Review of best practices and experiences in DHE

DUALOM - Strengthening capacities for the implementation of dual education in Montenegro Higher Education

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Abstract	This document reports on the state-of-the-art best practices in dual higher education across different program countries. It includes the results of the survey and desk-research of 15 dual study programs in HE from Erasmus+ programme countries in different industrial sectors.

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DISCLAIMER

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Abstract

This document reports on the state-of-the-art best practices in dual higher education across different program countries. It includes the results of the survey and desk-research of 15 dual study programs in HE from Erasmus+ programme countries in different industrial sectors.

Common Understanding of Dual Higher Education Institutions in Europe

1. Unitary, binary and mixed system of provision in Europe

Per the EURASHE's publication on Professional Higher Education in Europe (EURASHE, 2014), the working group found three models of Professional (Dual) Higher Educations across 15 European countries.

In **binary systems**, universities provide Academic Higher Education while specialized institutes provide Professional Higher Education / Dual Higher Education. Lithuania, Estonia, Belgium (Flanders), the Czech Republic, Malta, the Netherlands, Finland, Portugal, Denmark, and Germany all fall into this category.

Mixed systems blur the line between universities and other institutions (i.e., universities may offer Professional Higher Education or Professional Higher Education institutions may offer academic education as in Poland).

Professional Higher Education is delivered in **partly unitary systems** by specialized institutes housed inside universities (e.g., France and Slovenia). In a fully unified system, all forms of higher education would be given by the same institutions, with considerable overlap between "professional" and "academic" activity. However, the working group also discovered autonomous Professional Higher Education institutions operating within universities in the nations they investigated; hence, they refer to them as "partial unitary."

2. Elusive terminology

Today, several models of higher education institutions (HEIs) coexist throughout the academic spectrum, from the post-Humboldtian "ivory tower" to the "entrepreneurial university." In various federal German states, "dual learning" institutes were formed on the paradigm of long-existing vocational training.

In the majority of cases, the so-called dual universities, which have a mix of public and private "ownership" of the administration, are public institutions that operate under a framework of shared responsibility between public authorities and private corporations. They are responsible for the technical or practical components of the training while

providing a wage to the student, who is treated as an employee for the purposes of this arrangement.
Such cooperative projects are uncommon in other EU member states, since they can only be presented if the prevailing economic conditions of a country permit them.

When it comes to the names of the institutions, their programs, and degrees, the terminology is different. The following table below provides an overview of the institutional denominations found in various EU countries.

Institutions that have had a clearly defined and long-standing vocational or professional emphasis have had their names changed to reflect the broadening of their objectives as well as the "academic shift" as indicated above. For example, the phrase "University of Applied Sciences" (UAS) is a relatively recent designation that is rapidly replacing the term "University College" (UC), which is still in use in the United Kingdom and other nations that prefer to follow the English pattern.

Hochschule für angewandte Wissenschaften" (Hochschule for Applied Sciences) is the phrase used to refer to universities that specialize in applied sciences. Switzerland and Austria both use the same designation, and the Netherlands, Finland, and the Baltic nations have all adopted it as a result of this precedent.

Other countries, such as Lithuania, only use the term to paraphrase their own denominations in an international context, but never at "home," because their own legislation only permits the use of the term "university" for "research universities," which are not included in the definition of "university." The same is true for nations such as Portugal (where the "native" phrase for technical college is "Polytechnico") and Ireland (where the "native" term for technical college is "Institute of Technology").

When used in an international setting, UAS is regarded an appropriate translation by officials in both nations; The name "university college" continues to be used in some countries, such as Denmark and Belgium (mostly Flanders), because the phrase "applied sciences" appears to exclude the human sciences (with the exception of economics) as well as the faculties of arts and design. Croatia looks to be taking a middle-of-the-road approach by referring to its university colleges as "University Colleges of Applied Sciences." (EURASHE, 2014).

Country	Classification	Institutions offering Professional Higher Education
BE (FL)	Binary	Universities (through professional bachelor degrees), Hogescholen (UAS) provide professional bachelor degrees and level 5 in PHE, Hoger Beroepsonderwijs
CZ	Binary	Vyssi odborne skoly (tertiary professional schools), Vysoka Skola Neuniverzitniho Typu (Higher Education Institutions of the non-university type)
DE	Binary	Fachhochschulen (universities of applied science), Duale Hochschulen (universities od applied science), Duale – Hochschulen (cooperative universities)
DK	Binary	Erhvervsakademier (Academies of Professional Higher Education), Professionshojskoler (University Colleges), Dual Universities are also offering PHE e.g. Journalism)
EE	Binary	Rakenduskorgkool (Universities od Applied Sciences),ÜLIKOOL (University Colleges)
FI	Binary	Polytechnics
FR	Partly Unitary	Primarily institutes universitaires de technologie (technological university institutes), Professional Masters in AHE.
HR	Binary	Visoke Škole (Colleges), Veleučilišta (Polytechnics)
IE	Binary	Institutes of Technology (to become Technological Universities under announced reforms)
LT	Binary	Kolegija (Colleges)
MT	Binary	Institution of tourism Studies, Malta College for Arts, Science and Technology
NL	Binary	Hogescholen (Institutions of Higher Professional Education)
PL	Mixed	Uczelnie zawodowe (Professional higher education institutions) (Non-University HEIs)
PT	Binary	Ensino Politecnico (Polytechnic)
SI	Partial Unitary	Higher Vocational Colleges, Higher Professional Colleges, Higher Professional Colleges and Faculties (within universities)

(EURASHE, 2014)

Characterising Dual Higher Education in Europe

"Professional higher education is a form of higher education that offers a particularly intense integration with the world of work in all its aspects, including teaching, learning, research and governance, and at all levels of the overarching qualifications framework of the EHEA." (EURASHE, 2014)

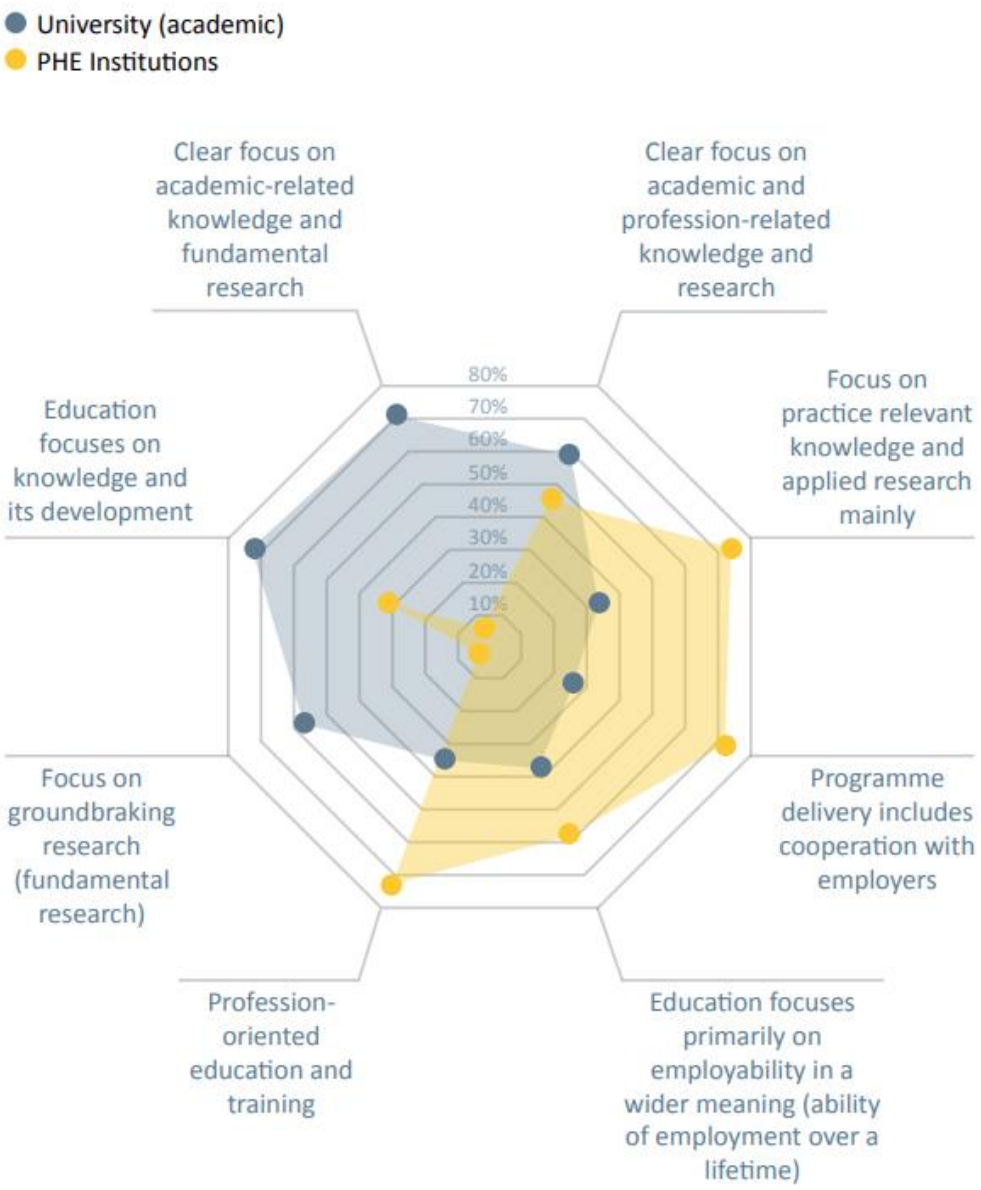


Figure 1 - : Self-image of academic and professional (dual) higher education (EURASHE, 2014)

3. Policy and strategy

3.1. Policy and strategy

Institutional policies and strategies are defined in collaboration and needs of the industry.

3.2. Objectives and Outcomes

Main objectives in relation to the outcome of Dual Higher Education is that DHE specifically focuses on enhancing job-related skills and competencies with a mission to raising the employability of students. The emphasis of the programmes is thus on outcome based learning and applied research.

3.3. Regional Integration

Dual Higher Education is strongly embedded in regional strategies and partnerships with the regional employers.

(EURASHE, 2014)

4. Teaching and Learning

4.1. Methods of Curriculum Development

Education curricula are produced by academics in partnership with stakeholders, particularly those from the world of work, while taking into consideration the future demands of practice and the environment in which they will be employed.

4.2. Learning Outcomes

The learning goals should include but not be limited to fundamental information, abilities, and attitudes linked to the specific professional needs. Additionally, students develop professional and personal skills that enable them to function effectively, innovatively, and autonomously in a changing work environment. Students that participate in research, development, and innovation activities create more effective professional practices.

4.3. Materials for Teaching and Learning

The learning material integrates theory and practice well as a foundation for sophisticated problem solving in real-world professional contexts. The information is based on the most recent research, trends, and references from both the business and academic worlds.

(EURASHE, 2014)

4.4. Learning and Assessment Design

The learning methodology incorporates active, collaborative, and self-organized learning strategies, with a particular emphasis on experience-based learning techniques such as simulation-based learning (SBL), scenario-based learning (SceBL), problem-based learning (PBL), and any other authentic learning situations. Both formative and summative evaluations should take into account the unique characteristics and approach of the PHE learning environment.

4.5. Programme Faculty Teams

At the program level, the team demonstrates a balance of academic credentials and relevant job experience.

(EURASHE, 2014)

4.6. Apprenticeship

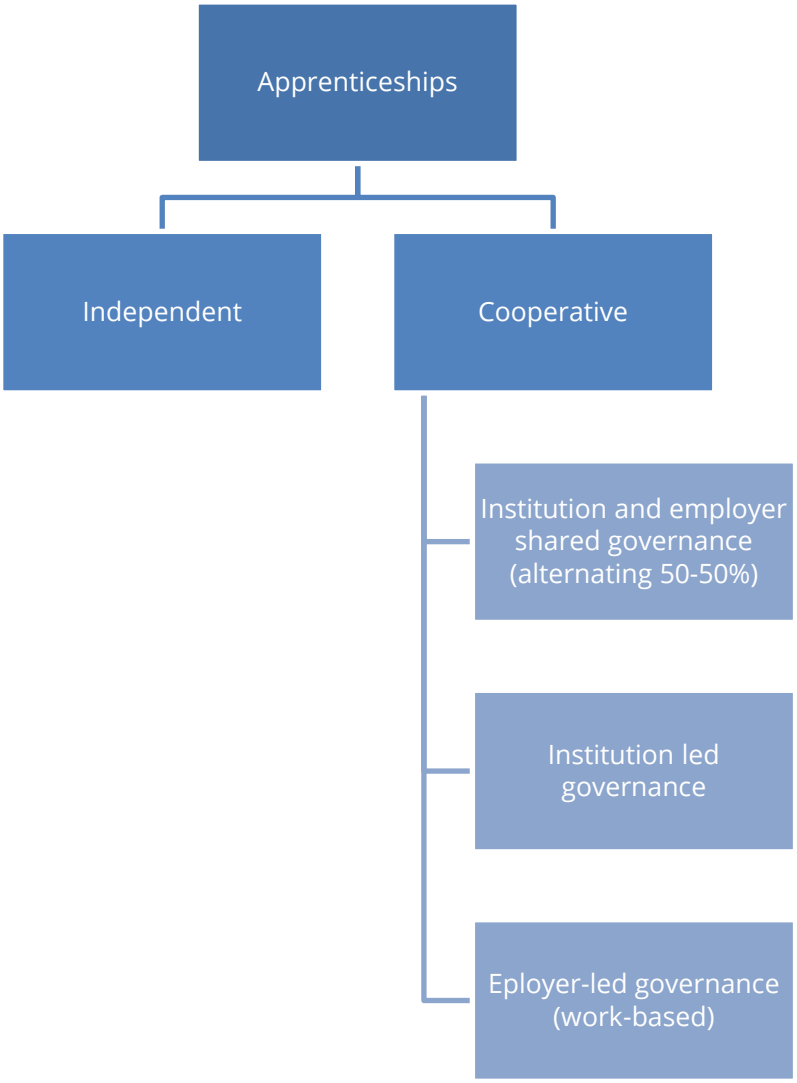
The most current comprehensive research on apprenticeships in Europe (Directorate-General for Employment, Social Affairs and Inclusion (European Commission), 2012) makes only a distinction between university-based apprenticeships and apprenticeships provided by private businesses.

However, within these two classifications, there are a plethora of different types of work-based learning (WBL), such as, for example:

- Business/Industry Field Trips,
- Cooperative Education,
- Entrepreneurial Experiences,
- Internship,
- Job Shadowing,
- Mentorship,
- School-Based Enterprise,
- Service Learning and
- many others.

Apprenticeship descriptions and/or definitions that differ from country to country might be in disagreement. For example, in some countries, an apprentice is classified as an employee for legal purposes, whereas in others, they are classified as students; in some countries, terms such as internship or traineeship can be used to describe an apprenticeship; and in some countries, apprentices are classified as either students or employees, depending on the country (Davy & Frankenberg, 2018).

The ApprenticeshipQ project developed the following typology of apprenticeships:



(Davy & Frankenberg, 2018)

Cooperative Apprenticeships across Europe can be further summarized with the following characteristics

	Institution and employer shared governance	Institution led governance	Employer-led governance
EQF Level of programme	EQF L 6	EQF L5 - L6	EQF L5 - L6
Type of programmes	Professional HE, HE	Higher VET, Professional HE, HE	Higher VET, Professional HE
Length of the programme	3 or 4 years	2 or 3 years	1 year
Theory vs. Practice	Alternating theory & practice	Short placements up to 6 months from	Employed for min. 30h/week
Theory vs. Practice ratio	50:50	90:10 up to 60:40	20:80
Location of learning	HE institution and work-integrated	HE institution and work-integrated	Work-based
Contractual relationship	Yes	Yes	Yes

(Davy & Frankenberg, 2018)

5. Legal requirements for Cooperative Apprenticeship / Dual Higher Education Programmes across Europe in Higher Education

Country	Institutions offering Professional (Dual) Higher Education
BE (FL)	Belgian law does not set any specific requirements for practical elements of curriculum. However, work placements are general practice in DHE in Flanders. It is noteworthy that the Act on Higher Education Structure (terms for accreditation) state that learning outcomes should fit the actual demands for the content of the programme from the world of work and the professional field in international perspective.
CZ	For higher education: No specific requirements or regulations are set regarding the content or structure of curricula. These should simply reflect the knowledge, skills and competencies declared within the professional profile as may be derived from decrees on accreditation and other relevant documents. Only the decree on “accreditation submission” requires professional bachelor study programme to specify the scope and content of practical placement. There is no further specification in any other

	document. Tertiary professional education shall contain theoretical education and vocational training and include "professional practice at workplaces," as part of the curriculum is obligatory.
DE	A practical orientation is required for DHE (i.e., reflected by the curriculum and through practical placements). There are special regulations for cooperative state universities (such as Berufsakademien, Duale Hochschulen).
DK	Some specific requirements for DHE are determined by law.
EE	DHE in Estonia are subjected to the same requirements as higher education; in addition, professional experience in the respective fields is requested.
FI	Curricular requirements are regulated by the Polytechnic Act. The law sets compulsory training periods from 30 to 75 ECTS for bachelors. For some programmes, there are additional requirements (related with professional regulations).
FR	BTS: no specific requirements but each STS specialty has a specific curriculum DUT: 20% of teaching must be undertaken by professionals Licences professionnelles: 25% of teaching must be done by professionals Engineering schools, master's: each or faculty defines its professional input BTS: no specific requirements but each STS course of study has a specific curriculum DUT: an internship of 350 working hours is mandatory Licences professionnelles: an internship of between 600 and 1000 working hours is mandatory Masters professionnelles: The 2-year M-cycle comprises an internship totalling an average of 600 hours Engineering schools, management and business schools: The 3-year engineering cycle comprises 2500 taught hours and internships totalling an average of 1000 hours. Licences professionnelles: 50% of teaching within the professional modules must be done by professionals with a total of 25% of teaching globally done by professionals
HR	Professionally oriented modules in Croatia need to contain at least 50% practical work (preferably 60%). Otherwise, there are no specific differences between AHE and DHE.

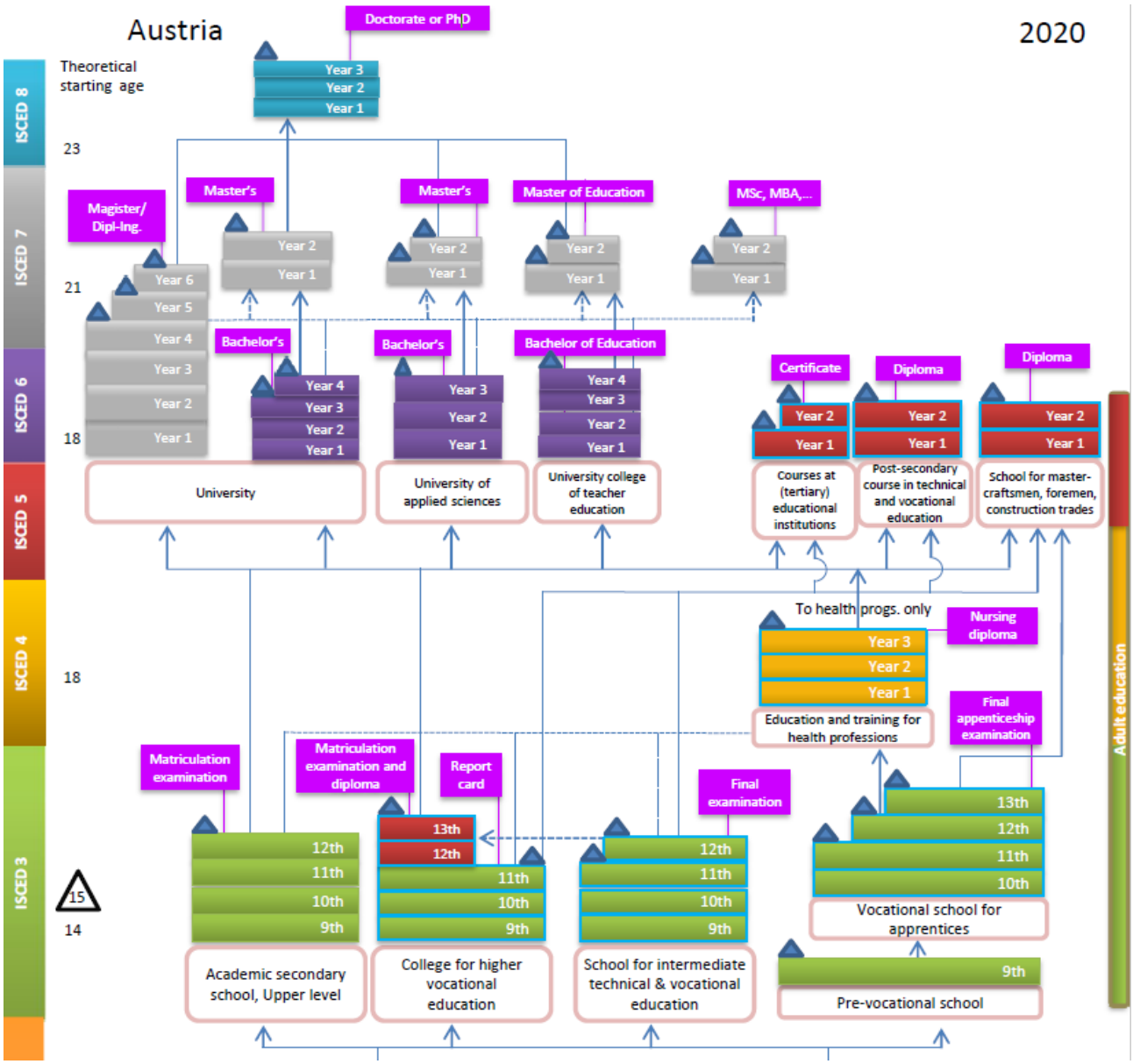
IE	There are no specific requirements at the country level; hence, curricula are institution-dependent.
LT	In Lithuania, the requirements for academic and professional bachelor programmes differ. For DHE and any other kind of practical training, at least a third of the study programme's scope must be accounted. Training practice, induction practice, practice placement, etc., should account for minimum 30 (until 1 September 2011, 20) credit points. The total scope of professional practices for artistic studies should be no less than 18 (until 1 September 2011, 12) credits, and for other studies no less than 24 (until 1 September 2011, 16) credits. The final practice placement should be in line with the subject of the final thesis and like jobs the students are educated for.
MT	Curricular details are institution-dependent. The share of ECTS/ECVET is related to key competences and sectoral skills determined in Malta Qualifications Framework.
NL	DHE programmes focus on practical applications of arts and sciences. There are implicit rules and conventions, rather than country-wide regulations, concerning curricular details in the Netherlands.
PL	Practically oriented programmes shall have a substantial share of practically oriented modules, but the law does not determine a fixed ceiling. Those practical modules should create learning conditions similar to real work situations. Curriculum structure is evaluated from the point of view of its adequacy to ensure expected learning outcomes. Learning outcomes for practical study profiles, determined by ministerial regulations, slightly differ from those for academic study profiles. Integrating practical placements of at least 3 months is compulsory.
PT	No differences between AHE and DHE exist. There are specific requirements for some regulated professions.
SR	Higher Professional Colleges, Higher Professional Colleges and Faculties (within universities)
SI	University programmes do not demand any practical training in the work environment. Professional study programmes, on the other hand, are obliged to include a practical training in the work environment (10%). Higher vocational colleges have an obligatory practical training in the work environment (40%).

(EURASHE, 2014)

Best practices of Dual Higher Education from selected Erasmus+ programme countries

6. Austria

6.1. Overview of the secondary and tertiary education system (EAG 2021)



(OECD, 2021)

6.2. Dual Higher Education in Austria

UASs are the primary "owners" of DHE programs in Austria, according to the Ministry of Education and Research. However, it is also conceivable, and in some cases, fairly uncommon, for "traditional" higher education institutions to participate in the development and execution of DHE programs. The format and appearance of the DHE programs in Austria are standardized, as is the content of the programs.

DHE programs in Austria are predominantly found in technical subjects and follow the Bologna criteria (6 semesters for Bachelor programs (180 ECTS) and 4 semesters for Master programs (120 ECTS). Graduates of the DHE program have the option to continue their study at the Master's or PhD level. The EQF Level has also been unified, with EQF 6 for Bachelor's programs and EQF 7 for Master's programs now being the same. (WUS Austria, 2020).

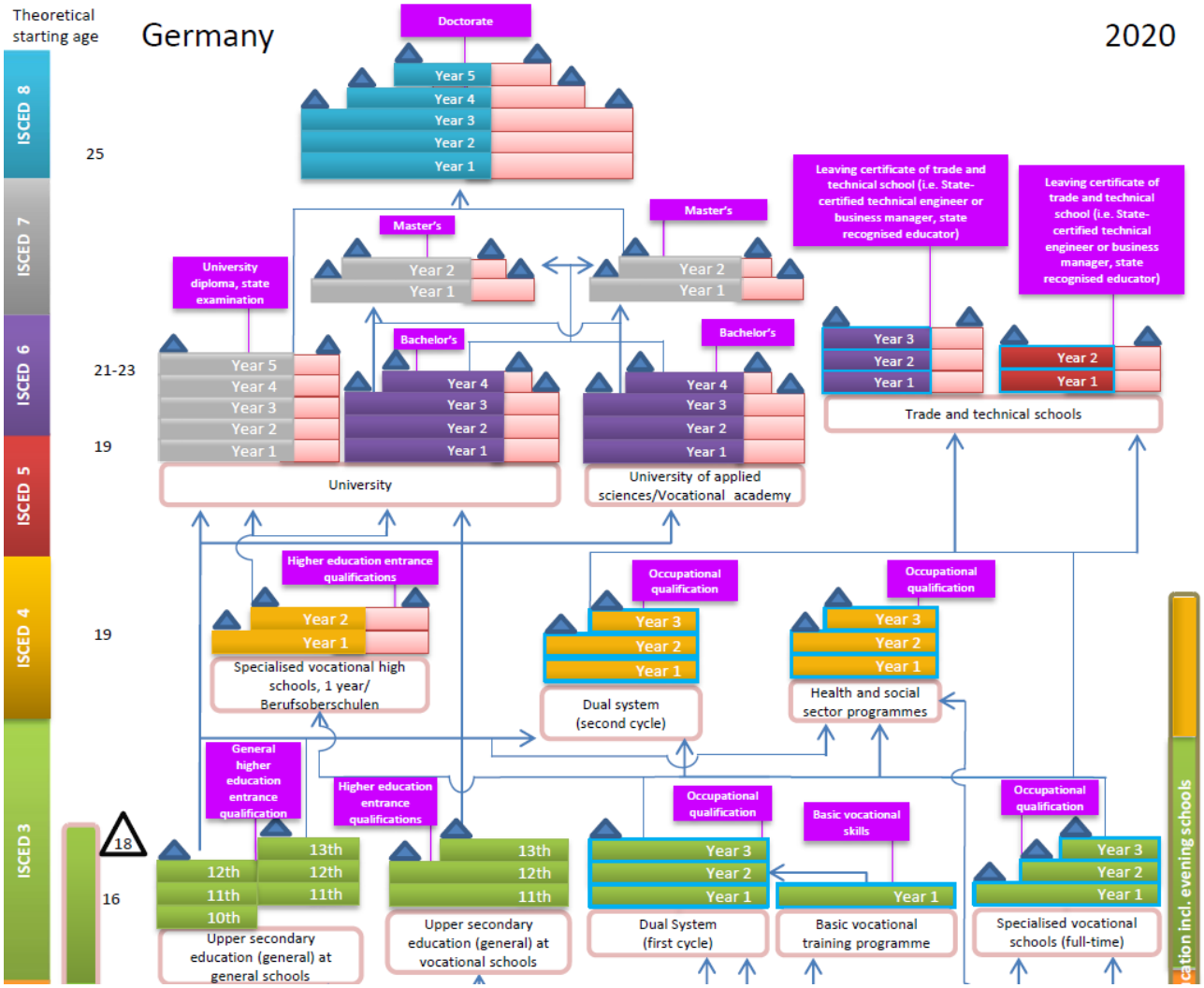
Type of apprenticeship / characteristics	dual study program, coop and workintegrated HE	full time dual/ cooperative education	full time (regular)	part time (work enabeling)	full time (health sciences)
Educational programm EQF level Bachelor / Master	6 / 7	6 / 7	6 / 7	6 / 7	6 / -
Type of programm (HE, HVET)	HE	HVET	HE	HVET	HVET
Duration [semesters]	6	6	6	6	6
Balance between education in university and company	60 - 70% university, different models: 3 months, 1/2 week	50% university, 50% company (4x 12 week a 40h)	1 internship between 4th and 6th semester	working full time, studying at weekends	short placements in hospitals
Curriculum intergrated, work-related, work-based, work-integrated	work-integrated	work-integrated	curriculum integrated	work-based	work-integrated
Formal contract	employment contract (+ educational part)	employment contract (+ educational part)	internship contract	employment contract	placement without payment

Source: H.Hochrinner, characterization of study programmes in Austria (EQF 6-7), 08.06.2020

(Hochrinner & Dragan, Process of the dual study program „Production Technology and Organization", 2021), (Hochrinner, 2020), (University of Applied Sciences Vorarlberg GmbH, 2021), (WUS Austria, 2020)

7. Germany

7.1. Overview of the secondary and tertiary education system (EAG 2021)



(OECD, 2021)

7.2. Dual Higher Education in Germany

A dual study program in Germany combines academic studies with on-the-job training and experience. Due to their practical nature, dual study programs are quite popular in Germany. Practical experience is a required component of dual study programs. If you enrol in a dual study program, you must also sign an employment contract with a company. The training is thus often conducted in two locations: on the grounds of the employer and at the higher education institution.

“Dual study programmes can be training-integrated, career-integrated or practice-integrated.

Training-integrated: The degree programme is combined with training in a recognised occupation requiring formal training. Study phases and vocational training are linked in terms of time and content.

Practice-integrated: Study phases alternate with practical phases in a company. The content of the courses at the higher education institution and the content of the practical training are related. Students gain a first degree that qualifies them to practice a profession, but not a qualification in a recognised occupation requiring vocational training.

Career-integrated: Here academic studies are combined with vocational further training. The learning content of the two forms of training is also connected in this model. Alongside full-time employment, students learn largely through self-study in a manner similar to a distance learning course.” (DAAD, 2021).

Ausbildung Plus maintains a database of over 1,600 dual study programs. These courses are mostly given by universities of applied sciences, but also by cooperative education universities and private and public institutes of higher education.

Germany

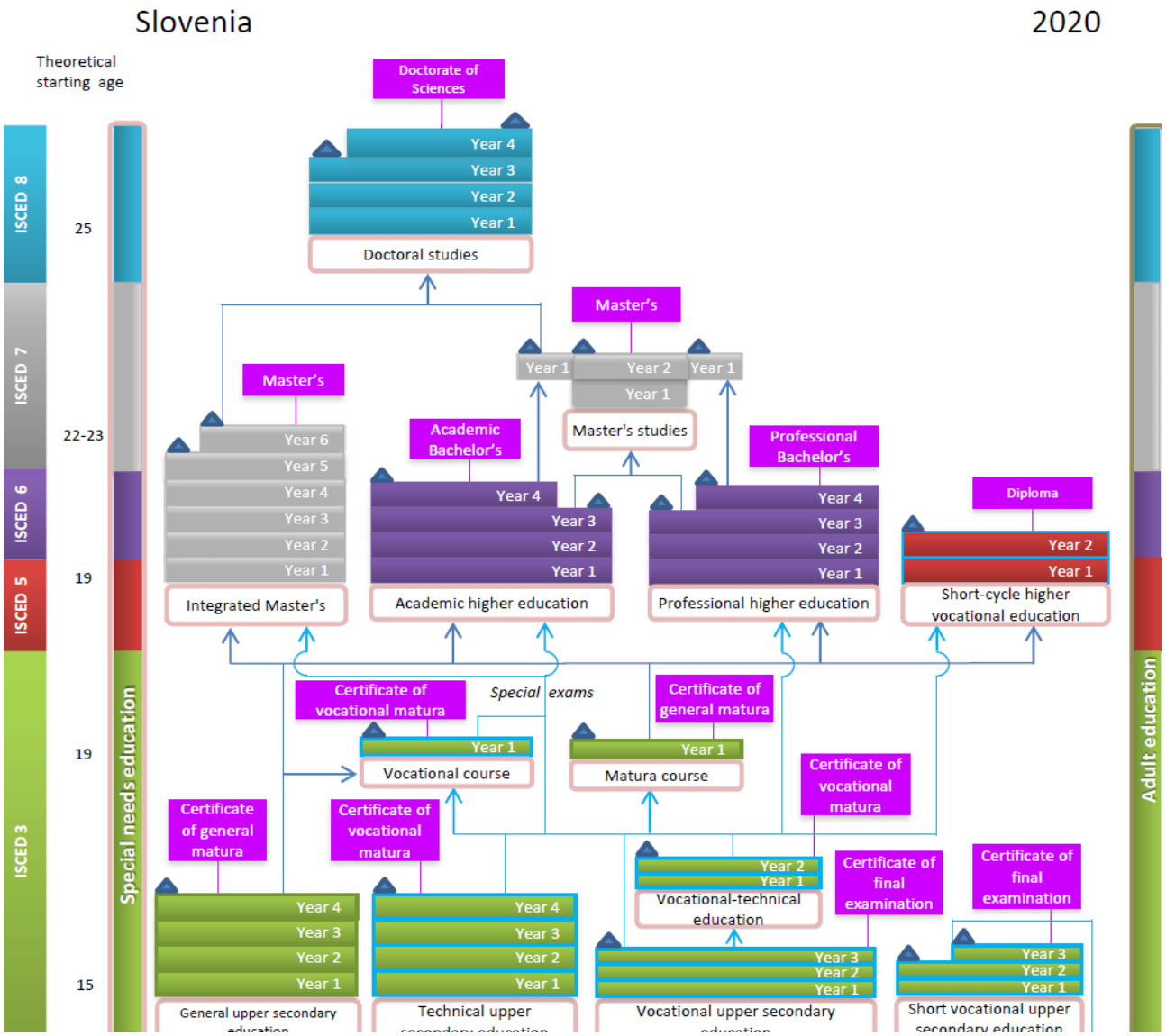
	full time Dual Study Programmes (Universitiy, UAP)	full time Dual Bachelor Programmes (University of Cooperative Education DHBW)	full time Dual Study Programmes (UAP, University of Cooperative Education DHBW)	part time Dual Master Programmes extra-occupational (CAS at University of Cooperative Education DHBW)	part time Dual Study Programmes extra-occupational (public or private HE institutions)	Advanced Vocational Programme (Trade Schools, Technical Schools, HealthSchools)
Education programme EQF-Level Bachelor / Master	6 (partly incl. 4) / 7	6	6 incl. 4	7	6 / 7	6 (or 5)
Type of programme (HVET, PHE, HE)	HE, PHE	HE, PHE	PHE	PHE	HE	HVET (certification by chambers or state authorities)
Average Length of programme Bachelor / Master	3 years / 5 years	3 years	3.5 up to 4 years	2 years or more	3.5 years / 2 years	1-3 years
Balance between education in institution and company	different models depending on institution, alternation varying between daily, weekly, monthly or irregular rhythm	alternating 50% in university, 50% work experience (each 4 x 12 weeks per year)	integrated training, mostly alternating in blocks of some months, entirely practical phase in the first year or in the last year	Individualised, extraoccupational, allocation of study time (and places) varies, e.g. evening, weekend, off work time	extraoccupational, allocation of study time varies, e.g. evening, weekend, off work time	only school, or extraoccupational, allocation of study time varies, e.g. evening, weekend, off work time
curriculum-integrated, work-related, work-based, work-integrated	curriculum integrated, work integrated	curriculum intergrated, work integrated	partly work based, work integrated, ,curriculum integrated	curriculum integrated, work integrated	curriculum integrated, work integrated	work integrated or merely school based
Formal contract	mostly yes (depending on state law and institution)	yes, between company and student	yes, between student and company or health institution	yes, regular work contract between company and student	yes, regular work contract between company and student	yes if work integrated, no, if school based

Source: DHBW, July 2020

(Baden-Württemberg Cooperative State University, 2020)

8. Slovenia

8.1. Overview of the secondary and tertiary education system (EAG 2021)



(OECD, 2021)

8.2. Dual Higher Education in Slovenia

Dual Higher Education in Slovenia exists in study programmes that sit on EQF levels 5 and EQF levels 6:

EQF Level 5 Short-Cycle Higher Education
Short-Cycle Higher Education Programmes in Slovenia are delivered in a dual manner. Approximately 40% of guided learning hours are represented by the work-based learning called “practical education” in partner companies. By accreditation criteria, for each study place a college is required to have a company-institutional agreement for student placement.

Programmes are delivered by independent public or private colleges of short-cycle higher education or so-called school centres that deliver both secondary VET and Higher VET programmes. Programmes are publicly owned, meaning that 35 subject-specific programmes are delivered among 47 colleges. In-company work-based learning (internship) in mentored and graded jointly by in-company mentor as well as lecturer from the college. Final thesis is based on the industry challenges and jointly mentored by in-company mentor as well as lecturer from the college.

EQF Level 6 1st Cycle Professional Higher Education
Professional Higher Education Programmes are “owned” and delivered by independent Higher Education institutions, either Higher Education Colleges, Independent Faculties or Faculties members of Universities. Slovenia does not have a proper binary system of education and only recognizes academic universities as universities, i.e. Universities of applied do not exist.

It is up to the institution to decide on the size of the internships in terms of ECTS. Mostly between 10 – 20% of curricula is dedicated to practical learning in companies, however in-company mentorship is not structured, not it is compulsorily to base the final thesis on the practical experience.

	EQF Level 5 SCHE	EQF Level 6 PHE 1st Cycle
EQF Level of programme	EQF L5	EQF L6
Type of programmes	Higher VET	Professional HE
Length of the programme	2 years – 120 ECTS	3 years – 180 ECTS
Theory vs. Practice	Alternating theory & practice	Short placements up to 6 months from
Theory vs. Practice ratio	60:40	90:10 up to 80:20
Location of learning	HE institution and work-integrated	HE institution and work-integrated
Contractual relationship	Yes	Yes

(Institute of the Republic of Slovenia for Vocational Education and Training, 2021), (Slovenian Quality Assurance Agency in Higher Education, 2021), (Academia, College of Short-Cycle Higher Education, 2021), (Academia, College of Short-Cycle Higher Education, 2021), (Assocation of Higher Vocational College Slovenia, 2021)

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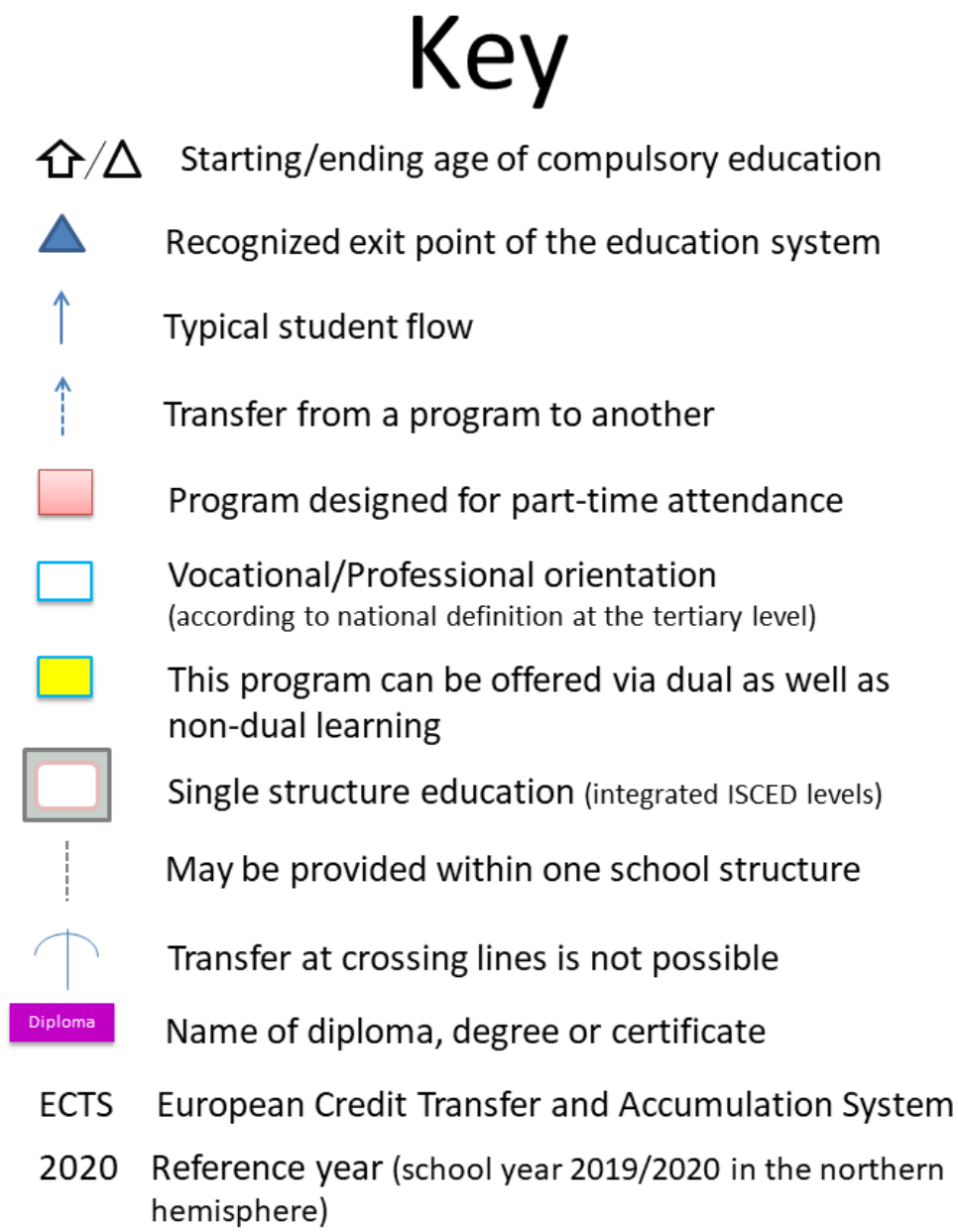
Appendix

9. Key for the Educational Maps



* **Theoretical starting ages** refer to the ages as established by law and regulation for the entry to a programme, actual starting ages may vary depending on the programme.

(OECD, 2021)

10. Detailed analysis of 15 different Dual Higher Education Programmes

10.1. FH Joanneum: Industrial mechatronics EQF Level 6 (Austria)

"Industrial manufacturing and production systems of tomorrow: In the course of studies, you will acquire the latest technological know-how in electrical engineering and electronics, technical informatics as well as mechanical engineering and manufacturing technology. Your plus - in laboratory exercises at the university and during the practical phases in the training company, you can put this knowledge to practical use. Courses such as robotics, technology management or digital image processing give you the finishing touches." (University of Applied Sciences Vorarlberg GmbH, 2021).

Key characteristics of the Study Programme

	**Industrial Mechatronics**
	Bachelor's degree Bachelor of Science in Engineering
	European Qualification Framework Level 6
	6 semesters (3 years) duration, 180 ECTS
	60% from Faculty; 40% from Industry with requirements of practical experience in industry
	Formal contract for dual phase is drafted only between company and student without HEI
	½ employment / 20 hours a week according to national labour laws
	Assessment is completed solely by HEI based upon examination and standardized evaluation documents for practical part.
	Final thesis is mentored by in-company mentor and academic mentor
	Fees are approx. EUR 20 per semester (ÖH contribution)
	Semester abroad is possible but the dual phases can also be done abroad
	Dual mode of education from the 3rd semester (50:50)
	http://www.fh-joanneum.at/mec

(University of Applied Sciences Vorarlberg GmbH, 2021)
(Davy & Frankenberg, 2018) (FH Joanneum, 2021)

10.2. FH Joanneum: Mobile software development EQF Level 6 (Austria)

"Due to the digital change, IT specialists are in demand. In the "Mobile Software Development" bachelor's degree, you will be trained to become an IT expert. We convey content around mobile software development in two forms: theory at the university and practice in a company. The innovative training is offered in cooperation with CAMPUS 02 and TU Graz." (University of Applied Sciences Vorarlberg GmbH, 2021).

Key characteristics of the Study Programme

	**Mobile Software Development**
	Bachelor's degree, degree Bachelor of Science in Engineering (BSc)
	European Qualification Framework Level 6
	6 semesters (3 years) duration, 180 ECTS
	100% from Faculty with requirements of practical experience in industry
	Formal contract for dual phase is drafted only between company and student without HEI
	Letter of intent and an apprenticeship contract
	Assessment is completed by HEI based upon examination and jointly with industry upon standardized evaluation documents for practical part.
	Final thesis is mentored by in-company mentor and academic mentor
	No tuition fees
	Semester abroad is possible but the dual phases can also be done abroad
	Dual mode from the 3rd semester (33:66): 2 days in HEI:3 days in Company
	http://www.fh-joanneum.at/mobile-software-development/bachelor/

(Davy & Frankenberg, 2018)
(University of Applied Sciences Vorarlberg GmbH, 2021) (FH Joanneum, 2021)

10.3. FH Joanneum: Engineering and Production Management EQF Level 7 (Austria)

"Engineers who have the courage to make progress are more in demand than ever. In the dual master's degree, you prepare for the management tasks in the production companies of tomorrow. And our academic training with extensive professional experience is your key to success." (University of Applied Sciences Vorarlberg GmbH, 2021).

Key characteristics of the Study Programme

	**Engineering and Production Management**
	Master's degree, degree Master of Science in Engineering (MSc)
	European Qualification Framework Level 7
	4 semesters (2 years) duration, 120 ECTS
	60% from Faculty; 40% from Industry with requirements of practical experience in industry and completed HE with min. 300 ECTS
	½ employment / 20 hours a week according to national labour laws
	Letter of intent and an apprenticeship contract
	Assessment is completed solely by HEI based upon examination and standardized evaluation documents for practical part.
	Final thesis is mentored by in-company mentor and academic mentor
	No tuition fees
	Semester abroad is possible in 3rd or 4th Semester, also the dual phases can also be done abroad
	Dual mode from the 1st semester (40 HEI : 60 University)
	http://www.fh-joanneum.at/engineering-and-production-management/master/

(Davy & Frankenberg, 2018)
(University of Applied Sciences Vorarlberg GmbH, 2021) (FH Joanneum, 2021)

10.4. MCI - The Entrepreneurial University: Smart Building Technologies EQF Level 6 (Austria)

"The bachelor's degree in Smart Building Technologies offers students a sound engineering education with excellent career opportunities in the fields of building technology and building automation. This future-oriented dual course of study enables practical training in close cooperation with well-known partner companies. The focus is always on a well-founded, application-relevant conveyance of the content. The focus of the course is on solutions for current challenges from the core areas of building technology, in order to meet growing comfort requirements in symbiosis with architecture and building physics and at the same time to conserve resources and the CO2 balance. The focus on networked technologies enables the highly automated and controllable building of tomorrow." (University of Applied Sciences Vorarlberg GmbH, 2021)

Key characteristics of the Study Programme

	**Smart Building Technologies**
	Bachelor of Science in Engineering (MCI) / BSc (MCI) / B.Sc. (MCI)
	European Qualification Framework Level 6
	6 semesters (3 years) duration, 180 ECTS
	100% from HEI
	Employment contract is drafted between partner company and the student
	Paid employment with a partner company for the entire duration of their studies
	Assessment is completed solely by HEI based upon examination and standardized evaluation documents for practical part.
	Final thesis is mentored by in-company mentor and academic mentor
	No, only legally required ÖH fee (approx. € 20 / semester)
	Semester abroad is possible, also an internship can also be done abroad
	Each semester is dual mode appx. 12 weeks per semester with a ratio of 72 HEI : 17 Practical Phase : 11 Practical R & D
	https://www.mci.edu/de/studium/bachelor/smart-building-technologies

(University of Applied Sciences Vorarlberg GmbH, 2021) (The MCI, 2021)

10.5. UAS Technikum Wien: Bachelor Computer Science Dual EQF Level 6 (Austria)

"The bachelor's degree in Smart Building Technologies offers students a sound engineering education with excellent career opportunities in the fields of building technology and building automation. This future-oriented dual course of study enables practical training in close cooperation with well-known partner companies. The focus is always on a well-founded, application-relevant conveyance of the content. The focus of the course is on solutions for current challenges from the core areas of building technology, in order to meet growing comfort requirements in symbiosis with architecture and building physics and at the same time to conserve resources and the CO2 balance. The focus on networked technologies enables the highly automated and controllable building of tomorrow." (University of Applied Sciences Vorarlberg GmbH, 2021)

Key characteristics of the Study Programme

	**Bachelor Computer Science Dual**
	Bachelor's degree, degree Bachelor of Science in Engineering (BSc)
	European Qualification Framework Level 6
	6 semesters (3 years) duration, 180 ECTS
	100% from HEI
	During the first year of study, the application phase begins with one of the available partner companies. Employment contract is made between student and company.
	Paid employment with a partner company for the entire duration of their studies
	Assessment is completed solely by HEI based upon examination and standardized evaluation documents for practical part completed by the company.
	Final thesis is mentored by in-company mentor and academic mentor
	€ 363.36 tuition fee, € 75.00 fee for additional services, € 19.20 student union fee (some partner companies cover these costs)
	Semester abroad is at any time in coordination with the partner company
	Dual phase starts from the 3rd semester with a ratio of appx. 50:50
	https://www.technikum-wien.at/duales-studium-bachelor-studiengang-informatik/

(University of Applied Sciences Vorarlberg GmbH, 2021) (FH Technikum Wien, 2021)

10.6. VSGT Maribor: Catering and Tourism EQF Level 5 (Slovenia)

Main goals of the study program:

- *to educate business organizers in catering and tourism with a broad professional-theoretical and practically useful knowledge in the field of hospitality and tourism,*
- *to acquire generic and vocational-specific competencies in the professional field of hospitality and tourism,*
- *be trained to monitor the latest developments in the profession and use professional literature,*
- *to form self-confidence and determination for business decisions and solving concrete professional problems,*
- *to form a responsible attitude towards quality assurance in their work*

Key characteristics of the Study Programme

	**Catering and Tourism Short-Cycle Higher Education Programme**
	Short-Cycle Higher Education Diploma in Catering and Tourism (“Organizator poslovanja v gostinstvu in turizmu/ organizatorka poslovanja v gostinstvu in turizmu”=
	European Qualification Framework Level 5
	4 semesters (2 years) duration, 120 ECTS
	60% from HEI ; 40% from the Industry with min. 3 years of working experience in industry, min. MSc/MA Degree ; appointment census by required by the Ministry of Education
	Three-party internship contract between the college, student and company
	Minimum internship payment is reimbursement for lunch and transport with possibility to pay a taxable “award” to student.
	Assessment is completed by HEI based upon examination and standardized evaluation documents for practical part suggested by the in-company mentor.
	Final thesis is mentored by in-company mentor and academic mentor
	No tuition for full-time programme, appx. 2,000 EUR for part-time programme per year
	Study or internship abroad is at any time in coordination with college
	Dual phases start in year 1 and year2 in the second semester with the 50:50 ratio in each semesters; overall ratio 60:40
	https://vsgt.si/visja-sola/programi/gostinstvo-in-turizem/

(VSGT Maribor, 2021) (Center RS za poklicno izobraževanje, 2021)

10.7. Academia Maribor: BTEC HND Business EQF Level 5 (Slovenia / United Kingdom)

"The purpose of Pearson BTEC Higher Nationals in Business is to develop students as independent-thinking professionals who can meet the demands of business employers and adapt to a constantly changing world. The qualifications aim to widen access to higher education and improve the career prospects of those who take them." (Pearson BTEC, 2021)

Key characteristics of the Study Programme

	**BTEC Higher National Diploma in Business (RQF)**
	UK Higher National Diploma (HND) – Pearson BTEC HND in Business
	European Qualification Framework Level 5, UK Level 5
	2 years' duration, modular delivery, no semesters, 120 ECTS
	100% from the Industry with min. 3 years of working experience in industry; min. MSc/MA Degree; appointment census by required by the Ministry of Education
	Three-party internship contract between the college, student and company
	Minimum internship payment is reimbursement for lunch and transport with possibility to pay a taxable "award" to student.
	Assessment is completed by HEI based upon examination and standardized evaluation documents for practical part suggested by the in-company mentor.
	Research project is mentored by in-company mentor and academic mentor
	2,248 EUR per year
	Study or internship abroad is at any time in coordination with the college
	Dual phase starts immediately with overall ration 50:50
	https://www.academia.si/studijski-program/o-programu-komercialist-ekonomist

(Pearson BTEC, 2021) (Academia, College of Short-Cycle Higher Education, 2021)

10.8. Academia Maribor: Creative Media Production EQF Level 5 (Slovenia)

Generic and Professional competences for the graduates of the programme are: Plans and organises his/her own work and the work of the team, Ensures quality and success of personal work in the working environment in accordance with standards and within legal, economic and marketing framework, Follows the development of the profession and a wider media field, Takes care of rational usage of production resources, Protects the environment and personal health, Develops entrepreneurial characteristics, skills and behaviour, Uses state-of-the-art IT technology, Coordinates preparation of the production plan in the media field, Prepares calculations and makes final financial project reports, Organises, coordinates and monitors the media and production process, Motivates co-workers for achieving goals, Ensures quality of the media production process, Masters the modern technologies in the actual segments of media production, Plans solutions and processes in media-related areas. (Center RS za poklicno izobraževanje, 2021).

Key characteristics of the Study Programme

	**Creative Media Production**
	Short-Cycle Higher Education Diploma in Media Production (“inženir / inženirka medijske produkcije”)
	European Qualification Framework Level 5
	4 semesters (2 years) duration; 120 ECTS
	100% from the Industry with min. 3 years of working experience in industry, min. MSc/MA Degree ; appointment census by required by the Ministry of Education
	Three-party internship contract between the college, student and company
	Minimum internship payment is reimbursement for lunch and transport with possibility to pay a taxable “award” to student.
	Assessment is completed by HEI based upon examination and standardized evaluation documents for practical part suggested by the in-company mentor.
	Final thesis is mentored by in-company mentor and academic mentor
	Appx. 3,600 EUR per year
	Study or internship abroad is at any time in coordination with college
	Dual phase starts immediately with overall ration 50:50
	https://www.academia.si/studijski-program/o-programu-video-produkcija

(Center RS za poklicno izobraževanje, 2021) (Academia, College of Short Cycle Higher Education, 2021)

10.9. University of Maribor: Mechanical Engineering EQF Level 6 (Slovenia)

"The Higher Education Professional Degree programme of "Mechanical Engineering" is a 3-year undergraduate programme consisting of 180 ECTS points. The study program consists of four fields: "Energy, process and environmental engineering", "Engineering design", "Production Engineering" and "Maintenance of machines and devices". This allows students to professional specialization in the second and third year of study. The students can also continue their studies on Master and PhD study programmes, which are also offered at our faculty." (Faculty of Mechanical Engineering University of Maribor, 2021)

Key characteristics of the Study Programme

	**Mechanical Engineering 1st Cycle Professional Higher Education study programme**
	Bachelor's degree, Bachelor of Mechanical Engineering ("diplomirani inženir strojništva (VS)"
	European Qualification Framework Level 6
	6 semesters (3 years) duration, 180 ECTS
	100% from HEI
	Three-party internship contract between the college, student and company.
	Minimum internship payment is reimbursement for lunch and transport with possibility to pay a taxable "award" to student.
	Assessment is completed solely by HEI based upon examination and standardized evaluation documents for practical part completed by the company.
	Final thesis is mentored only by an academic mentor. Theme relation to the industry is not compulsory.
	No tuition for the full-time programme, appx. 4,000 EUR per year for part-time
	Semester or internship abroad is possible at any time
	Dual phase starts only from the 6th semester. Professional work in industry is awarded 18 ECTS with overall ratio (90:10)
	https://www.fs.um.si/en/study/study-programme/first-cycle/

(Faculty of Mechanical Engineering University of Maribor, 2021)

10.10. FKPV Celje: Tourism I EQF Level 6 (Slovenia)

"In addition to general competences, such as recognising and understanding business processes and research methods and acquiring skills for personal development, growth and life-long learning, graduates of the Tourism I programme also gain subject-specific competences, such as: understanding the basics of macro- and microeconomics and knowledge of fundamental economic ideas and questions, knowledge of financial planning and ways of financing a company, understanding the importance of the connection: organisational structure – company strategy – organisational culture, recognising the role and significance of organising, running and managing a company; gaining qualifications for project work and for devising contemporary forms of organising, running and managing a company or organisation, knowledge of the methods of modelling and analysing business processes, recognising the role and significance of tourism within a business entity; the ability to develop and organise the relevant business models in a working environment,…"
(FKPV, 2021)

Key characteristics of the Study Programme

	**Tourism I 1st Cylce Professional Higher Education Degree**
	Bachelor's degree in Tourism ("diplomirani organizator turizma (VS)")
	European Qualification Framework Level 6
	6 semesters full time / modular part-time (3 years) duration; 180 ECTS
	100% from HEI
	Three-party internship contract between the college, student and company.
	Minimum internship payment is reimbursement for lunch and transport with possibility to pay a taxable "award" to student.
	Assessment is completed solely by HEI based upon examination and standardized evaluation documents for practical part completed by the company.
	Final thesis is mentored only by an academic mentor. Theme relation to the industry is not compulsory.
	1,440 EUR per year for the full-time programme, 1,890 EUR per year for part-time programme
	Semester or internship abroad is possible at any time
	Dual phase starts only from the 6th semester. Professional work in industry is awarded 15 ECTS with overall ratio (92:8)
	http://www.fkpv.si/studij/dodiplomski-studij/turizem-i/splosno-2/

(FKPV, 2021)

10.11. IU International University: Tourism Management EQF Level 6 (Germany)

"*In the dual degree in tourism management, you will deal with topics such as current trends in tourism, digital business models and marketing. Sustainability and quality management are also on your curriculum. With this knowledge, you can develop creative, tailor-made travel offers - and at the same time keep an eye on important aspects such as the environment. After your studies, you will work for a tourism company, in the hotel industry, for event agencies or for destination management organizations, for example."* (IUBH, 2021)

Key characteristics of the Study Programme

	**Bachelor Tourism Management**
	Bachelor of Arts
	European Qualification Framework Level 6
	7 semesters (3,5 years) duration; 180 ECTS in total
	100% from HEI with several years of professional experience in business practice
	Part-time employment contract
	Company pay for tuition fee. Additional stipend by the company may be provided.
	Assessment is completed solely by HEI based upon examination and standardized evaluation documents for practical part completed by the company.
	Final thesis is mentored only by an academic mentor and in-company mentor.
	Full Tuition Fee is paid by the partner company.
	Semester abroad is possible, however subject to partner company approval.
	Dual phase starts from Semester 1 with each semester awarded 5 ECTS of "practical project" – in total 30 ECTS. Weekly changes 40h of internship every second week or shared week (20h/week). Overall ratio 50:50
	https://www.iu-dualesstudium.de/bachelor/tourismusmanagement/

(IUBH, 2021)

10.12. DHBW: Computer Science EQF Level 6 (Germany)

"In our dual computer science course, students acquire IT, business and intercultural skills. In this way, you can help shape IT systems and applications. Student papers, teaching projects and laboratory exercises ensure that the theoretical phases are not just theoretical. Graduates shape future information and communication technology with exciting activities." (DHBW, 2021)

Key characteristics of the Study Programme

	**Computer Science with focus on Computational Data Science**
	Bachelor of Science (B.Sc.)
	European Qualification Framework Level 6
	6 semesters (3 years) duration; 210 ECTS in total
	40% from HEI with several years of professional experience in business practice; 60% from the Industry
	Part-time employment contract
	Company pay for tuition fee. Additional stipend by the company may be provided.
	Assessment is completed solely by HEI.
	Final thesis is assessed only by an academic mentor but co-mentor from industry is available.
	Full Tuition Fee is paid by the partner company.
	Semester abroad is possible, however subject to partner company approval.
	Dual phase starts from Semester 1 with overall ratio 50:50. Each semester 12 weeks of theory and 12 weeks of pratice
	https://www.dhbw-stuttgart.de/studium/bachelor-studienangebot/technik/informatik/

(DHBW, 2021)

10.13. University Master's Degree in Digital Manufacturing EQF Level 7 (Spain)

"The Dual University Master's Degree in Digital Manufacturing responds to the new reality of companies within the framework of Industry 4.0, in which companies need professionals with a global vision of the Digital Factory, mastery of the associated technologies and capacity to lead the changes that the new industrial revolution implies in business models. This Industry 4.0 Master offers multidisciplinary knowledge and trains competent specialists in the "Intelligent Factory". This master's degree gives access to doctoral programs. Consult the companies where the students work." (IMH, 2021)

Key characteristics of the Study Programme

	**University Master's Degree in Digital Manufacturing**
	Master Degree
	European Qualification Framework Level 7
	4 semesters (2 years) duration; 90 ECTS in total
	100% from HEI with several years of professional experience in business practice
	Either Employment contract or university-company-student collaboration agreement.
	Company pay for tuition fee. Additional stipend by the company may be provided.
	Assessment is completed by HEI in size of 70% and Industry partners 30%.
	Final thesis is assessed both by an academic mentor and mentor from the industry.
	appx. 6.000 EUR per year
	Semester abroad is possible, however subject to partner company approval.
	Dual phase in last semester with 100% at the company (total 29 ECTS). Overall ratio 70:30.
	https://www.imh.eus/en/engineering-school/digital-manufacturing-master

(IMH, 2021)

10.14. Architecture (BEng) EQF Level 6 (Germany)

The Architecture DUAL course is an undergraduate eight-semester dual bachelor's degree in the Faculty of Construction with 240 credit points according to the European Credit Transfer System. The course and teaching prepare the students for their professional field of activity and provide them with the necessary specialist knowledge, skills and methods in such a way that they are able to carry out scientific work and responsible professional behaviour. For this purpose, a broad, scientifically sound qualification as a basis for professional practice is imparted in application-oriented teaching in cooperation with suitable companies in professional practice (professional qualification). The students are enabled to plan, carry out and evaluate structural measures independently and in cooperation with others, taking into account scientific knowledge and their significance for the individuals, recognize and take into account society and professional practice. A pratical approach is pursued in cooperation with the university professors from the building construction department, which leads to an engineering degree (Bachelor of Engineering)" (HS21, 2021)

Key characteristics of the Study Programme

	**Architecture (BEng)**
	Bachelor of Engineering
	European Qualification Framework Level 6
	8 semesters (4 years) duration; 240 ECTS in total
	100% from HEI with several years of professional experience in business practice
	Employment contract.
	Payment provided by the company.
	Assessment is completed by HEI based upon examination and standardized evaluation documents for practical part suggested by the in-company mentor.
	Final thesis is assessed both by an academic mentor and mentor from the industry.
	5.760 EUR per year
	Semester abroad is possible, however subject to university approval.
	Dual phase begins in semester 1 until semester 8 with an overall ratio 50:50
	https://www.hs21.de/fuer-bewerber/studiengaenge/architektur-dual/studieninhalte-architektur

(HS21, 2021)

10.15. UE Germany Dual Study Programme: Sport & Event Management, BSc EQF Level 6 (Germany)

"Turning your passion into your job – a dream, especially for sports enthusiasts. Basketball has much more to offer than sports entertainment, and no one knows this better than ALBA BERLIN, one of Germany's most successful basketball clubs. Become a sport & event management champion! This bachelor programme offers a unique opportunity to become a real expert: you will study Sport & Event Management at University of Applied Sciences Europe in Berlin and gain an excellent academic education in the principles of management and business administration. At the same time, you will be granted a position at ALBA BERLIN, giving you insights behind the scenes of the biggest basketball club and one of the leading professional sport clubs in Germany. Study and working schedules are perfectly harmonised." (UE Germany, 2021)

Key characteristics of the Study Programme

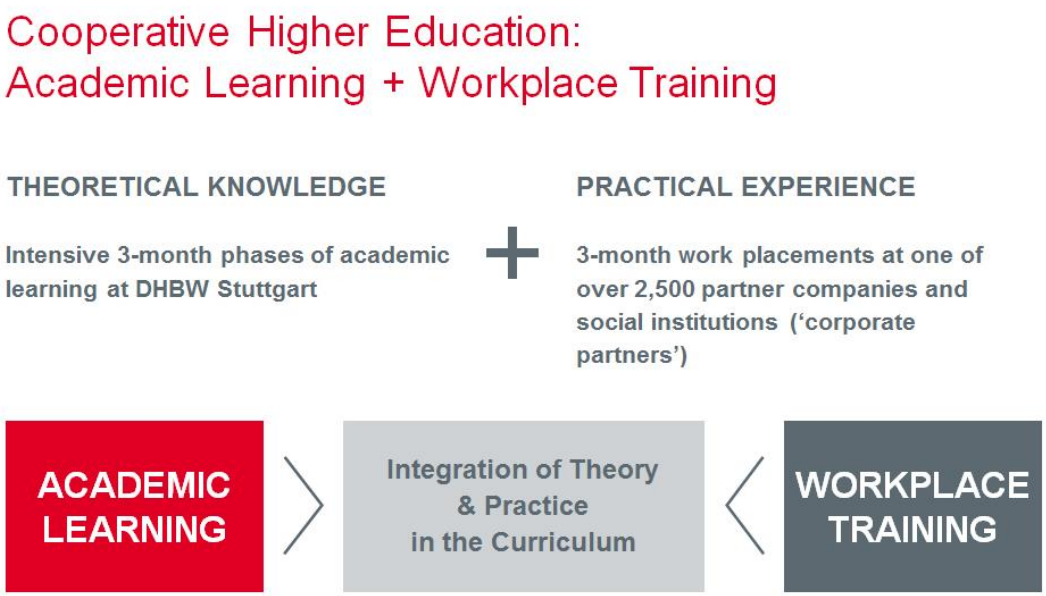
	**Dual Study Programme: Sport & Event Management, BSc**
	Bachelor of Science (BSc)
	European Qualification Framework Level 6
	8 semesters (4 years) duration; 240 ECTS in total
	100% from HEI with several years of professional experience in business practice
	Employment contract.
	Payment provided by the company.
	Assessment is completed by HEI 100%
	Final thesis is assessed both by an academic mentor and mentor from the industry, however 100% assessed by the HEI.
	9.420 EUR per year
	Semester abroad is possible, however subject to partner company approval.
	Dual phase begins in semester 1 until semester 8 with overall 40 ECTS of practice; appx 18%.
	https://www.ue-germany.com/programmes/business-and-sport/bachelor/sport-event-management-dual-alba

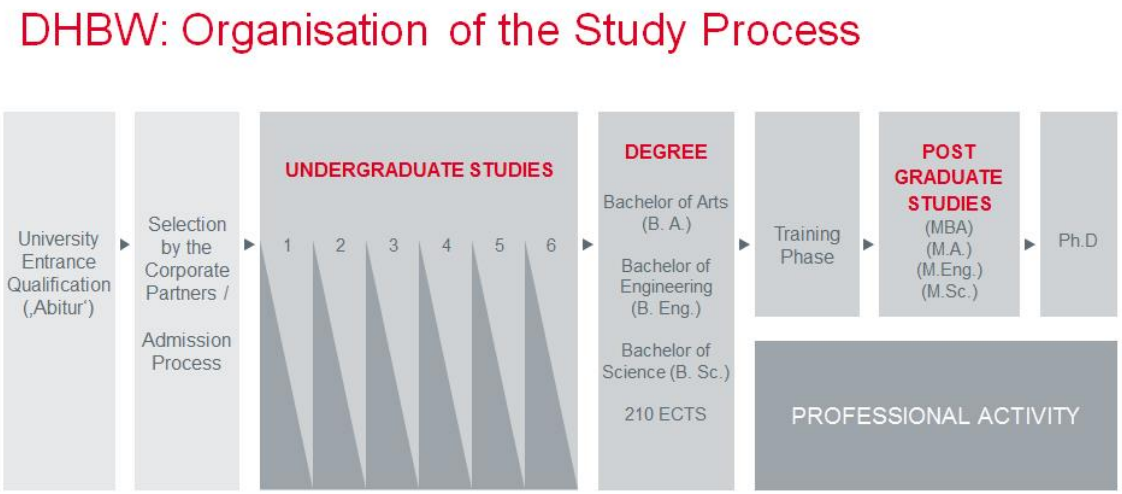
(UE Germany, 2021)

11. Delivery Concepts of Dual Higher Education

11.1. DHBW Delivery Concept of Cooperative Higher Education

"The core principle of the dual study concept at DHBW is the three-month rhythm, by which students switch between university and their workplace training provider, i.e. between gaining theoretical knowledge and applying this knowledge in practice. Students are employed at a company or a social institution and receive a monthly salary, including social security benefits." (DHBW, 2021)





11.2. IUBH Dual Study Delivery Concept

“In the dual study program at the IU, you regularly switch between theory on campus and practice in the company. At the end of each semester, you take your exams. Depending on the course and practice partner, we offer different time models - the weekly change or the divided week. Simply speak to our student advisory service about it.” (IUBH, 2021)

WEEKLY CHANGE
“You alternate between theory and practice on a weekly basis. So you study one week on campus and the other week you work 40 hours with your practice partner.”

SHARED WEEK
“You study the one half of the week and work in the other half at your practice partner. Every week you have a working time of 20 hours.”

11.3. Academia Dual Study Delivery Concept

SHARED WEEK
“Study the one half of the week and work in the other half at your practice partner. Every week you have a working time of 20 hours.”

11.4. VSGT Maribor Dual Study Delivery Concept

Semester 1	Semester 2	
Theory 100%	Theory 50%	Practice 50%
Theory 100%	Theory 50%	Practice 50%