core content analyses of individual study units together and integrate the study units with each other.

### **Learning outcomes**

Learning outcomes describe the student's attainment of knowledge (what s/he knows?) and skills (what s/he can do?) required for the specific study unit, module or degree. Learning outcomes should be clearly phrased and concrete so that their attainment can be assessed. They should be defined so that they can be used as assessment criteria on the basis of which a student passes or fails a course. Clearly stated outcomes help the teacher to choose appropriate methodology and focus on right aspects in teaching. Learning outcomes are preferably defined by using active verb structures. The definitions should also enhance student motivation and activity.

### **Student workload**

The ECTS system is based on a principle of credit allocation per student workload per different study units, modules and programmes. The workload analysis, together with the core content analysis, is a necessity

for successful curriculum design. Workload measurement starts by allocating the time that is needed for the attainment of learning outcomes and for the completion of a degree (e.g. 4 years \* 1 600 hours/ year = 6 400 hours), which is then divided between various courses and study units. The time allocation per unit should not be determined by the social status of a subject or teacher or any other irrelevant factor, but the decisions should be made rationally on the basis of competence requirements, learning outcomes and working life relevance.

### **Workload analysis**

Core competence analysis sets the basis for workload analysis of study units and courses. In practice workload analysis means allocating the right amount of time for learning. In the curriculum each study unit is given a certain extent and number of hours. Within the limits of these resources, it is then estimated how much time is needed for guided or independent studying, training, producing various papers or other outputs, reading relevant literature or studying other reference materials, and for assessment and feedback.

## **3 USING A MATRIX (GRID) FOR OUTLINING CURRICULA**

The ECTS system has a clear learning-oriented and competence-based orientation. The competence descriptors do not yet guarantee that they are actually used in teaching and learning. The curriculum should also clearly illustrate students' learning processes and approximated pathways of professional development towards the defined learning outcomes and competences.

**The matrix (grid) used in the Tuning project is recommended to be used as a curriculum outline at Finnish universities of applied sciences.** The different stages or steps of the learning process can be illustrated with the help of annual themes and learning outcomes. For meaningful learning and for the comprehensibility of the curriculum it is important that the studies consist of large enough units and modules that have a clear working life orientation and relevance and that the units form a logical continuum.

		competence 1	competence 2	competence 3	competence 4	competence 5	competence 6	competence 7	competence 8	competence 9	competence 10
1 <sup>st</sup> year <b>Annual theme</b> Learning outcomes	Unit A	x					x				
	Unit B	x									
	Unit C			x				x			
	Unit D					x					
	Unit E		x					x	x		
	Unit F	x			x						x
	Total of <b>60 cr</b>										
2 <sup>nd</sup> year <b>Annual theme</b> Learning outcomes	Unit G	x			x						
	Unit H		x			x					
	Unit I		x	x				x			
	Unit J			x							
	Optional studies		x			x					
	Training (placement)		x	x					x		x
	Total of <b>60 cr</b>										
3 <sup>rd</sup> year <b>Annual theme</b> Learning outcomes											
4 <sup>th</sup> year <b>Annual theme</b> Learning outcomes											

X = competence is enhanced and assessed and it is set as the learning outcome and objective of the study unit. The competence is resolutely developed and assessed and it is also mentioned as one of the learning outcomes of this study unit.

### Appendix 3.

## THE EUROPEAN QUALIFICATIONS FRAMEWORK – THE DESCRIPTORS FOR THE FIRST AND SECOND CYCLE HIGHER EDUCATION DEGREES (European Commission 2006).

	Knowledge <sup>1</sup>	Skills <sup>2</sup>	Competences <sup>3</sup>
<b>Level 6</b> <b>The relevant learning outcomes</b> (1st cycle degrees, e.g. degree awarded by Finnish universities of applied sciences)	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles.	Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study.	Manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts.  Take responsibility for managing professional development of individuals and groups.
<b>Level 7</b> <b>The relevant learning outcomes</b> (2nd cycle degrees, e.g. the professional Master's degree awarded by Finnish universities of applied sciences)	Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking.  Critical awareness of knowledge issues in a field and at the interface between different fields.	Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields.	Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches.  Take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams.

<sup>1</sup> Knowledge means the outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practises that is related to a field of study or work. In the EQF, knowledge is described as theoretical and/or factual.

<sup>2</sup> Skills mean the ability to apply knowledge and use know-how to complete tasks and solve problems. In the EQF, skills are described as cognitive (use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).

<sup>3</sup> Competence means the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and/or personal development. In the EQF, competence is described in terms of responsibility and autonomy.

## Appendix 4.

### GENERIC COMPETENCES OF POLYTECHNIC GRADUATES

as recommended by the ECTS project on 19 April 2006

contributors: Eeva Harjulahti (Turku University of Applied Sciences), Johanna Heikkilä (Jyväskylä University of Applied Sciences), Outi Kallioinen (Laurea University of Applied Sciences), Leena Mäkelä (Tampere University of Applied Sciences), Minna Nieminen (SAMOK), Lasse Seppänen (HAMK University of Applied Sciences), Pekka Auvinen (ECTS-project/ North Karelia University of

Generic competences	Description of the competence, first-cycle graduate	Description of the competence, second-cycle graduate
<b>Learning competence</b>	<ul style="list-style-type: none"> <li>■ is able to self-evaluate one's competences and define his/her development and learning needs</li> <li>■ recognises one's learning style orientation and is able to conduct studies independently and develop one's learning strategies</li> <li>■ is capable of collaborative learning and sharing knowledge in teams and working communities</li> <li>■ is able to operate in changing environments and to recognise and utilise available learning opportunities and scopes for action</li> <li>■ Is able to plan, organise and develop one's own actions</li> </ul>	<ul style="list-style-type: none"> <li>■ is able to self-evaluate one's competences and expertise in a versatile and systematic way and to define one's development and learning needs</li> <li>■ is equipped for life-long learning and understands and self-directs one's learning process</li> <li>■ is able to study together and share one's learning and expertise in different expert teams and networks</li> <li>■ is able to work initiatively and to anticipate changes and needs for change</li> <li>■ is able to plan, organise and develop one's actions</li> </ul>
<b>Ethical competence</b>	<ul style="list-style-type: none"> <li>■ is able to apply the value systems and ethical principles of the subject field in one's conduct and tasks</li> <li>■ takes responsibility of one's own actions and works according to the jointly agreed principles and measures</li> <li>■ Is able to apply the principles of sustainable development in one's actions</li> <li>■ is able to take other people into account in one's actions</li> </ul>	<ul style="list-style-type: none"> <li>■ is able to apply the value systems and ethical principles of the subject field in one's conduct and tasks as an expert and a developer of working life</li> <li>■ takes responsibility of one's own actions and works according to the jointly agreed principles and measures</li> <li>■ is able to apply the principles of sustainable development in one's actions and knows the social responsibility of one's organisation</li> <li>■ is able to cater for others in one's actions and make decisions considering an individual, community and a society at large</li> </ul>

<b>Communicative and social competence</b>	<ul style="list-style-type: none"> <li>■ is capable of listening to others and communicating in writing, speech and visually using different communicative styles</li> <li>■ is able to function in the communicative and interactive situations typical of the field</li> <li>■ understands the principles of group and teamwork and is able to work together with others in multidisciplinary teams</li> <li>■ is able to utilise information and communications technology at one's work</li> </ul>	<ul style="list-style-type: none"> <li>■ is able to listen to others and communicate in writing, speech and visually with different target groups</li> <li>■ is able to manage in different communicative and interactive situations and to organise and create professional networks</li> <li>■ understands the principles of group and team work and is capable of working together in multidisciplinary teams also as a team-leader</li> <li>■ is able to utilise information and communications technology at one's work</li> </ul>
<b>Development competence</b>	<ul style="list-style-type: none"> <li>■ is able to retrieve and analyse information of one's subject field, to critically evaluate it and to perceive entities in a holistic way</li> <li>■ knows the basic principles and methods of research and development work and is able to conduct small-scale research and development projects applying the existing knowledge of the field</li> <li>■ knows the principles of project work and is able to work in projects</li> <li>■ adopts an initiative and proactive approach to work and is capable of problem solving and decision making at one's work</li> <li>■ understands the principles of profitable and customer-focused operations and possesses entrepreneurial skills</li> </ul>	<ul style="list-style-type: none"> <li>■ is able to retrieve and analyse information of one's own subject and neighbouring fields and to critically evaluate and holistically perceive it as well as to generate new knowledge</li> <li>■ masters the methods of research and development work and is able to independently carry out R&amp;D projects of one's field</li> <li>■ knows the intricacies of project work and is able to work in projects and manage them</li> <li>■ works initiatively and proactively and is able to start and implement change processes</li> <li>■ is capable of creative and innovative problem solving and decision making at one's work</li> <li>■ is able to start profitable and customer-focused development projects</li> <li>■ is able to guide and mentor others</li> </ul>
<b>Organisational and societal competence</b>	<ul style="list-style-type: none"> <li>■ knows the socio-economic interdependence of the organisations in one's subject field</li> <li>■ knows the possibilities of societal influencing for the development of one's field</li> <li>■ knows the basic principles of organisational management and leadership and has abilities for supervision tasks</li> <li>■ knows the methods of working life and is able to operate in work communities</li> <li>■ is able to plan and organise activities</li> </ul>	<ul style="list-style-type: none"> <li>■ knows the socio-economic interdependence of the organisations in one's subject field</li> <li>■ knows and is able to utilise the possibilities of societal influencing</li> <li>■ knows the organisational and work cultures and is able to participate in intra-organisational and inter-organisational coordination, development and management</li> <li>■ is able to evaluate the operations of a work community and to plan, organise and develop activities in the changing situations in working life</li> <li>■ is able to perceive holistically wide entities and cause – effect relationships as well as to operate in demanding situations requiring versatile competences even when there are constraints of information</li> </ul>

<p><b>Internationalisation competence</b></p>	<ul style="list-style-type: none"> <li>■ possesses spoken and written communicative competence at least in one foreign language necessary for one's work and for professional development</li> <li>■ understands cultural differences and is able to work together with people coming from different cultural backgrounds</li> <li>■ is able to use international sources of information of his/her own field</li> <li>■ understands the effects and opportunities of internationalisation in one's own field</li> </ul>	<ul style="list-style-type: none"> <li>■ possesses the written and spoken communicative competence in one or two foreign languages necessary for one's work and for professional development</li> <li>■ understands cultural differences and is able to operate in diverse international environments</li> <li>■ is able to apply international knowledge and competences in one's own field</li> <li>■ possesses an overview of the position and importance of the profession in the international environment</li> </ul>
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Applied Sciences)

**SUBJECT SPECIFIC COMPETENCES, 05/2006**

Degree programme in Wood Technology

Subject specific competences Degree Programme in Wood Technology	Description of the competence
<b>Material competence</b>	<p>Bachelor of Engineering</p> <ul style="list-style-type: none"> <li>■ knows the properties and behaviour of wood in both the manufacturing process and the finished product</li> <li>■ knows the other materials and supplies (glues, surface coatings and fittings) used in wood products</li> <li>■ knows the properties and possible uses of different wood species</li> </ul>
<b>Competence in production engineering of wood products</b>	<ul style="list-style-type: none"> <li>■ knows the general and special features of the production processes of different wood products</li> <li>■ knows the different production techniques of wood products (woodworking, gluing and surface treatment techniques) and knows how to apply the knowledge in practice</li> <li>■ knows how to adapt the possibilities of automation technology to the production processes of the wood products industry</li> <li>■ is able to plan functioning production processes and to implement investment projects</li> </ul>
<b>Competence in production economics</b>	<ul style="list-style-type: none"> <li>■ knows the main aspects of production and quality control and knows how to apply them in practical situations of production and quality control</li> <li>■ knows the factors influencing profitability and productivity and understands what effect they have on the operation of a company</li> <li>■ understands the significance of production development and rationalization as a company's competitive factor</li> <li>■ understands the significance of external and internal logistics in the operation of a company</li> <li>■ understands the significance of marketing for business and is able to work in sales jobs or as a technical consultant for marketing</li> <li>■ knows the basics of management and can work in a supervisory position</li> </ul>
<b>Competence in development of wood products</b>	<ul style="list-style-type: none"> <li>■ understands the significance of product development in guaranteeing the company's competitive ability</li> <li>■ knows the possibilities of combining different materials in the development of wood products and is innovative about looking for new material alternatives to improve the properties of wood products</li> <li>■ knows 3D-modelling (CAD) and is able to use it in product design</li> <li>■ understands the significance of design and customer requirements in product design</li> <li>■ understands that user-oriented product design requires good cooperation between technology, marketing and economy</li> </ul>

**SUBJECT SPECIFIC COMPETENCES 08/2006**

Subject specific competences Degree Programme in Design	Description of Competence
<b>Design competence</b>	<p>Bachelor of Culture and Arts (Crafts and Design)</p> <ul style="list-style-type: none"> <li>■ understands the methods of creative problem solving</li> <li>■ is able to anticipate future changes and develop working environments in a change oriented way</li> <li>■ is able to acquire knowledge through reflection and application</li> <li>■ masters the use of design methods and instruments of one's own specialisation area</li> <li>■ understands the importance of user-centred design and ergonomics</li> <li>■ understands and masters creative processes and the theory of the field.</li> <li>■ understands the ethical and aesthetical responsibility of a designer</li> </ul>
<b>Production competence</b>	<ul style="list-style-type: none"> <li>■ knows the most important materials and how to use them</li> <li>■ understands the essential manufacturing and production processes</li> <li>■ knows the production chains of one's field</li> <li>■ understand the role of quality as a vital part of design work</li> </ul>
<b>Competence in design processes</b>	<ul style="list-style-type: none"> <li>■ understands cultural aspects affecting design and is able to interpret the phenomena and values of the present age.</li> <li>■ is able to use project working methods</li> <li>■ is able to present one's ideas and products interactively</li> <li>■ understands the importance of business and marketing in the design process</li> <li>■ understands the importance of the design process and product in the enhancement of company image.</li> </ul>
<b>Visual competence</b>	<ul style="list-style-type: none"> <li>■ is able to observe, use and evaluate colours and shapes and their relations as a basis for design work</li> <li>■ understands the importance of composition as a basis for design work</li> <li>■ knows and manages visual means of description as part of design processes</li> </ul>

Degree programme in Design  
**SUBJECT SPECIFIC COMPETENCES 05/2006**

Degree programme in Nursing

<b>Subject specific competences</b> Degree Programme in Nursing	<b>Description of the competence</b>  Bachelor of Health Care (Nurse)
<b>Competence in customer-ship in health care</b>	<ul style="list-style-type: none"> <li>■ has a holistic concept of man and recognises the complexity of a human being using the knowledge base of neighbouring disciplines and fields</li> <li>■ recognises different human deficiencies and disorders and their different degrees of difficulty</li> </ul>
<b>Competence in health promotion</b>	<ul style="list-style-type: none"> <li>■ knows the treatment chains and service networks in health care and understands the aetiology and medical treatment processes of the most common diseases (general practice, surgery, paediatrics, obstetrics and maternity care, mental health care, psychiatry, geriatric care and geriatrics) in order to define nursing needs</li> <li>■ recognises and anticipates the medical problems and threats of an individual and a family/ group</li> <li>■ knows and empowers an individual, family and group to assume responsibility in the maintenance and promotion of their health and capacities</li> <li>■ acts according to and applies the principles of rehabilitative health care</li> <li>■ acts as an expert in health care enhancing sustainable development and environmental health</li> </ul>
<b>Clinical competence</b>	<ul style="list-style-type: none"> <li>■ assumes responsibility for the patient's/ client's physical, psychological, spiritual and social needs and safety</li> <li>■ monitors the patient's condition, symptoms and the effectiveness of medical care in the treatment of the most common diseases and is able to make necessary conclusions</li> <li>■ examines, assesses, monitors and secures the vital functions of the patient</li> <li>■ prevents infections</li> <li>■ manages the most essential examination and treatment methods, and the safe and right use of the necessary machinery and equipment and is able to carry out examinations with the equipment suitable for immediate care</li> <li>■ uses the examination results in treatment and follow-up</li> <li>■ supports the wellbeing and coping of the patient and his/her family</li> <li>■ prevents and recognises situations threatening the patient's/ client's mental health and assists him/her whenever necessary</li> <li>■ alleviates the patient's/ client's pain and suffering in different life situations, also in end-of-life care</li> </ul>

	<ul style="list-style-type: none"> <li>■ provides first aid in various care and operative environments as well as gives both manual, machine and intensive resuscitation within the limits of his/her authority</li> <li>■ acts as a nurse in crises and emergency situations according to the valid instructions</li> <li>■ is able to use various instruments and aids in a safe and ergonomic way</li> <li>■ is able to estimate the need for holistic care</li> <li>■ implements safe medical treatment (pharmacotherapy) as prescribed by a medical doctor and monitors the effects and effectiveness of medical treatment</li> <li>■ is able to do medical and dose calculations and possesses the knowledge of clinical pharmacology essential for nursing patients of different age</li> <li>■ manages the preparative procedures for intravenous (IV) therapy, endovascular treatment and blood transfusion, is able to prepare a patient for these procedures and treatments and to monitor the patient during and after IV-therapy and blood transfusion</li> <li>■ is able to cannulate the peripheral vein and implement IV-therapy</li> <li>■ implements intravenous and medical treatment to the central vein</li> <li>■ recognises the risks of pharmacotherapy and is able to use information on unexpected effects of medical treatment in order to develop processes of pharmacotherapy</li> </ul>
<p><b>Decision-making competence</b></p>	<ul style="list-style-type: none"> <li>■ is able to establish and maintain client-centric and goal-oriented interaction and relationships with the patient, family and community</li> <li>■ assumes responsibility for defining the nursing needs and plans, implements and evaluates the patient care together with the patient and his/her next-of-kin</li> <li>■ enters nursing information to patient documents and data registers in accordance with data and privacy protection policies</li> </ul>
<p><b>Counselling and mentoring competence</b></p>	<ul style="list-style-type: none"> <li>■ is able to mentor and counsel different patients/ clients, their next-of-kin and groups</li> <li>■ supports and guides the patient/ client in his/her self-treatment and management of personal health problems and concerns</li> <li>■ supports and guides students and staff</li> <li>■ uses and produces suitable counselling material and uses electronic means of patient counselling</li> <li>■ guides patient/ client in matters relating to medical treatment to promote the patient's commitment to his/her health promotion and treatment</li> </ul>

**SUBJECT SPECIFIC COMPETENCES 04/2006**

Degree programme in Horticulture

Subject specific competences Degree Programme in Horticulture	Description of the competence
<b>Competence in growing technique</b>	Bachelor of Natural Resources (Horticulture) <ul style="list-style-type: none"> <li>■ can do cultivation work taking work safety into consideration.</li> <li>■ can plan and organize work.</li> <li>■ can make cultivation and fertilizing plans.</li> <li>■ is able to choose the correct varieties, propagation method and cultivation system.</li> <li>■ can time the harvest and control its quantity and quality.</li> <li>■ knows the effect of the handling and storage procedures on the end product.</li> </ul>
<b>Competence in species and products used in horticulture</b>	<ul style="list-style-type: none"> <li>■ is able to identify plant species of cultivated and wild plants including weeds and has a knowledge of a minimum of 500 species.</li> <li>■ knows the characteristic uses of food and ornamental plants.</li> </ul>
<b>Competence in plant protection</b>	<ul style="list-style-type: none"> <li>■ is able to identify the most important plant enemies and knows how to control them as a combination with the cultivation system in use.</li> <li>■ is able to make a plant protection plan.</li> </ul>
<b>Competence in the economy of horticultural production and entrepreneurship</b>	<ul style="list-style-type: none"> <li>■ is acquainted with project work, can do profitability accounting, production planning and strategic business planning.</li> </ul>
<b>Competence in trade and marketing of horticultural products</b>	<ul style="list-style-type: none"> <li>■ knows the most common activities in the trade of horticultural commodities and in the related marketing activities.</li> <li>■ knows about international trade of horticultural products.</li> </ul>

**SUBJECT SPECIFIC COMPETENCES, 04/2006**

## Degree programme in Business Logistics

<b>Subject specific competences</b> Degree Programme in Business Logistics	<b>Description of the competence</b>
<b>Business competence</b>	Bachelor of Business Administration <ul style="list-style-type: none"> <li>■ mastering the central business operations (law, financial administration, marketing, economics)</li> <li>■ a client-centred approach</li> <li>■ an entrepreneurial approach</li> </ul>
<b>Supply chain competence</b>	<ul style="list-style-type: none"> <li>■ understanding the criteria for creating the measures needed in the supervision and effectivising of logistic chains, and the skills to create measures which support the supervision</li> <li>■ ability to grasp the internal and external operational processes of a company, and to identify the operational conditions required in the interface area</li> <li>■ understanding the requirements of process thinking for the implementation of viable and expanding business operations</li> </ul>
<b>Logistic information management competence</b>	<ul style="list-style-type: none"> <li>■ adopting diverse information systems and understanding their significance as tools in the development of logistic chains.</li> <li>■ understanding the objectives of logistic information management and familiarity with the most common application programs in the branch</li> </ul>
<b>Quality and environmental competence</b>	<ul style="list-style-type: none"> <li>■ understanding the significance of quality and the various factors in business logistics</li> <li>■ knowing how to define the requirements for measuring the quality of logistic processes</li> <li>■ awareness of environmental requirements for the logistic process.</li> </ul>
<b>International competence</b>	<ul style="list-style-type: none"> <li>■ understanding the rules of global business operations</li> <li>■ ability to assess the effects of global events on business operations</li> <li>■ ability to implement international business and international logistics operations</li> <li>■ good command of "business" languages</li> </ul>

**SUBJECT SPECIFIC COMPETENCES 04/2006**

## Degree programme in Tourism

<b>Subject specific competences</b> Degree Programme in Tourism	<b>Description of the competence</b>
<b>Service-mindedness</b>	Bachelor of Hospitality Management <ul style="list-style-type: none"> <li>■ understands that hospitality is one of the central values and success factors of the sector.</li> <li>■ can provide healthy, safe and profitable services which promote customers' wellbeing.</li> <li>■ can take aesthetic and ethical perspectives into account when providing services (premises, service products, communications).</li> <li>■ is familiar with the principles of consumer behaviour and can make use of them in developing services.</li> </ul>
<b>Competence in service systems</b>	<ul style="list-style-type: none"> <li>■ can plan, produce and develop services to suit the needs of the operating environment.</li> <li>■ can define, manage and evaluate service processes (product planning, profitability, and organisation, management and development of work)</li> <li>■ can develop services using product development and commodification methods</li> <li>■ is aware of the safety requirements for the sector and can apply them to his/her own work.</li> </ul>
<b>Competence in service management</b>	<ul style="list-style-type: none"> <li>■ knows and understands company strategies and can make use of them in managing service operations.</li> <li>■ can plan, implement and evaluate his/her own and the department's daily supervisory management activities.</li> <li>■ can organise a work community and make use of the skills of individuals, teams and communities.</li> </ul>
<b>Business competence</b>	<ul style="list-style-type: none"> <li>■ can analyse customer relationships from the point of view of service development.</li> <li>■ understands the main concepts of business and has internalised the principles of a commercial approach.</li> <li>■ can predict the effect of alternative operating methods on financial results and competitiveness.</li> <li>■ can apply the principles of entrepreneurship, both as an entrepreneur and as an employee.</li> <li>■ can operate in, make use of and develop various kinds of networks.</li> </ul>
<b>Competence in service environments for tourism</b>	<ul style="list-style-type: none"> <li>■ can develop service environments and networks related to leisure and business travel.</li> <li>■ understands the significance of internationalisation, globalisation and different cultures for services and their development.</li> <li>■ can work in various international operating environments.</li> <li>■ can benefit from applying the characteristics of national cultures in developing tourism.</li> <li>■ can develop regional strengths and improve regional influence in tourism.</li> </ul>

**SUBJECT SPECIFIC COMPETENCES 03/2006**

## Degree programme in Business Information Technology

<b>Subject specific competences</b> Degree Programme in Business Information Technology	<b>Description of the competence</b>
<b>Information Systems Competence</b>	Bachelor of Business Administration <ul style="list-style-type: none"> <li>■ understands information systems as a whole</li> <li>■ understand the production, acquisition and deployment processes of an information system</li> <li>■ understands the principles of data management</li> <li>■ is able to specify, design and implement secure software systems, databases, and user interface</li> <li>■ is able to program</li> <li>■ is able to document and decode documentation of an information system e.g. when dealing with tasks related to software maintenance</li> <li>■ is able to plan and implement training</li> </ul>
<b>ICT Infrastructure Competence</b>	<ul style="list-style-type: none"> <li>■ understands the purpose and principles of the main network components (hardware and software components) and services</li> <li>■ is able to utilize various network components in his/her solutions</li> <li>■ is able to construct and maintain basic network solutions</li> <li>■ is able to take data security into account in solutions regarding ICT infrastructure</li> </ul>
<b>Project Work Competence</b>	<ul style="list-style-type: none"> <li>■ understands the differences between various kind of ICT projects and the role of projects as a part of an organizational structure</li> <li>■ understands the purpose of a systematic way of action in project work and is able to work in a responsible manner in ICT projects</li> <li>■ is able to use and apply various ICT project planning and management methods</li> <li>■ is able to identify and provide for possible risks related to ICT projects</li> </ul>
<b>Business Competence</b>	<ul style="list-style-type: none"> <li>■ understands essential business processes and functions</li> <li>■ understands the role of ICT within an organization and its supportive role in business processes and their development</li> <li>■ is able to develop business processes using ICT</li> <li>■ understands the purpose of contracts, offers, licences, and immaterial rights in his/her work</li> <li>■ is able to serve customers</li> </ul>
<b>Specialized ICT Field Competence</b>	<ul style="list-style-type: none"> <li>■ is able to apply his/her knowledge and skills in a specialized ICT field</li> <li>■ is able to analyse, evaluate, and develop operations in this field</li> </ul>

**SUBJECT SPECIFIC COMPETENCES 03/2006**

## Degree programme in civic activities and youth work

<b>Subject specific competences</b> Degree Programme in Civic Activities and Youth Work	<b>Description of the competence</b> Bachelor of Humanities
<b>Pedagogical competence</b>	<ul style="list-style-type: none"> <li>■ understand the principles of education and development, and are able to apply their knowledge in practice.</li> <li>■ are familiar with the pedagogical methods used in civic activities and youth work, and are able to use and develop instruction methods suitable for different operating environments.</li> </ul>
<b>Development competence</b>	<ul style="list-style-type: none"> <li>■ are able to plan, organise, implement and evaluate projects, and to participate in projects in different types of working communities.</li> <li>■ are able to use research-oriented, experimental, development-oriented and evaluative approaches in their profession.</li> </ul>
<b>Community competence</b>	<ul style="list-style-type: none"> <li>■ understand the significance of group dynamics and group processes, and are able to apply their knowledge to different types of communities ranging from NGOs to virtual communities.</li> <li>■ are able to use various participatory pedagogical methods in instructing communities and groups comprised of people of different ages.</li> <li>■ are able to utilise the growth potential and resources of different communities to strengthen a sense of community and the identity of individuals and communities.</li> <li>■ are able to work in multiprofessional teams.</li> </ul>
<b>Social competence</b>	<ul style="list-style-type: none"> <li>■ are familiar with the structures, mechanisms and service systems of the Finnish society.</li> <li>■ are able to analyse social phenomena at a local, national and international level.</li> <li>■ understand the social significance of civic activities and youth work, and are familiar with the practices of the public and third sectors.</li> <li>■ possess a good understanding of the living conditions of young people and of mechanisms that generate social problems.</li> <li>■ are able to encourage young people to participate in the society.</li> <li>■ understand the common goals of intercultural education, and are able to apply this knowledge in their educational work.</li> <li>■ are able to work in multicultural working communities.</li> </ul>

## **The Bologna Process and Finnish Universities of Applied Sciences**

The economic and political integration of Europe is tightly connected with the globalisation of the world economy and it is affecting education now even stronger than before. The integration and harmonisation of European higher education institutions has been steered by the process that was triggered by the Bologna Declaration in 1999 and which aims at making Europe a uniform, attractive and competitive higher education area by 2010.

The Finnish universities of applied sciences have actively participated in the establishment of the European Higher Education Area (EHEA). This work has been coordinated by a national project initiated by the Rectors' Conference of the Universities of Applied Sciences ARENE ry, and financed by the Ministry of Education. This final report discusses and evaluates the rationale, practical measures and results of the project, as well as the future challenges that the universities of applied sciences will face in the establishment of the EHEA.

During the project, the ECTS credit system was introduced in the universities of applied sciences. Furthermore, the project gave out recommendations for subject-specific and generic competences that would be used to describe learning outcomes in the degrees awarded by the universities of applied sciences. Currently curricula are being renewed along the student-centric and competence-based principles of the ECTS system.