



**STAFFER**  
EUROPEAN RAIL SKILLS ALLIANCE



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# Development of Mobility and Training Programmes

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# 1 EXECUTIVE SUMMARY

This report describes the activities performed within Task 4.5 “Development of mobility and training paths, programmes, and courses”.

Built on the results of WP 1, WP 2, WP 3, Tasks 4.2 and 4.3, this task developed new training and mobility programmes that reflect the skill and competence needs resulting from the general trends described in Task 1.1 and from their specific elaboration provided by rail operators, infrastructure managers, and suppliers.

Moreover, the activities were conducted in synergy with Task 4.4 “Development of mobility and training programmes in the field of cross-border railways, communication and language” that provided T4.5 important inputs concerning new training contents that reflect skills and competence needs in the context of cross-border railway operation and as emerging from the European Single Rail Area and as resulting from new requirements in the field of Energy and environmental policies and ICT Digitalisation/Big Data/Cybersecurity.

While Task 4.4 and the related deliverable D4.4 are devoted to identify contents in the specific field of cross-border railways, communication and language, focusing on the three specific target groups (train drivers, maintenance staff (rolling stock) and dispatchers), Task 4.5 addresses a wider ambitious goal of selecting the needed programmes to fill the skills gaps in rail sector at the different EQF levels, covering the point of view of both rail operators/infrastructure managers and rail suppliers.

The main objectives of Task 4.5 were:

- **Select specific skills according to the results of WP1, WP2 and WP3 about skills gaps and new trends in the sector.**
- **Identify the proper EQF levels for the training curricula according to the ECVET's (European Credit System for Vocational Education and Training) framework.**
- **Develop the programmes taking into account the EQAVET's (European Quality Assurance in Vocational Education and Training) framework.**
- **Include in the programmes soft skills, STEMS, job specific skills and, upon all, mobility plans.**
- **Focus on new and possible (joint) training contents and mobility opportunities.**

Task 4.5 is expected to serve as an important basis for the future implementation activities that will be performed within WP6. In particular, selected programmes, developed in this task, will be implemented in pilot cases in WP6 “Implementation of training and mobility programmes”.

## 2 METHODOLOGY FOR PROGRAMME SELECTION AND DEFINITION

The adopted methodology for programmes development consists of four main phases:

- **Phase 1. Skills and EQF Levels matching**
- **Phase 2. Occupational profiles clustering and programme selection**
- **Phase 3. Skills and programme matching**
- **Phase 4. Programme finalization**

In the following sections, each phase is described in detail.

### 2.1 Skills and EQF Levels matching

The objective of this phase is to propose a consolidated approach to properly assign EQF levels to skills.

The approach consisted of the following activities:

- **Selection of innovative field/trend/skillset relevant to the sector.**
- **Identification of the subskills for each innovative field/trend/skillset**
- **Subdivision of the subskills according to the different EQF levels.**

Even if the proposed approach is general and can be applied to any trend, within the project it was applied to the 14 trends that were identified according to the results of previous WP1, WP2, WP3, reported in Table 1. The reason is that these trends were recognized as the most significant in creating skills gaps and mismatches in the rail sector by rail operators, infrastructure managers and rail suppliers.

**TABLE 1 SELECTED FIELDS/TRENDS/SKILLSETS**

<b>Fields / Trends / Skillsets</b>
Big Data & Artificial Intelligence
Cybersecurity & Internet of Things (IoT)
Global new energies & technologies
Formal methods for system design & verification
Living language
Networking & ICT technologies
Norms, standards & certification
Reliability, maintenance & life cycle management
Safety, dependability, security
Smart cities & Smart station design
Transportation systems

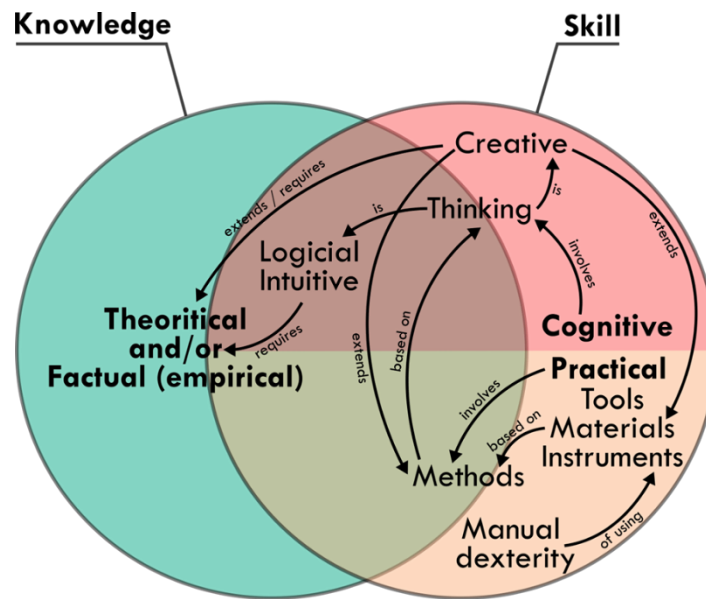


Transversal skills	Learning skills
	Communication
	Soft skills
Virtual reality	
Web development	

The first faced issue was purely fundamental, it is about the criteria according to which (relevant selected) skills are assigned to EQF levels. Another considered issue, related to this aspect, was to sort out all the terms already used in previous WPs: skill, knowledge, topic, sub-skill, field, trend, and skillset. In this conceptual approach of skills/EQFs mapping, the three terms join the same concept space. Some of the fields are too specific skillsets (like norms, standards & certifications, and soft skills sub-categories), some others are trending big fields (like cybersecurity & digital forensics, and AI) and the remaining ones are considered more traditional fields (like transportation systems, and safety, dependability & security).

At a given EQF level, knowledge is theoretical and/or factual (empirical) built up on sense experience or experimental procedures. A skill is however a learning outcome described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments).

Figure 1 depicts an intersection ontology between the two concepts. A sub-skill is an intermediate skill (see Figure 3: algorithmic & programs is a sub-skill, formal design by abstraction and refinement is a skill). A topic could be considered as knowledge with a slight nuance between the two concepts: a topic is specific but knowledge tends to be more generic (mathematical foundations & tools is knowledge, discrete maths & logics is a topic), because of that we opted for the term topic (instead of knowledge) in harmony with the customization aspects dominating the task. Hence by definition, fields, trends, and skillsets (FTSs) encompass skills, sub-skills and topics (SSTs).



**FIGURE 1 SKILL AND KNOWLEDGE: EQF DEFINITIONS INTERSECTIONS**

The second issue was technically dependent on the previous achievements of the project, especially the Occupational Profiles (OP) database of WP2.2 and WP3.2. Nearly 57% of profiles were initially exclusively assigned to EQF 7, with the unique focus on their output main skills and competencies, which is an unfair distribution of EQF levels throughout the database. The key questions were: how to use relevant information about skills to make it fairer? how EQF levels could be gradually distributed on the SSTs of a specific OP? how the chronological dependencies between SSTs could be established? and which skills should be decomposed into sub-skills and topics and how? According to these interrogations, this activity could not be naively approached with a simple orientation towards a raw Skills/EQFs mapping.

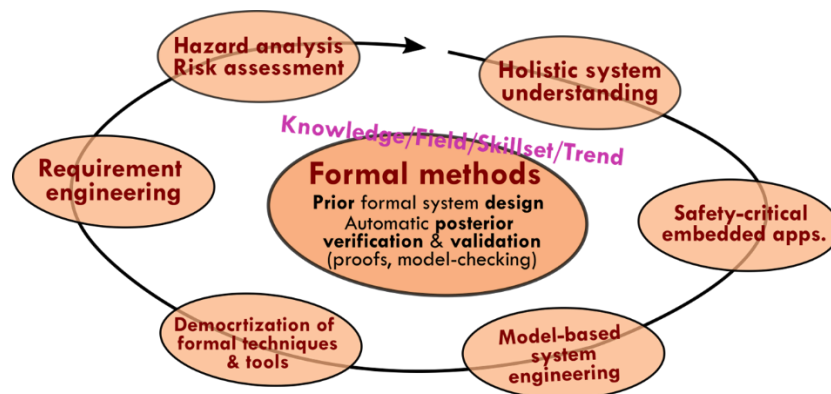
**TABLE 2 EQF LEVELS DEFINITIONS KEYWORDS AND TAGGED MEANINGS**

EQF	Keywords	Meanings	EU VET
3	Keywords of <b>general &amp; well-known</b> topics/skills, in a field of study or work, <b>transversal</b> ...	<b>Understand, general well-known #31 topics, concepts, facts, processes and principles, apply basic #32 methods &amp; tools</b> ...	<b>Secondary</b> levels
4	Keywords of <b>well-mastered &amp; common</b> topics/skills, in a field of study or work, <b>transversal</b> ...	<b>Well-mastered/common #41, medium-skilled staff #42, (creatively) find solutions to specific problems, predictable &amp; changing contexts #43</b>	<b>Upper-secondary</b> levels
5	<b>Foundations, tools, system, level 1, transversal</b> ...	<b>Abstract problems #51, cornerstone general required for specialized #52 topics &amp; skills, (creatively) solve (develop) problems (solutions), specialized unpredictable &amp; changing contexts #53</b>	<b>Initial bachelor</b> programmes
6	<b>Advanced, complex, design, model, analysis, optimization, architecture, complexity, theory, smart, methods, approaches,</b>	<b>Cornerstone specific advanced topics/skills #61, methods &amp; procedure critic #62, (creatively) solve (develop) complex, specialized &amp; unpredictable problems (solutions) #63</b>	<b>Final bachelor</b> programmes

	strategies, levels 2, 3, transversal ...		
7	(new) Approaches, keywords of specific highly specialized topics/skills keywords	Highly complex #71, specialized, holistic #72, and trending #73 fields/topics; mastery of complex #74, unpredictable innovative & contemporaneous contexts #75, renewed strategic approaches #76	Master programmes & Post master mid-career training
8	Special keywords in a specific research domain, in the political & administrative strategies, philosophy ...	at the most advanced frontier of a field #81, most advanced & specialized skills/techniques #82, solve (develop) critical (innovative) problems (solutions) #83, extend/redefine existing knowledge #84, substantial authority & autonomy #85, scholarly and professional integrity and sustained commitment #86 ...	PhD ...

Therefore, in our approach, EQF levels definitions are decomposed into groups of keywords and meanings (see Table 2). Then, the following steps are applied.

Firstly, each involved partner selects a relevant FTS, and identifies the SSTs for that selected FTS with their specific keywords and headings. The example related to the FTS “Formal Methods” is reported in Figure 2 case-study field “Formal Methods” and its related skills.



**FIGURE 2 CASE-STUDY FIELD “FORMAL METHODS” AND ITS RELATED SKILLS**

SSTs are then chronologically distributed based on their gradual complexities. This distribution is then refined/adjusted during the next step. EQF levels should not be involved in this first step.

Secondly, the headings of SSTs are keyword-decomposed and meanings-tagged. A keyword is any qualifier appearing in the heading of a SST, most of them are specific to that SST, and some of them are generic like those included in Table 2(advanced, approaches, design, etc.). A meaning is any qualification descriptive feature not appearing in the heading of a SST.

Finally, EQF levels could then be assigned according to this processing. The presence of several keywords of a given EQF level  $x$  in the heading of a SST, and the cumulative tagging of that SST by several meanings related to EQF  $x$  affirms beyond any doubt that this SST is assignable to EQF  $x$  (see the example shown in Figure 3).

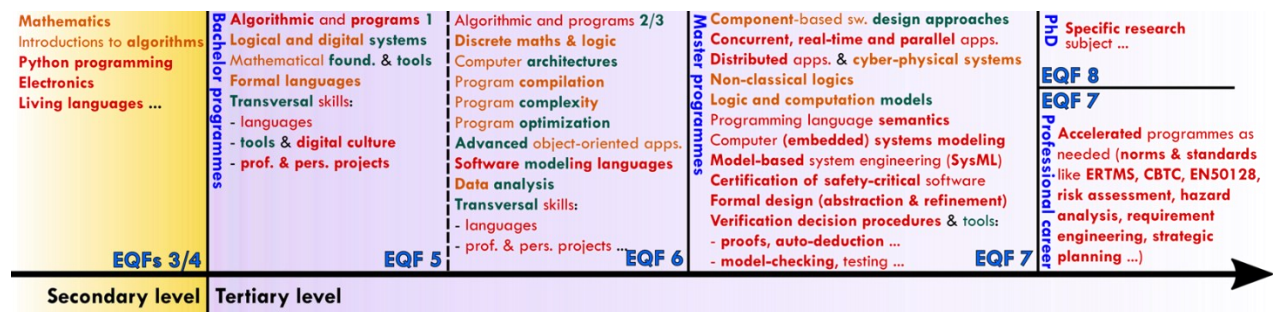


FIGURE 3 RESULT FOR THE FIELD “FORMAL METHODS”

The results of this phase are reported in ANNEX 1 – Skills and EQF Levels matching.

## 2.2 Occupational profiles clustering and programme selection

In this phase, the Occupational Profiles identified by WP2 and WP3 were analysed.

Three main occupational profiles groups have been identified as highly relevant for upskilling from the point of view of railway infrastructure managers and operators (WP2):

- a) Train Drivers.
- b) Staff in traffic management and control (train dispatchers, disponents, etc.).
- c) Staff in maintenance and infrastructure management, including engineering staff.

In addition, from the perspective of rail operators and infrastructure managers, new occupational profiles are mostly related to engineering occupations (for example BIM project manager), IT (Big Data analyst in maintenance, cybersecurity specialists) and the field of customer and mobility services (web developer, mobility agent/specialist, etc.).

The complete list is reported in Table 3 RELEVANT Occupational Profiles from the point of view of rail operators/infrastructure managers.

**TABLE 3 RELEVANT OCCUPATIONAL PROFILES FROM THE POINT OF VIEW OF RAIL OPERATORS/INFRASTRUCTURE MANAGERS**

<b>Train drivers</b>	<b>Train driver</b>
	<b>Train driver instructor</b>
<b>Traffic control</b>	<b>Rail operations manager</b>
	<b>Rail logistics coordinator</b>
	<b>Rail traffic controller</b>
<b>Infrastructure and maintenance</b>	<b>Rail maintenance engineer</b>
	<b>Rail maintenance technician</b>
	<b>Railway infrastructure inspector</b>
	<b>Rolling stock engineer</b>
	<b>Rolling stock technician</b>
	<b>Rolling stock inspector</b>
<b>New profiles</b>	<b>App developer</b>
	<b>Big data analyst</b>
	<b>Digital/virtual learning developer</b>
	<b>Marketing automation</b>
	<b>Cybersecurity specialists</b>
	<b>BIM specialists</b>
	<b>Rail digitisation expert</b>
	<b>Innovation programme manager</b>

From the perspective of rail suppliers (WP3), the engineers and technicians profiles that have been considered relevant for upskilling are reported in Table 4.

**TABLE 4 RELEVANT OCCUPATIONAL PROFILES FROM THE POINT OF VIEW OF RAIL SUPPLIERS**

<b>Electrical Engineers</b>
<b>Electrical technicians</b>
<b>Software Engineers</b>
<b>Civil Engineers</b>
<b>Railway engineers</b>
<b>RAM/ LCC Engineers</b>
<b>Programmers</b>
<b>Telecommunication Engineers</b>
<b>Welding Engineers</b>
<b>Welding Technicians</b>
<b>Integrated Logistic Support Manager</b>
<b>Computer Engineers</b>
<b>Automation Engineers</b>
<b>Robotic Engineers</b>
<b>Vehicle Architecture/ Rolling Stock Engineer</b>
<b>Information Technology Engineers</b>

ICT network engineers
Signal processing
System Engineers
Transportation systems engineers
Artificial Intelligence Engineers
Safety Engineers
Mechanical Engineers
Process Engineers

Among this list, rail suppliers identified emerging occupational profiles for which ESCO has no profile or skills/ competence/ knowledge defined (\*) or for which ESCO has no profile defined, but a description as skills/ competence/ knowledge (\*\*):

- **ILS MANAGER\***
- **SIGNAL PROCESSING\*\***
- **SYSTEM ENGINEERS\*\***
- **TRANSPORTATION SYSTEM ENGINEERS\*\***
- **PROGRAMMERS\***
- **ARTIFICIAL INTELLIGENCE ENGINEERS\*\***
- **SAFETY ENGINEERS\*\***

The second step consisted of clustering the Occupational Profiles from the point of view of the needed training and educational path.

Six main programmes were identified trying to cover the main identified Occupational Profiles, as reported in Table 5.

The programmes at low EQF levels are depicted in green and correspond to specific occupational profiles, such as the train driver programme, in which the link to the occupational profile is evident.

In other cases, such as the “Rail traffic/operations technicians programme” and the “Railway systems technicians programme”, the programmes are related to a group of occupational profiles.

The “Rail traffic/operations technicians programme” covers all the occupational profiles related to traffic management and control, while the “Railway systems technicians programme” covers the occupational profiles related to design and maintenance of infrastructure but also rolling stocks.

The programmes at high EQF levels are instead reported in orange colour in Table 5.

In this case, specific railway engineer profiles are introduced, overcoming the traditional subdivision in engineering disciplines.

In detail, three different engineers are identified, the Railway systems engineer responsible for designing and planning the physical rail systems; the Rail traffic/operations engineer responsible for designing and planning train control and operations; the Rail transport engineer responsible for the organization of all the aspects of the rail transport system (infrastructure, rolling stock, and operations) into an efficient and effective transport system, also considering business aspects.

**TABLE 5 SELECTED PROGRAMMES**

Programme title	Description	Main acquired skill	Keywords on the main acquired skills
<b>Train drivers</b>	The programme is focused on train drivers training. Train drivers are responsible for driving the locomotive respecting all relevant safety, operational and communication regulations, and have full responsibility for the safety of passengers and cargo.	--> Driving train	Driving the locomotive; Checking safety aspects; Communicating and cooperating with TOCs, IMs and on-board staff
<b>Rail traffic/operations technicians</b>	The programme is focused on the training of rail traffic/operations technicians. Rail traffic/operations technicians are responsible for controlling the movement of trains ensuring safe operations at all times (i.e., in normal, degraded, and emergency conditions).	--> Doing the work of train control / operations	Controlling traffic and train operations; Checking signalling and safety aspects; Coordinating logistics
<b>Railway systems technicians</b>	The programme is focused on the training of rail systems technicians. Railway systems technicians are responsible for constructing, installing, inspecting, testing, and maintaining railway infrastructure and rolling stock.	--> Doing work on the physical systems	Inspecting and maintaining infrastructure and rolling stock; Building, testing and installing infrastructure and rolling stock
<b>Railway systems engineering</b>	Railway systems engineering deals with designing and managing all types of railway infrastructure and rolling stock. Two different curricula are considered; the first focused on infrastructure and the second focused on rolling stocks.	--> Designing and planning the physical systems	Designing - planning work on the physical systems; Planning maintenance, Dealing with signalling interoperability and digitalisation
<b>Rail traffic/operations engineering</b>	Rail traffic/operation engineering is the discipline that addresses all the aspects of railway operations (traffic) planning and management.	--> Designing and planning train control and operations	Designing timetable; Analysing and simulating rail traffic; Managing rail projects, Dealing with digitalisation
<b>Rail transport engineering</b>	Rail transport engineering is the discipline related to the organization of all the aspects of the rail transport system (infrastructure, rolling stock, and operations) into an efficient and effective transport system, also considering business aspects.	--> Putting it all together	Analysing rail performance; Applying a systemic approach; Planning integrated transport services; Managing staff; Evaluating rail attractiveness considering social, economic and environmental factors; Analysing rail transport demand; Defining rail business strategy; Evaluating the compliance with regulations, standards and certifications; Promoting innovation and digitalisation transition; Designing customer relations and services



## 2.3 Skills and programme matching

In this third phase, the skills identified in Phase 1 “Skills and EQF Levels matching” for each field reported in Table 1, were assigned to the selected six Programmes.

In Table 6 an example is reported for the field “TRANSPORTATION SYSTEMS”.

**TABLE 6 EXAMPLE OF MATCHING TABLE FOR THE FIELD “TRANSPORTATION SYSTEMS”**

		Train drivers	Rail traffic/operations technicians	Railway systems technicians	Railway systems engineering	Rail traffic/operations engineering	Rail transport engineering
EQF 3-4	Mathematics & geometry	X	X	X	X	X	X
	Probability & statistics		X	X	X	X	X
	Introduction to algorithms		X	X	X	X	X
	Physics	X	X	X	X	X	X
	Chemistry		X	X	X	X	X
	Electronics	X	X	X	X	X	X
	Languages	X	X	X	X	X	X
	Transversal skills	X	X	X	X	X	X
	- communication ...	X	X	X	X	X	X
EQF 5	Maths: algebra (Boolean) & analysis				X	X	X
	Statistics				X	X	X
	Physics				X	X	X
	Chemistry				X	X	X
	Languages				X	X	X
	Transversal skills				X	X	X
	- professional project				X	X	X
	- teamwork, cooperation				X	X	X
EQF 6	Transportation systems analysis				X	X	X
	Transport economy & technique						X
	Transport systems planning					X	X
	Algorithms & programming				X	X	X
	Planning and organization methodologies					X	X
	Adaptability to changes				X	X	X
	Transversal skills				X	X	X
	- professional project				X	X	X
- critical thinking				X	X	X	
- teamwork, cooperation				X	X	X	
EQF 7	Advanced transport systems design & simulation					X	X
	Advanced transport systems planning					X	X
	Sustainable mobility & transport services					X	X
	Rail Transport				X	X	X
	Smart logistics & freight transport					X	X
	Transportation systems theory & analysis						X
	Operational research & optimization						X
	Traffic flow theory						X
	Rail infrastructure				X	X	X
	Methods & models for decision support						X
	Transport systems safety & risk management				X	X	X
	Requirement engineering				X		X
	User behaviour & human factors					X	X
Multimodal transport					X	X	

EQF 8	Specific research subjects:						X
	- Innovative Rail maintenance strategies			X			X
	- Innovative energy management solutions					X	X
	- Rail operations & management new approaches					X	X
	- Rail automation					X	X
	- New signaling systems			X			X
	- Integrated rail transport services					X	X

## 2.4 Programme finalization

During the last phase, the lists of skills subdivided for each trend or field were merged and refined taking into account the specific EQF level and the specific programme requirements according to the EQAVET framework.

In detail, the programmes were developed for selected EQF levels which are considered the most relevant for that profile.

The list of the final nine programmes is reported in Table 7. Table 6

**TABLE 7 DEVELOPED PROGRAMMES**

Programme title	EQF Level
Train drivers	EQF3-4
Rail traffic/operations technicians	EQF3-4
	Post-master & Mid-career Trainings EQF 7
Railway systems technicians	EQF 5
Railway systems engineering	EQF 7/8
Rail traffic/operations engineering	EQF 6
	EQF 7
Rail transport engineering	EQF 7
	EQF 8

The programmes detailed description is included in ANNEX 2 – Programmes.

---

## 3 MOBILITY REQUIREMENTS ANALYSIS

This chapter describes the main mobility and cooperation frameworks that were considered within T4.5.

The requirements and constraints of the possible mobility options were analysed for the different EQF levels and the different Countries/organisations, highlighting the most flexible and rapid solutions.

The cooperation between academic partners and companies is also addressed, in particular in terms of internships and dual systems training.

The mobility related to the staff is instead addressed by T4.4.

In the following sections, the different mobility solutions are reported according to the EQF level.

### 3.1 EQF level 8

#### 3.1.1 Joint PhD Programme

Universities can apply for accreditation of PhD Programmes also in associated form through the stipulation of agreements or the establishment of consortia, with one or more of the following organizations:

- a) other universities, including foreign ones, with the possibility of issuing multiple or joint final qualifications;
- b) public or private research bodies, including foreign ones, possessing the requisites of high educational qualification;
- c) companies, including foreign ones, that carry out qualified research and development activities.

A Joint doctorate is a doctoral path designed by two institutions. The PhD candidate prepares a single PhD thesis and performs a unique thesis defense. Whenever possible, the involved institutions will award a joint diploma, signed and stamped by both institutions.

In joint doctoral paths, the Home University is the institution which selects the candidate and where the candidate is first enrolled. The host University is the institution enrolling the candidate at a later stage, after having assessed his/her eligibility.

#### 3.1.2 Joint PhD Curricula

A more flexible procedure can be the accreditation of a Joint Curriculum within an existing PhD Programme.

The needed documentation is

- **A signed agreement between the involved entities;**
- **The definition of the research activity plan with the indication of the time period spent at the different universities;**
- **The number of PhD positions.**

### 3.1.3 Industrial Doctorate

Existing PhD Courses can activate Industrial PhD positions. These positions are reserved for Company staff members. The agreement can be signed also with foreign companies. The procedure is usually quite fast and flexible. It is required just the approval from the PhD Teacher Board and from the Department Board.

The main requirements of this kind of collaboration:

- **Call for applications dedicated to highly qualified employees of the company**
- **Two tutors: a company tutor and a university tutor.**
- **The Enterprise will consent to the employee to attend the activities agreed upon in the training plan.**

The needed documentation:

- **Signed agreement between the involved entities;**
- **definition of the research project and training plan;**
- **number of involved employees;**
- **Agreement on the exploitation and the Intellectual property of the research results.**

### 3.1.4 Co-tutoring

Existing PhD Courses can stipulate a Co-tutoring agreement for existing PhD positions and already enrolled students.

This type of agreement implies that the PhD student will have two advisors one for each university and will spend a period of at least 6 months at each university.

At the end of the Course there will be just one thesis discussion but two issued certificates. The examining commission shall comprise an equal number of scientific representatives from both countries and will be jointly designated by both Universities and approved by both Rectors.

The certificate awarded by each University will mention the other University at which the co-tutored activity will have been carried out.

It is a fast and flexible procedure: just a couple of months are needed and the request can be done at any moment of the year but before the end of the second year of the student's research plan.

The activation requires the approval of the Teachers' Boards and the Departments of both the Universities and the signatures of the two Rectors.

Regarding the requirements, the Academic Board must check the compatibility and equivalence of the programmes of the two PhD courses. In addition, the PhD student must have an equivalent degree and education level according to the entry requirements of both PhD Courses.

The needed documents are:

- **signed Agreement**
- **the research plan with the indication of the time period spent at the two universities: the period at each University cannot be shorter than six months**
- **The name of the two advisors one for each university**

### 3.1.5 Visiting PhD students

Existing PhD Programmes give the possibility for PhD students to spend a research period of 3-5 months abroad during the second or the third year of the course.

The procedure is very fast and flexible. It requires just approval from the PhD Course Coordinator and Teachers Board and an invitation letter from the hosting university.

### 3.1.6 Other types of Programmes at EQF level 8

In some countries, such as Italy, there are programmes for Master of Science graduated students, sponsored by many companies in the sector, which include a mandatory internship of 6 ECTS.

## 3.2 EQF level 7

### 3.2.1 Joint Degree/ International Programme

All the students will receive a joint degree at the end of the Programme. A unique Degree certificate issued by both universities.

It is a difficult process due to the high level of cooperation required between the universities and the long accreditation process.

The Programme must obtain accreditation from both Countries.

The degree programme must be jointly defined and must be compliant with the requirements of both Countries. Usually, at least 6 months (30 ECTS) must be spent abroad, but the time period may vary.

### 3.2.2 Double Degree

A Double Degree Agreement gives the possibility to study abroad to some interested students within an existing Master of Science Programme. These students at the end will receive two Degree certificates, one for each university. It is a fast procedure that does not require the accreditation process.

Needed documents:

- **Agreement signed by both Universities**
- **compatibility check of the two existing Programmes**
- **agreed study plan for each student**
- **course/ECTS recognition tables**
- **mark conversion table.**
- **number of students that can apply.**

Regarding the entry requirements:

- **undergraduate degree or bachelor and have accomplished at least an established % of ECTS in the first/second year of the Master of Science at the home university**
- **submit a certificate issued by the home university confirming compliance with these requirements**
- **students of both Parties are required to have adequate knowledge of the main languages used during lectures.**

### 3.2.3 Erasmus Agreement for a study period abroad

Erasmus Agreement gives the possibility to students to spend a study period at a foreign University. The number of available positions depends on European funding.

It is a standardised framework and procedure within the ERASMUS Programme.

Nevertheless, the procedure is not fast: needs to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and Countries.

Regarding the needed documents and information:

- **signed agreement;**
- **course/ETCS recognition tables;**

- **mark conversion table;**
- **call for students' application;**
- **number of students that can apply;**
- **linguistic requirements.**

### **3.2.4 Erasmus Traineeship abroad**

Within the ERASMUS framework, there is the possibility of establishing agreements between Universities and Companies or Research Centres to activate traineeship abroad for students.

The procedure and the deadlines are the same as the Erasmus Agreement for a study period abroad, with a first phase in which the agreements are signed and a second phase in which the call is published and the interested students can apply.

### **3.2.5 Dual System/Apprenticeship**

Dual Master's programmes combine two learning venues (i.e., the workplace and the education institution). Learners must hold a bachelor's degree (traditional, dual or professional bachelor).

Dual study programmes usually have the following characteristics:

- **alternation between theory phases in the institution of higher education or academy and practical phases in the training enterprise;**
- **a regulation about the practical training;**
- **learners have the status as a student/employee (a) or an mostly unpaid-trainee (b), based on a contract with the company;**
- **closely interwoven learning activity in the company and acquisition of theoretical knowledge in the higher education institution / academy;**
- **close coordination and cooperation between the higher education institution and company.**

## **3.3 EQF level 6**

### **3.3.1 Joint Degree/ International Programme**

All the students will receive a joint degree at the end of the Programme. A unique Degree certificate issued by both universities.

It is a difficult process due to the high level of cooperation required between the universities and the long accreditation process.

The Programme must obtain accreditation from both Countries.

The degree programme must be jointly defined and must be compliant with the requirements of both Countries.

Usually, at least 6 months (30 ECTS) must be spent abroad, but the time period may vary.

### 3.3.2 Double Degree

A Double Degree Agreement gives the possibility to study abroad to some interested students within an existing Bachelor Programme. These students at the end will receive two Degree certificates, one for each university. It is a fast procedure that does not require the accreditation process.

Needed documents:

- **Agreement signed by both Universities;**
- **compatibility check of the two existing Programmes;**
- **agreed study plan for each student;**
- **course/ECTS recognition tables;**
- **mark conversion table;**
- **number of students that can apply.**

Entry requirements:

- **At least twelve 12 years of education (secondary school certificate) and must hold the document certifying they passed the qualifying examination (if needed) for admission to a university course in the same or similar scientific area, of the aforementioned double Bachelor, in their home Country. Copy of the certification must be provided to the hosting Institution by the sending Institution/the student at the moment of the enrolment.**
- **Students of both Parties are required to have an adequate knowledge of the main languages used during lectures.**

### 3.3.3 Erasmus Agreement for study period abroad

Possibility for students to spend a study period at a foreign University. The number of available positions depends on European funding.

It is a standardised framework and procedure within the ERASMUS Programme.



Nevertheless, the procedure is not fast: needs to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and Countries.

Regarding the needed documents and information:

- **signed agreement;**
- **course/ETCS recognition tables;**
- **mark conversion table;**
- **call for students' application;**
- **number of students that can apply;**
- **linguistic requirements.**

### **3.3.4 Erasmus Traineeship abroad**

Within the ERASMUS framework, there is the possibility of establishing agreements between Universities and Companies or Research Centres to activate traineeship abroad for students.

The procedure and the deadlines are the same as the Erasmus Agreement for a study period abroad, with a first phase in which the agreements are signed and a second phase in which the call is published and the interested students can apply.

### **3.3.5 Dual System/Apprenticeship**

Dual study bachelor programmes combine two learning venues (i.e., the workplace and the education institution).

Dual study programmes usually have the following characteristics:

- **alternation between theory phases in the institution of higher education or academy and practical phases in the training enterprise;**
- **a regulation about the practical training;**
- **learners have the status as a student/employee (a) or an mostly unpaid-trainee (b), based on a contract with the company;**
- **closely interwoven learning activity in the company and acquisition of theoretical knowledge in the higher education institution / academy;**
- **close coordination and cooperation between the higher education institution and company.**

Dual study programmes lead in general to a bachelor qualification, which can differ in the following way:

- **initial dual study programmes with an integrated training component combine a course of study with practical training in a recognised occupation in a company. In addition to the bachelor degree, learners obtain a formal IVET qualification;**
- **initial dual study programmes with a work experience component combine a course of study with extended practical placements with an employer (about 40-50% in-company training). Learners obtain a bachelor degree but not a recognised vocational qualification;**
- **continuing VET dual study programmes with an employment component are primarily aimed at people who have already completed vocational or professional training and/or have a number of years of professional experience. They are designed to offer further professional development and combine a course of study with professional experience that is directly relevant to the course.**

## **3.4 EQF level 3-4-5**

### **3.4.1 Dual System/Apprenticeship**

The dual education system combines apprenticeships in a company and vocational education at a part-time vocational school. The trainees spend alternating blocks of days or weeks in the company and the part-time vocational school.

The vocational skills, knowledge and competencies to be acquired in the course of in-company training are set out in the training regulation, the particulars of which are specified by the training company in an individual training plan. A framework curriculum is drawn up for vocational part-time school classes for each recognised training occupation as set out in the training regulations structured along learning fields.

## 4 ANNEX 1 – SKILLS AND EQF LEVELS MATCHING

### 4.1 Big Data & Artificial Intelligence

<p>(Upper-)secondary level(s) / EQF 3-4*</p>	<p>Mathematics (Algebra, Calculus, Statistics)          Physics (Mechanics, Electronics, electron model)          English          (Programming / Informatics)          (Economics)</p>
<p>Bachelor programme (core curriculum) / EQF 5</p>	<p>Introduction to Programming and programming languages (Python, Matlab, Java, R, C++)          Data processing and Visualization (also in Excel)          Statistics (fundamentals, descriptive statistics, inductive statistics)          Mathematics (Linear Algebra, Calculus, mathematical statistics)          Fundamentals of Transport Sciences (modes of transport and their fundamental operation)          Physics (Classical Mechanics, Thermodynamics, Electricity, Magnetism)          Economics (especially related to fundamentals, transportation, accounting, introduction to macroeconomics, microeconomics)          -Affinity for Programming</p>
<p>Bachelor programme (specialized curr.) / EQF 6</p>	<p>Programming (KI, Clustering, Machine Learning (Unsupervised), data preprocessing, imputation)          Data Ethics          Fundamentals of Transport (logistics, engineering, telematics, planning)          Specific transport mode related subjects (bicycles, IMT, Public transport, water transport, aircraft)          Competence in Method selection and application in Big Data and statistics          Structuring and approaching data sets          [Cooperation in Coding]          Proficient application of programming languages          Application of Methods in Big Data          Interpretation of Data</p>
<p>Master programme (core &amp; specialized curr.) / EQF 7</p>	<p>Big Data (Machine Learning, Deep Learning, Reinforcement Learning, Automated Machine Learning, Markov decision process, dynamic vehicle routing)          Methods in Data Analytics (theoretical concepts, application of methods relevant to transport problems)</p>

	<p>Advanced Methods in Data Analytics (Decision tree, Random Forest, neural Networks)</p> <p>Application of Methods in Data Analytics</p> <p>Conceptualize Methods for data analysis to find solutions for specific tasks, interpret and discuss scientific research</p> <p>Statistics (Multivariate Statistics)</p> <p>Economics (Costs and prices in Transport, spatial economics, urban economics, Cost-Benefit-Analyses, Economics of power systems)</p> <p>Logistics and Management</p> <p>Computational Logistics</p> <p>Transportation Econometrics and Statistics</p> <p>[Proficient application of programming languages]</p> <p>Practical Experience in model training</p> <p>Understanding what results are capable of and what limits the individual methods have</p> <p>General understanding of transport and transport problems in general</p>
PhD / EQF 8	<p>Individual research project</p> <p>Multi-Criteria Optimization</p> <p>Machine and Deep Learning for Data Analysis</p>
Post-master mid-career trainings EQF7	<p>Accelerated programmes as needed:</p>

## 4.2 Communication

(Upper-)secondary level(s) / EQF 3-4*	<p>Basics customer care</p> <p>The role of message consistency</p> <p>Science of communication</p> <p>Public Relations</p> <p>Psychology</p>
Bachelor programme (core curriculum) / EQF 5	<p>Customer satisfaction management strategies</p> <p>Regulations on competition and consumer protection</p> <p>Methods of functioning in society</p> <p>Approaches of public speaking</p> <p>Strategies of negotiation</p>
Bachelor programme (specialized curr.) / EQF 6	<p>Methodology for building customer service standards</p> <p>Tools and techniques used in customer service quality management processes</p> <p>Innovations and information technologies in customer service quality management</p>



	<p>Effective interviewing</p> <p>Advanced ways of communication</p> <p>Theory of exerting influence</p> <p>Emotional intelligence of a leader</p>
Master programme (core & specialized curr.) / EQF	<p>Organisational and strategic communication research</p> <p>Advanced didactic methods</p> <p>Theory of consumer behaviour</p>
PhD / EQF 8	<p>Individual research project</p> <p>Multi-Criteria Optimization</p> <p>Machine and Deep Learning for Data Analysis</p>
Post-master mid-career trainings EQF7	<p>Development of communication skills</p> <p>Quality of customer service in a company</p> <p>Methodology for communication and implementation of customer service standards</p> <p>Customer Relationship Management and Customer Value Enhancement</p> <p>Advanced communication methods</p>

### 4.3 Cybersecurity & Internet of Things (IoT)

(Upper-)secondary level(s) / EQF 3-4*	<p><b>Cybersecurity</b></p> <p>Introduction to algorithms</p> <p>Introduction to cybersecurity</p> <p>Computing</p> <p>Electronics</p> <p><b>Embedded systems</b></p> <p>BASIC programming</p> <p>Introduction to algorithms</p> <p>Introduction to OS</p> <p><b>Internet of Things (IoT)/Sensor networking</b></p> <p>Sensors initiation</p> <p>Introduction to mathematics</p> <p>Introduction to physics</p> <p>Python programming</p> <p>Computer basics</p>
Bachelor- programme (core curriculum) / EQF 5	<p><b>Cybersecurity</b></p> <p>Install appliances</p> <p>Maintain appliances according to strategy measures and policies</p> <p><b>Embedded systems</b></p> <p>Programming (C/C++ and python)</p> <p>Real-time Computing (soft and hard)</p> <p>Introduction to Assembly</p> <p>Computer Basics : understanding Operating System</p> <p><b>Internet of Things (IoT)/Sensor networking</b></p> <p>Sensor basics</p> <p>Sensor knowledge (measurands, precision, robustness)</p>



	<p>Sensor installation</p> <p>Sensor calibration</p> <p>Sensor sampling</p> <p>Sensor measurements</p> <p>Protocol basics (main protocols: LoRaWAN, BLE, Zigbee, country specifics...)</p> <p>Networking basics (TCP/IP, OSI Model)</p> <p>Algorithm programming 1</p> <p><i>System Maintenance</i></p> <p><i>Act on breakdowns and deviations</i></p>
<p>Bachelor programme (specialized curr.) / EQF 6</p>	<p><b>Cybersecurity</b></p> <p>Apply security measures &amp; policies</p> <p>Apply cybersecurity strategy</p> <p>Ensure Security compliance</p> <p>Security monitoring &amp; response</p> <p>Forensics</p> <p>Conduct pentests</p> <p><b>Embedded systems</b></p> <p>Parallel programming : algorithm, MPI for Embedded Systems</p> <p>Understanding, Installation and maintenance of Real-time OS</p> <p>Computer program design and development</p> <p>Installation, Administrative and Maintenance procedures redaction</p> <p>Ensure testing and production follow-up</p> <p>Ensure MRO (maintenance in operational condition)</p> <p><b>Internet of Things (IoT)/Sensor networking</b></p> <p>Select sensor</p> <p>Algorithm programming 2/2</p> <p>MRO (Maintenance in operational condition) (commissioning + exploitation)</p> <p>Sensor advanced (deployment)</p> <p>Protocol architecture deployment</p> <p>Networking advanced</p> <p>(Network theory, Wired/Wireless communication)</p> <p>Network architecture (set-up, technical acceptance validation and calibration)</p> <p>Rules &amp; Regulations (which frequency to use etc...)</p> <p>IoT Security (cf IoT Security table)</p> <p>System Maintenance</p> <p>Sensor Diagnostic/ Monitoring</p> <p>Data Management (collect,storage and analysis)</p> <p>Entry data: Specifications</p>
<p>Master programme (core &amp; specialized curr.) / EQF 7</p>	<p><b>Cybersecurity</b></p> <p>Ensure testing and production follow-up</p> <p>Ensure MRO (maintenance in operational condition)</p> <p>Define security compliance</p>



	<p>Patch Management Programme (OOB/OTA)</p> <p>Design Vulnerability bounty strategy</p> <p>Protocol security/Data storage (ciphering/encryption, hashing)</p> <p>Ethical hacking</p> <p>Define pentest strategies &amp; schedules</p> <p>Define reverse engineering prevention strategies</p> <p><b>Embedded systems</b></p> <p>Software architecture</p> <p>Hardware architecture (microprocessors, microcontrollers)</p> <p>Hardware security</p> <p><b>Internet of Things (IoT)/Sensor networking</b></p> <p>Select sensor</p> <p>Define communication architecture</p> <p>Design communication architecture</p> <p>Select communication architecture</p> <p>Protocol architecture design</p> <p>Pre-launch phase design (test &amp; pilot)</p> <p>Rules &amp; Regulations (which frequency to use etc...)</p> <p>IoT Security(cf IoT Security Table)</p> <p>Sensor Monitoring design</p> <p>Big Data architecture (collect, storage and analysis) (cf Big Data table)</p> <p>Sensor Design</p> <ul style="list-style-type: none"> <li>Sizing (how many? Where?)</li> <li>Select best protocol and linked best sensors</li> <li>Technical acceptance validation and calibration</li> </ul> <p>Entry data: Specifications</p>
PhD / EQF 8	Specific research subject
Post- master mid-career trainings EQF7	Accelerated programmes as needed: (profile: supervisory staff/maintenance technician)

#### 4.4 Formal methods for system design & verification

(Upper-)secondary level(s) / EQF 3-4*	<p>Mathematics</p> <p>Introductions to algorithms</p> <p>Python programming</p> <p>Electronics</p> <p>Living languages ...</p>
Bachelor programme (core curriculum) \ EQF 5	<p>Algorithmic and programs 1</p> <p>Logical and digital systems</p> <p>Mathematical foundations &amp; tools</p> <p>Formal languages</p> <p>Transversal skills:</p> <ul style="list-style-type: none"> <li>- languages</li> </ul>





	<ul style="list-style-type: none"> <li>- tools &amp; digital culture</li> <li>- professional &amp; personal projects</li> </ul>
Bachelor programme (specialized curr.) / EQF 6	<p>Algorithmic and programs 2/3</p> <p>Discrete maths &amp; logic</p> <p>Computer architectures</p> <p>Program compilation</p> <p>Program complexity</p> <p>Program optimization</p> <p>Advanced object-oriented apps.</p> <p>Software modeling languages</p> <p>Data analysis</p> <p>Transversal skills:</p> <ul style="list-style-type: none"> <li>- languages</li> </ul> <p>- professional &amp; personal projects ...</p>
Master programme (core & specialized curr.) / EQF 7	<p>Component-based software design approaches</p> <p>Concurrent, real-time and parallel apps.</p> <p>Distributed apps. &amp; cyber-physical systems</p> <p>Non-classical logics</p> <p>Logic and computation models</p> <p>Programming language semantics</p> <p>Computer (embedded) systems modeling</p> <p>Model-based system engineering (SysML)</p> <p>Certification of safety-critical software</p> <p>Formal design (abstraction &amp; refinement)</p> <p>Verification decision procedures &amp; tools:</p> <ul style="list-style-type: none"> <li>- proofs, auto-deduction</li> <li>- model-checking, testing ...</li> </ul>
PhD / EQF 8	Specific research subjects
Post-master / mid-career trainings EQF7	<p>Accelerated programmes as needed:</p> <ul style="list-style-type: none"> <li>- Norms &amp; standards: ERTMS, CBTC, EN50128 ...</li> <li>- Risk assessment &amp; hazard analysis ...</li> <li>- Requirement engineering</li> <li>- Living languages</li> <li>- Strategic planning</li> </ul>

## 4.5 Global new energies & technologies

(Upper-)secondary level(s) / EQF 3-4*	<p>Mathematics</p> <p>Physics</p> <p>Chemistry</p> <p>Biology</p> <p>Languages</p>
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	<p>Political Science</p> <p>Understanding of different cultures</p>
Bachelor programme (core curriculum) / EQF 5	<p>Mathematics (Linear Algebra, Calculus, mathematical statistics)</p> <p>Physics (Classical Mechanics, Thermodynamics, Electricity, Magnetism)</p> <p>Chemistry (Organic Chemistry, Environmental Organic Chemistry)</p> <p>Science Laboratory skills, Field work and practices</p> <p>Introduction to Biology / Life Sciences / Ecology</p> <p>Political Sciences</p> <p>Introduction to programming and programming languages (Matlab, Python, Java,R)</p> <p>Statistics (Methods, Software use, Interpretation of Data)</p> <p>Economics</p> <p>Electric Engineering (components, circuits, measuring and automation technologies)</p> <p>International and EU Environmental Law</p>
Bachelor programme (specialized curr.) / EQF 6	<p>Energy Analysis (Well-to-Wheel Analysis, energy networks)</p> <p>Chemistry (inorganic chemistry, solid state chemistry, environmental chemistry)</p> <p>Physics (electromagnetism, electric machines)</p> <p>Application of systems analysis methods and tools to analyse and understanding human interactions with the environment</p> <p>Approach environmental and sustainable issues through an interdisciplinary approach</p> <p>Analyse and evaluate economic, social and legal developments regarding environmental and sustainability issues</p> <p>Economics incl. environmental economics (Macroeconomics and economic modelling, instruments, management)</p> <p>Geoinformation Science</p> <p>Soil and water processes, pollution and protection</p> <p>Renewable energy technologies (Wind, solar, hydro, biochemical [production, conversion, transmission, storage])</p>
Master programme (core & specialized curr.) / EQF 7	<p>Definition of research problems, sample collection, laboratory work, data analysis and interpretation</p> <p>Advanced Energy Analysis (energy flows, energy requirements, energy conversion processes, conversion technologies)</p> <p>Electric Network Simulations (Sources, users, transmission and distribution, storage, applications)</p> <p>Electrical Engineering (Automation, measuring and control technologies, electrical-energy technologies)</p>





	<p>Information Technologies (Signal and Information Technology, communication networks, analogue and digital circuits and systems)</p> <p>Microelectronics (fundamentals, design, construction and production of electric components and their quality assurance)</p> <p>Environmental and Energy policy (Historical Evolution, Understand Challenges, understand the roles of actors)</p> <p>Environmental Assessment methods ( for example Life Cycle Assessment/ Multi-Criteria Assessment)</p> <p>Economics incl. Environmental Economics (Macroeconomics and Economic Modelling, instruments, management)</p> <p>Integrated analysis of perceived or potential environmental and sustainability issues</p> <p>Pursuit of interdisciplinary approaches to environmental problem solving and sustainable resource management</p> <p>Data Analysis through software and programming (Big Data)</p> <p>General, laboratory and field safety</p> <p>Interaction with stakeholders from different cultural backgrounds</p>
PhD / EQF 8	<p>Individual research projects</p> <p>Design of smart transmission/ distribution networks</p> <p>Design and implementation of predicting models for renewable energies</p> <p>Design of novel energy conversion technologies (wind, solar, hydro)</p> <p>Predictive load management in electric networks</p> <p>Network balancing and quality control with integration of electric vehicles</p>
Post-master mid-career trainings EQF7	<p>Accelerated programmes as needed:</p>

## 4.6 Learning skills

(Upper-)secondary level(s) / EQF 3-4*	<p>understand how to fit into the class community, a work or study group, take on tasks and functions and set and pursue common goals;</p> <p>apply stress management methods;</p> <p>Respond to work and learning requirements in an open-minded manner and with adequate self-organization, as well as taking on tasks reliably;</p> <p>Research, process and pass on information in a goal-oriented manner and contribute and link their knowledge from different areas;</p>
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	<p>Working in learning and working groups (recognition of goals, team rules, functions in the team, distribution of tasks, reflection on teamwork); Working and practicing in homogeneous and heterogeneous groups, collaboration between students for practice purposes and to prepare for exams.</p> <p>Personal strengths and weaknesses, possibilities of motivation, exemplary learning related to the current life situation of the student and the experiences in the professional and social environment.</p> <p>Recognizing personal goals, dealing with stress and fear, strategies for avoiding stress, aspects of job applications.</p> <p>fundamentals (brain, memory, learning styles); Work and learning organization (workplace design, time planning, handling documents, methods for practicing, repeating and preparing, setting learning goals)</p> <p>Exemplary exercises for dealing with new information (goal-oriented procurement, structuring, summarizing, processing, visualizing and passing on information)</p>
<p>Bachelor programme (core curriculum) / EQF 5</p>	<p>Describing conflicts, dealing constructively with one's own interests and needs and those of others, and working out joint solutions with others for a conflict;</p> <p>Select communication media in a goal-oriented and addressee-oriented manner and coordinate their communication behavior for the respective addressee (including application situations) and the chosen communication medium</p> <p>Plan and organize learning and work processes, implement them purposefully even in the event of unexpected difficulties and failures and complete them with the necessary perseverance.</p> <p>Brain-friendly work, exercises to improve memory performance; personal learning strategies</p> <p>Processing cross-curricular information.</p> <p>Setting group goals, reacting as needed in unforeseeable situations, aligning your own work behavior accordingly, contributing your resources and skills to work and study groups and evaluating the achievement of goals.</p> <p>Recognizing and understanding the meaningfulness of norms, rules and limits and taking responsibility for their actions;</p> <p>Working and practicing in learning and working groups (setting and adhering to realistic group goals, creating a work plan for the team, working independently in a team, reflecting on your own performance in the team).</p>

## 4.7 Living languages

<p>(Upper-)secondary level(s) / EQF 3-4*</p>	<p>general receptive skills (listening, reading)</p> <ul style="list-style-type: none"> <li>- understand everyday and job-related topics</li> <li>- can understand overall meaning and specific details</li> </ul> <p>general productive skills (speaking, writing)</p> <ul style="list-style-type: none"> <li>- can summarise information</li> <li>- can give instructions</li> <li>- can talk about familiar and job-related topics</li> <li>- can convey factual information and describe problems</li> </ul> <p>lexical knowledge in field of study</p> <ul style="list-style-type: none"> <li>- can produce coherent texts on a range of familiar subjects</li> <li>- can write emails, letters, articles, blog posts</li> </ul>
<p>Bachelor programme (core curriculum) / EQF 5</p>	<p>well-mastered receptive skills (listening, reading)</p> <ul style="list-style-type: none"> <li>- understand familiar and unfamiliar topics in standard and familiar variety</li> <li>- can understand even longer complex messages/texts in field of specialisation</li> </ul> <p>well-mastered productive skills (speaking, writing)</p> <ul style="list-style-type: none"> <li>- can present complex subjects</li> <li>- can give elaborate descriptions of a variety of subjects</li> <li>- can give clear instructions in their professional context</li> <li>- can produce clear, well-structured texts of complex subjects</li> </ul>

	<ul style="list-style-type: none"> <li>- can follow the conventions of relevant text types in their field</li> <li>- can express themselves fluently and spontaneously, almost effortlessly on wide range of topics</li> </ul> <p>lexical knowledge in field of study</p>
Bachelor programme (specialized curr.) / EQF 6	<p>advanced receptive skills (listening, reading)</p> <ul style="list-style-type: none"> <li>- can understand complex academic writing</li> <li>- can follow lectures, discussions in field of study</li> </ul> <p>advanced productive skills (speaking, writing)</p> <ul style="list-style-type: none"> <li>- can communicate general and topics in their academic field almost effortlessly</li> <li>- can produce well structured academic writing</li> <li>- can engage in academic discussions</li> </ul> <p>Language analysis literature cultural knowledge</p>
Master programme (core & specialized curr.) / EQF 7	<ul style="list-style-type: none"> <li>can conduct studies on a research question</li> <li>can produce longer well-structured academic writing</li> <li>can present academic findings</li> <li>can engage in discussions on complex topics</li> </ul>
PhD / EQF 8	specific research subject
Post-master mid-career trainings EQF7	<ul style="list-style-type: none"> <li>subject-related language skills</li> <li>business communication skills</li> <li>receptive skills (listening, reading)</li> <li>productive skills (speaking, writing)</li> </ul>

## 4.8 Networking & ICT technologies

(Upper-)secondary level(s) / EQF 3-4*	<p>Mathematics &amp; geometry</p> <p>Probability &amp; statistics</p> <p>Introduction to algorithms</p> <p>Physics</p> <p>Chemistry</p> <p>Electronics</p> <p>Introduction to C Language</p> <p>Law of Physics (1)</p> <p>Languages</p> <p>Transversal skills</p> <p>- communication ...</p>
Bachelor programme (core curriculum) / EQF 5	<p>Maths: algebra &amp; analysis</p> <p>Laws of physics for electronics, electrical engineering, automation (2)</p> <p>Analog Electronics</p> <p>Digital Electronics</p> <p>Basics of Microcontrollers</p> <p>Modeling, analysis &amp; control of sequential systems</p>



	<p>Computer Aided Design in Electronics</p> <p>Basics of Software Tools</p> <p>Languages</p> <p>Transversal skills</p> <ul style="list-style-type: none"> <li>- professional project</li> <li>- Critical thinking</li> <li>- teamwork, cooperation</li> </ul>
Bachelor programme (specialized curr.) / EQF 6	<p>Probabilities, statistics, matrix calculation</p> <p>Computer &amp; field networks</p> <p>Sensors - Measurement</p> <p>Signal Processing</p> <p>Algorithms - Programming - Language</p> <p>Digital transmission (1)</p> <p>Security &amp; Networks</p> <p>Networks &amp; Protocols for the Internet</p> <p>Mobile &amp; wireless networks</p> <p>Business Management &amp; Organization</p>
Master programme (core & specialized curr.) / EQF 7	<p>Design &amp; Urbanization of network service</p> <p>Advanced techniques in analog &amp; digital electronics</p> <p>New communication network architectures</p> <p>Broadband technology</p> <p>Radiocommunications</p> <p>Advanced Networking Projects</p> <p>Digital transmission (2)</p> <p>Optical Telecommunications</p> <p>Social management &amp; corporate communication for engineers</p> <p>Professional Languages</p>
PhD / EQF 8	<p>Specific research subjects</p> <p>High speed radiocommunication for railways</p> <p>Role of Telecommunications in the new mobility systems</p>
Post-master mid-career trainings EQF7	<p>Accelerated programmes as needed:</p> <ul style="list-style-type: none"> <li>-Train localisation &amp; safe control circulation using Global Navigation Satellite System (GNSS)</li> <li>-Norms &amp; standards: ERTMS, ECTS, FRMCS, CBTC (IEEE 1474.1), EN50128, IEC 62443 .</li> </ul>

## 4.9 Norms, standards & certification

(Upper-)secondary level(s) / EQF 3-4*	<p>Mathematics</p> <p>Probability &amp; statistics</p> <p>Introduction to computing</p> <p>Science</p> <p>Electronics</p>
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	<p>Languages</p> <p>Transversal skills</p> <ul style="list-style-type: none"> <li>- Learning skills</li> <li>- Communications skills</li> <li>- Soft skills</li> </ul>
Bachelor programme (core curriculum) / EQF 5	<p>Calculus</p> <p>Physics</p> <p>Materials engineering</p> <p>Software programming</p> <p>Probability and statistics</p> <p>Electronics</p> <p>English</p> <p>Management</p> <p>Economics and public policy</p> <p>History</p> <p>Learning skills</p> <p>Communications skills</p> <p>Soft skills</p>
Bachelor programme (specialized curr.) / EQF 6	<p>Applied mathematics</p> <p>Physics for digital hardware</p> <p>Civil engineering</p> <p>Advanced software programming</p> <p>Probability and statistics</p> <p>Hardware design</p> <p>English</p> <p>Management</p> <p>Economics and public policy</p> <p>Learning skills</p> <p>Communications skills</p> <p>Soft skills</p>
Master programme (core & specialized curr.) / EQF 7	<p>Specialised mathematics (for topic)</p> <p>Scientific theory (for topic)</p> <p>Railway engineering</p> <p>Software programming (for topic)</p> <p>Probability and statistics</p> <p>Hardware design (for topic)</p> <p>English</p> <p>Management theory</p> <p>Advanced public policy and economics</p> <p>Research methods</p>
PhD / EQF 8	<ul style="list-style-type: none"> <li>- ERTMS</li> <li>- ETCS</li> <li>- CBTC and automation</li> <li>- Technical Interoperability</li> <li>- Regulatory interoperability</li> </ul>





	- Railway standards and norms
Post-master mid-career trainings EQF7	<p>State-of-the-art overview (for topic)</p> <p>Application of SOA techniques (for topic)</p> <p>Detailed design (for topic)</p> <p>Implementation strategies for advanced technology</p> <p>Effective input to regulation development</p> <p>Effective input to standards setting</p> <p>Management of technical staff</p>

## 4.10 Reliability, maintenance & life cycle management

(Upper-)secondary level(s) / EQF 3-4*	<p>Mathematics &amp; geometry</p> <p>Probability &amp; statistics</p> <p>Introduction to algorithms</p> <p>Physics</p> <p>Chemistry</p> <p>Informatics</p> <p>Electronics</p> <p>Mechanical machining</p> <p>Electrical repairs</p> <p>Maintenance plans</p> <p>Languages</p> <p>Transversal skills</p> <p>- communication ...</p>
Bachelor programme (core curriculum) / EQF 5	<p>Maths: algebra (Boolean) &amp; analysis</p> <p>Statistics</p> <p>Physics</p> <p>Mechanics</p> <p>Electronics</p> <p>Programming languages</p> <p>Languages</p> <p>Transversal skills</p> <p>- professional project</p> <p>- critical thinking</p> <p>- teamwork, cooperation</p>
Bachelor programme (specialized curr.) / EQF 6	<p>Discrete maths &amp; logic</p> <p>Data analysis</p> <p>Data mining</p> <p>Probability functions</p> <p>Reliability theory (failure rate, MTBF, MTTF)</p> <p>Failure rate trend models (Weibull function)</p> <p>Methods for reliability analysis: FTA, ETA,</p> <p>Markov techniques, FMEA, FMECA, FRACAS</p>





	Economics
Master programme (core & specialized curr.) / EQF 7	<p>Maintainability theory (MTBM)</p> <p>Availability theory</p> <p>Maintenance strategies: corrective maintenance, planned maintenance, condition-based maintenance, predictive maintenance</p> <p>Machine learning</p> <p>Artificial Intelligence</p> <p>Internet of Things</p> <p>Probabilistic Risk Assessment</p>
PhD / EQF 8	<p>Specific research subjects:</p> <ul style="list-style-type: none"> <li>- innovative technologies for rail infrastructure monitoring</li> <li>- innovative rolling stock diagnostic systems</li> <li>- predictive maintenance of rail infrastructure</li> <li>- predictive maintenance of rolling stock</li> <li>- Innovative Rail maintenance strategies</li> </ul>
Post-master mid-career trainings EQF7	<p>Maintenance policies (e.g. Reliability Centered Maintenance)</p> <p>Asset management</p> <p>LCC Life Cycle Costs Analysis</p> <p>Logistics Support Analysis (LSA)</p> <p>Maintenance standards (e.g. EN 13306)</p> <p>ISO 55000 series of Asset Management standards</p> <p>RAMS standard EN 50126</p>

## 4.11 Safety, dependability, security

(Upper-)secondary level(s) / EQF 3-4*	<p>Railway traffic</p> <p>Transportation of goods</p> <p>Transportation of freight</p> <p>Railway facilities</p> <p>Railway safety devices</p> <p>Railway vehicles operations</p> <p>Maths</p> <p>Physics</p>
Bachelor programme (core curriculum) / EQF 5	<p>Regular traffic and traffic safety</p> <p>Handling with the objects/goods in transport</p> <p>Basic of passenger transport</p> <p>Railway network facilities and its maintenance</p> <p>Handling and troubleshooting of telecommunication plants and devices</p> <p>Safe and rational use of railway cars</p> <p>Mathematics &amp; geometry</p> <p>Physics: energy and movement</p> <p>Transversal skills</p> <p>- communication ...</p>
Bachelor	Introduction to transport and traffic engineering





	<p>Railway traffic technology</p> <p>Railway traffic operation management</p> <p>Basic of railway traffic safety</p> <p>Railway signalling and railway telematic</p> <p>Risk fundamentals</p> <p>Analysis of railway accidents</p> <p>Transport Economy-Business Analysis</p> <p>Data collection, evidence and presentation</p> <p>Transversal skills</p> <ul style="list-style-type: none"> <li>- professional project</li> <li>- critical thinking</li> <li>- teamwork, cooperation</li> </ul>
Master programme (core & specialized curr.) / EQF 7	<p>Railway system performances and efficiency</p> <p>Regulatory system of railway transport</p> <p>Advance of railway freight transport</p> <p>Risk analysis</p> <p>Safety management system</p> <p>Technology Risk and decision analytics</p> <p>Modern techniques of safety control of moving railway vehicles</p> <p>Information technologies</p> <p>Business process management in railway traffic</p> <p>Requirements Engineering - fundamentals and principles</p>
PhD / EQF 8	<p>Specific research subjects:</p> <p>Railway Traffic and Transport Control</p> <p>Railway market regulation</p> <p>Simulation in railway transport</p> <p>Technology modeling of railway transport</p> <p>Risk and Resilience</p>
Post-master mid-career trainings	Accelerated programmes as needed

## 4.12 Smart cities & Smart station design

(Upper-)secondary level(s) / EQF 3-4*	<p><b>Mobile apps development and technologies</b></p> <p>programme Basics</p> <p>OOP Basics</p> <p>Introduction to GUI</p> <p><b>Building information modeling &amp; Smart station design</b></p> <p>BIM/CIM/TIM culture</p> <p>Model initiation</p> <p>Control (code + usability testing)</p>
Bachelor or programme (core curriculum) / EQF 5	<p><b>Mobile apps development and technologies</b></p> <p>Application code</p>



	<p>Testing (code check)</p> <p>Basic code</p> <ul style="list-style-type: none"> <li>Event-driven programme (different from pg algorithmic)</li> <li>GUI programme (window, button, link)</li> <li>Object Oriented programme languages (e.i java,...)</li> </ul> <p>Exploitation (Application update)</p> <p>Maintenance</p> <p>Customer Oriented programme</p> <ul style="list-style-type: none"> <li>Human cognition Basics</li> <li>Human-computer interactions Basics</li> </ul> <p><b>Building information modeling &amp; Smart station design</b></p> <p>BIM/CIM Model (building) (stations, maintenance facilities...)</p> <ul style="list-style-type: none"> <li>Architecture</li> <li>Equipment</li> <li>Structure</li> <li>Current building model (Scan to BIM)</li> </ul> <p>Building Environmental model</p> <p>BIM/CIM Model (infrastructure &amp; rail equipments)</p> <ul style="list-style-type: none"> <li>Rail infrastructure (Outline &amp; Levelling, tracks, tunnels, "ouvrage d'art", "ouvrage hydraulique"...) <ul style="list-style-type: none"> <li>Rail Equipments (telecommunications, signalling, catenary...)</li> </ul> </li> <li>Current infrastructure model (Scan to BIM)</li> </ul> <p>Execute (apply)</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Bachelor programme (specialized curr.) / EQF 6</p>	<p><b>Mobile apps development and technologies</b></p> <p>Advanced code</p> <ul style="list-style-type: none"> <li>Event-driven programme (different from pg algorithmic)</li> <li>GUI programme (window, button, link)</li> <li>Object Oriented programme languages (e.i java,...)</li> </ul> <p>Exploitation (Application update)</p> <p>Maintenance</p> <p>Data storage</p> <p>Data management</p> <p>Data storage and maintenance security</p> <p>Basic software engineering (software creation methodology, UML (OOP compatibility), document creation (for maintenance and operations use)</p> <p>Customer Oriented programme</p> <ul style="list-style-type: none"> <li>Human cognition Advanced 1</li> <li>Human-computer interactions Advanced 1</li> <li>Prototyping</li> <li>Usability testing on prototypes</li> <li>Roll-out</li> <li>Control (code + usability testing)</li> </ul> <p><b>Building information modeling &amp; Smart station design</b></p> <p>Analyse BIM strategy on an operational level (operational pov, ex: BIM convention)</p> <p>BIM Coordination / BIM modelling</p>





	<p>Understand technical synthesis and BIM input</p> <p>Set up coordination and BIM synthesis procedure</p> <p>Use BIM to make technical synthesis</p> <p>Manage the digital model</p> <p>Building/City Environmental modelling</p> <p>Current building/infrastructure model (advanced) (Scan to BIM)</p> <p>Current building/infrastructure modelling</p> <p>Smart city and smart station initiation</p> <p>Open BIM / Closed BIM</p> <p>Introduction to norms governing BIM (ex: ISO19650)</p> <p>Deploy strategy</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Master programme (core &amp; specialized curr.) / EQF 7</p>	<p><b>Mobile apps development and technologies</b></p> <p>Conception</p> <p>Specifications</p> <p>Data storage</p> <p>Data management</p> <p>Data storage and maintenance security</p> <p>Management</p> <p>Regulatory, legal &amp; economic context knowledge (RGPD)</p> <p>Innovation</p> <p>Advanced software engineering (software creation methodology, UML (OOP compatibility), document creation (for maintenance and operations use)</p> <p>Customer Oriented programme</p> <p>Human cognition Advanced 2</p> <p>Human-computer interactions Advanced 2</p> <p>Need analysis</p> <p>Prototyping</p> <p>Usability testing on prototypes</p> <p>Roll-out</p> <p>Control (code + usability testing)</p> <p><b>Building information modeling &amp; Smart station design</b></p> <p>Define BIM Management and its strategic and legal documents</p> <p>BIM specifications</p> <p>BIM convention</p> <p>BIM execution plan</p> <p>Norms governing BIM (ex: ISO19650) - Advanced</p> <p>Intellectual property</p> <p>Define a collaborative approach using a BIM platform</p> <p>Comprehend smart city/smart station/ specifics (SMART) management and rail infrastructures management</p> <p>Define strategy</p>
<p>PhD / EQF 8</p>	<p>Specific research subject</p>



Post-master mid-career trainings EQF7	Accelerated programmes as needed:
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### 4.13 Soft Skills

(Upper-secondary level(s) / EQF 3-4*)	<ul style="list-style-type: none"> <li>Psychology</li> <li>Presentation training</li> <li>Fundamentals of communication</li> <li>Management basics</li> </ul>
Bachelor programme (core curriculum) / EQF 5	<ul style="list-style-type: none"> <li>Quality Management</li> <li>Intellectual property protection</li> <li>Behavioural economics</li> <li>International project management</li> <li>Ethics in economics and international business</li> <li>Presentation training</li> <li>Fundamentals of Rail Cultures</li> <li>Cultural aspects of European Countries</li> <li>The culture of a modern organisation</li> </ul>
Bachelor programme (specialized curr.) / EQF 6	<ul style="list-style-type: none"> <li>Production and Operations Management</li> <li>Project Management</li> <li>Marketing management</li> <li>Marketing research &amp; analysis</li> <li>Presentation training</li> <li>Selected problems of the modern world I</li> <li>Team project</li> </ul>
Master programme (core & specialized curr.) / EQF 7	<ul style="list-style-type: none"> <li>Strategic management</li> <li>Marketing strategies in transport services</li> <li>Team and organisational management</li> <li>IT systems in management</li> <li>Advanced presentation training</li> <li>Selected problems of the modern world - advanced</li> <li>Advanced marketing management</li> <li>Research design theory</li> <li>Advanced team project</li> <li>Labour market research and analysis methods</li> <li>Leadership</li> </ul>
PhD / EQF 8	<ul style="list-style-type: none"> <li>Scientific databases and information skills</li> <li>Academic writing (English for Academic Purposes)</li> <li>Innovative didactic methods in the modern teaching process</li> <li>Commercialization of scientific outcomes</li> <li>Writing grant application</li> <li>Smart metering - social risk perception and risk governance</li> <li>Workshops in research ethics</li> </ul>
Post-master mid-career trainings EQF7	<ul style="list-style-type: none"> <li>Negotiation training</li> <li>Project management in an organization</li> </ul>



<p>Team management monitoring</p> <p>Shaping career paths</p> <p>Ethical aspects of managing people</p>
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## 4.14 Transportation systems

<p>(Upper-)secondary level(s) / EQF 3-4*</p>	<p>Mathematics &amp; geometry</p> <p>Probability &amp; statistics</p> <p>Introduction to algorithms</p> <p>Physics</p> <p>Chemistry</p> <p>Electronics</p> <p>Languages</p> <p>Transversal skills</p> <p>- communication ...</p>
<p>Bachelor programme (core curriculum) / EQF 5</p>	<p>Maths: algebra (Boolean) &amp; analysis</p> <p>Statistics</p> <p>Physics</p> <p>Chemistry</p> <p>Languages</p> <p>Transversal skills</p> <p>- professional project</p> <p>- teamwork, cooperation</p>
<p>Bachelor programme (specialized curr.) / EQF 6</p>	<p>Transportation systems analysis</p> <p>Transport economy &amp; technique</p> <p>Transport systems planning</p> <p>Algorithms &amp; programming</p> <p>Planning and organization methodologies</p> <p>Adaptability to changes</p> <p>Transversal skills</p> <p>- professional project</p> <p>- critical thinking</p> <p>- teamwork, cooperation</p>
<p>Master programme (core &amp; specialized curr.) / EQF 7</p>	<p>Advanced transport systems design &amp; simulation</p> <p>Advanced transport systems planning</p> <p>Sustainable mobility &amp; transport services</p> <p>Rail Transport</p> <p>Smart logistics &amp; freight transport</p> <p>Transportation systems theory &amp; analysis</p> <p>Operational research &amp; optimization</p> <p>Traffic flow theory</p> <p>Rail infrastructure</p> <p>Methods &amp; models for decision support</p> <p>Transport systems safety &amp; risk management</p>





	Requirement engineering User behaviour & human factors Multimodal transport
PhD / EQF 8	Specific research subjects: - Innovative Rail maintenance strategies - Innovative energy management solutions - Rail operations & management new approaches - Rail automation - New signalling systems - Integrated rail transport services
Post-master mid-career trainings EQF7	Accelerated programmes as needed: Rail system engineering Rail signalling

## 4.15 Virtual reality

(Upper-)secondary level(s) / EQF 3-4*	Digital culture Introduction to VR/AR devices Programming basics Visual Programming Control (code + usability testing)
Bachelor programme (core curriculum) / EQF 5	Being trained through XR Being guided through AR (maintenance) Knowledge of physical devices Devices setup CAD Basics 3D Capture (360°, photogrammetry) Python language Procedural programming Low-code solutions usage >>XR Use
Bachelor programme (specialized curr.) / EQF 6	Knowledge of professional use cases Object-oriented programming Game engines Animation Real-time Advanced Computer Aided Design Advanced 3D Capture (scanners) XR Storyboarding UX/UI Agile software development >> Ability to prototype using XR
Master program (core & speciali)	Collaborating in XR Identification of relevant use cases





	<p>Economics/ROI</p> <p>Collaborative development (Git...)</p> <p>3D development tool integration (API,SDK...)</p> <p>Standards (OpenXR)</p> <p>Advanced object-oriented programming</p> <p>3D Data Management</p> <p>Motion Capture</p> <p>Behavioural Data Analysis</p> <p>Change management</p> <p>&gt;&gt; Ability to prototype using XR</p>
PhD / EQF 8	<p>Specific research subject</p> <p>Digital twin</p> <p>Computer vision</p> <p>Human computer Interaction and ergonomics (UX/UI)</p> <p>Data science</p>
Post-master mid-career trainings EQF7	<p>Accelerated programmes as needed:</p> <p>XR Data visualisation</p> <p>XR Project Governance</p> <p>Computer vision and AR</p> <p>Connectedness (CloudXR)</p> <p>XR solutions deployment and security</p>

## 4.16 Web development

(Upper-)secondary level(s) / EQF 3-4*	<p>Mathematics</p> <p>Statistics</p> <p>Algorithms</p> <p>Basic Computers Skills</p> <p>Languages</p> <p>Transversal skills</p> <p>- communication skills</p>
Bachelor programme (core curriculum) / EQF 5	<p>Mathematics</p> <p>Statistics</p> <p>Object Oriented Programming</p> <p>Web Development</p> <p>HTML</p> <p>Javascript</p> <p>Ruby</p> <p>XML</p> <p>User Interface (UI)</p> <p>User Experience (UX)</p> <p>Web Hosting</p> <p>Databases</p> <p>SQL</p>





	<ul style="list-style-type: none"> <li>Mobile development</li> <li>Transversal Skills</li> <li>Problem Solving Skills</li> <li>Creative Ability</li> </ul>
Bachelor programme (specialized curr.) / EQF 6	<ul style="list-style-type: none"> <li>Data Science</li> <li>Artificial Intelligence</li> <li>Internet-of-Things</li> <li>Digital/Social Media Campaigning/Marketing</li> <li>E-Business</li> <li>Network Security</li> </ul>
Master programme (core & specialized curr.) / EQF 7	<ul style="list-style-type: none"> <li>User Experience (UX)</li> <li>User Interface (UI)</li> <li>Data Science</li> <li>Artificial Intelligence, Machine Learning, and Neural Networks</li> <li>Network Security</li> <li>Cyber security</li> <li>Security Testing</li> <li>Content Management</li> <li>Digital Art</li> <li>EU Data Protection Legislation</li> <li>Search Engine Optimization (SEO)</li> <li>Social Media Campaigning/Marketing</li> </ul>
PhD / EQF 8	Specialized Research Subjects Related to Subjects in Column G
Post-master mid-career trainings EQF7	Accelerated Programmes as needed related to subjects in Column G



## 5 ANNEX 2 – PROGRAMMES

### 5.1 Train drivers Secondary levels / EQF 3-4

<b>Programme</b>	<b>Train Drivers</b>
<b>EQF LEVEL</b>	<b>Secondary levels / EQF 3-4</b>
<b>Duration (years)</b>	<b>1 - 3 years</b>

Field	Topics to cover	Name of the course within the programme
Transportation systems / Science	Basic understanding of railroad and organizational structure  Understand how to fit into the class community, a work or study group, take on tasks and functions and set and pursue common goals  Fundamentals of mathematics & geometry Refreshing the basic arithmetic operations Informatics Probability & statistics  Physics: Physical relationships of friction and conservation of energy Chemistry (relevant?)  Fundamentals of electrical engineering: Accident prevention regulations on electric current  Fundamentals of electronics	Train driver preparation Course
Reliability, maintenance & life cycle management	Mechanical machining Electrical repairs Maintenance plans	Rail transport reliability
Safety, dependability, security	Railway traffic Railway facilities	Traffic regimes and operating systems in place on the railway infrastructure

	<p>EHS awareness</p> <p>Introduction to signalling</p> <p>Digital training related to ERTMS and ETCS deployment</p> <p>Railway vehicles operations</p> <p>High risk activities - VR experience</p>	
	<p>Transportation of goods</p> <p>Handling of dangerous g</p> <p>Transportation of freight</p>	Rail safety and security management: safety principles and operating regulations
Formal methods for system design & verification	Living languages	Basic and general skills: needed terminology for the interface with the different figures inside Railways companies
Cybersecurity & Internet of Things (IoT) /Sensor networking/Embedded systems	<p>Introduction to Cybersecurity</p> <p>Cyber Sec Awareness Training</p> <p>Operation and protection of electronic devices</p> <p>Digital culture</p> <p>Introduction to VR/AR devices</p> <p>Training related to the bridging of traditional and digital approaches</p>	
Networking & ICT technologies	<p>Basic Computers Skills</p> <p>Introduction to mobile devices handling</p> <p>Cybersecurity (how to prevent virus attacks aso.)</p> <p>Using online learning methods</p>	Information and communication Technologies for train drivers
	<p>Introduction to VR/AR/WT</p> <p>Visual Programming</p> <p>Language Training with AI</p> <p>Training in AI solutions</p> <p>Communication and presentation</p> <p>Introduction to signalling - Mobile App</p> <p>Informatic language</p>	
Norms, standards & certification	<p>Safety Norms (Rail Operations)</p> <p>Safety Norms (Workers)</p>	Rail transport regulations

	<p>Interoperability Norms</p> <p>National Regulations</p> <p>European Regulations</p>	
Communication	<p>Science of communication</p> <p>Knowing and understanding service communication methods</p> <p>The role of message consistency</p> <p>Communications skills</p> <p>Communication and social interaction in a European context</p> <p>Unambiguous and clear communication ( e.g. attention point double meanings)</p> <p>Consolidate required language competence to follow the training</p> <p>Introduction and consolidation: with whom do I communicate, how do we communicate with each other and about what, what are the procedures, what technology is used.</p>	Communication theory for train drivers
Living languages	<p>General receptive skills (listening, reading):</p> <ul style="list-style-type: none"> <li>- understand everyday and job-related topics</li> <li>- can understand the overall meaning and specific details</li> </ul> <p>General productive skills (speaking, writing):</p> <ul style="list-style-type: none"> <li>- can summarise information</li> <li>- can give instructions</li> <li>- can talk about familiar and job-related topics</li> <li>- can convey factual information and describe problems</li> </ul> <p>Lexical knowledge in field of study:</p> <ul style="list-style-type: none"> <li>- can produce coherent texts on a range of familiar subjects</li> </ul> <p>Appropriate and target group focused vocabulary base</p>	Basic and general skills: needed terminology for the interface with the different figures inside Railways companies
Soft skills	<p>Learning skills</p> <p>Welcome on board*<sup>1</sup> (integration of topic);</p> <p>Communications skills</p> <p>Soft skills</p> <p>Service skills in dealing with travellers, customers and colleagues</p>	The importance of communicating properly: technical language for train drivers

	<p>Announcement training for train drivers</p> <p>Basic understanding of railway and organisational structure</p>	
	<p>Learning Strategies</p> <p>Dealing with stressful events</p> <p>Stress management methods</p> <p>Work-life balance awareness</p> <p>`Resilience in Railways` (soft factors of safety and security)</p> <p>Contact points for support</p>	The Train drivers' life: learning how to keep in work-life-balance
Languages	<p>Understand rulebooks and training Material</p> <p>Colloquial language to follow training courses</p> <p>Effective Presentation</p> <p>Rule communication</p>	Technical Language for Train Drivers
	<p>Basic English knowledge</p> <p>Language courses with a focus on cross border operation</p> <p>Communication and social interaction in the European Context</p> <p>Modular Language courses with a focus on cross border operation</p>	A step toward the European context
Learning skills	<p>Learning Strategies</p> <p>Apply stress management methods</p> <p>Respond to work and learning requirements in an open-minded manner and with adequate self-organization, as well as taking on tasks reliably</p> <p>Research, process and pass on information in a goal-oriented manner and contribute and link their knowledge from different areas</p> <p>Working in learning and working groups (recognition of goals, team rules, functions in the team, distribution of tasks, reflection on teamwork); Working and practising in homogeneous and heterogeneous groups, a collaboration between students for practice purposes and to prepare for exams</p> <p>Personal strengths and weaknesses, possibilities of motivation, exemplary learning related to the current life situation of the student and the experiences in the professional and social environment</p>	Train the Trainer Programme for Driver Trainer

	<p>Recognizing personal goals, dealing with stress and fear, strategies for avoiding stress, aspects of job applications</p> <p>Fundamentals (brain, memory, learning styles); Work and learning organization (workplace design, time planning, handling documents, methods for practising, repeating and preparing, setting learning goals)</p> <p>Exemplary exercises for dealing with new information (goal-oriented procurement, structuring, summarizing, processing, visualizing and passing on information)</p>	
Environmental Aspects of Railway	<p>Energy saving driving style</p> <p>Energy-saving driving style - Data Repository, WBT, Simulation Programme</p> <p>Low emission level thanks to HSR</p> <p>Material recycling</p> <p>Acoustic mitigation measures</p>	Training on Environmental Aspects
Mobility and work-based learning experience		

## 5.2 Rail Traffic Technicians Secondary Levels EQF 3-4

<b>Programme</b>	<b>Rail Traffic Technicians</b>
<b>EQF LEVEL</b>	<b>(Upper-) Secondary Levels - EQF 3-4</b>
<b>ECTS</b>	<b>180</b>
<b>Duration (years)</b>	<b>3</b>

Field	Topics to cover	Name of the course within the programme
General Knowledge (identified in several fields): Transportation systems Reliability, maintenance & life cycle management (LCC)	Mathematics	Mathematics
	Geometry	

<b>Networking &amp; ICT Technologies</b> <b>Web Development</b> <b>Formal methods for system design &amp; verification</b>	Probability and Statistics	
	Physics	Sciences
	Chemistry	
	Electronics	
	Various clamping systems in Europe	Electronics
	Accident prevention	
	Main circuit in trains	
	Basic Information about train control System (ETCS)	
	Informatics (theory)	Introduction to Programming
	Introduction to Computing	
	Introduction to Algorithms	
	C Language	
	Languages	Languages/Communications
Communications		
<b>Cybersecurity</b>	Introduction to cybersecurity	Advanced Computing
	Behaviour in the event of data theft	
	Introduction to OS	
<b>Smart Cities-Mobile apps develop and tech</b>	Object Oriented Programming Basics	Mobile App Development and Technology
	Introduction to GUI	
<b>Internet of Things (IOT)</b>	Sensors initiation	Sensors
<b>Smart Cities - BIM Modeling &amp; Smart station design</b>	BIM/CIM/TIM culture	Building Information Systems
	Model initiation	
<b>Virtual Reality</b>	Digital culture	Introduction to Virtual and Artificial Reality
	Introduction to VR/AR devices	
	Visual Programming	
<b>Safety, dependability, security</b>	Railway traffic	Introduction to Railway Transport
	Transportation of goods	
	Transportation of freight	

	Railway facilities	
	Behavior on the track	
	Railway safety devices	
	Hazardous operating materials	
	Emergency brake override	
	Structure of the braking system	
	Railway vehicles operations	
<b>Soft Skills</b>	Management basics	Introduction to Management
<b>Norms, standards &amp; certification</b>	Learning Skills Interoperability	Introduction to Learning
Mobility and work-based learning experience		Internship

### 5.3 Rail Traffic Technicians Mid-career Trainings

<b>Programme</b>	<b>Rail Traffic Technicians</b>
<b>EQF LEVEL</b>	<b>Post-master &amp; Mid-career Trainings</b>

Field	Topics to cover	Name of the course within the programme
<b>Norms, standards &amp; certification</b>	State-of-the-art overview (for topic)	Norms, standards and certification at COMPANY X
	Application of SOA techniques (for topic)	
	Detailed design (for topic)	
	Management of technical staff	Management and supervision

Cybersecurity and Internet of things (IOT)	Advanced technical programs as needed	Information technology - advanced topics
Smart Cities-Mobile apps develop and tech / BIM	Advanced technical programs as needed	Information technology - advanced topics
Virtual Reality	Computer vision and AR	Information technology - advanced topics
	Connectedness (CloudXR)	
Formal methods for system design & verification	- Norms & standards: ERTMS, CBTC, EN50128 ...	Certification courses in appropriate disciplines
	- Risk assessment & hazard analysis ...	Railway safety
	- Requirement engineering	Planning and designing system improvements
	- Living languages	Living languages (i.e., courses in languages appropriate for RAILWAY X)
Mobility and work-based learning experience		staff mobility

## 5.4 Railway systems technicians EQF 5

<b>Programme</b>	<b>Railway Systems Technicians</b>
<b>EQF LEVEL</b>	<b>Bachelor programme EQF 5 or 6 (Depending on Countries)</b>
<b>ECTS</b>	<b>180</b>
<b>Duration (years)</b>	<b>3</b>

Field	Topics to cover	Name Of The Module
Scientific Base	Mathematics & geometry	Scientific Basics
	Probability & statistics	
	Introduction to algorithms	
	Introduction to computing	
	Physics	



Focus On Scientific Ground	Chemistry	Scientific Focus
	Electronics	
	Mathematics & geometry II	
	Probability & statistics II (Maths: algebra & analysis)	
	Electronics II	
	Informatics	
	Algorithms	
	Physics II	
	Mathematics III (Discrete maths & logic)	
Specific Skills of Railway System Technicians	Electronics III	Broad vision of Railways
	Brief History of Railways and Contextualisation of Modern vision and Stakes of European Railways	
	Railways Stakeholders	Conception Infrastructures
	Track Sizing and Design	
	Railways Works (Hydraulic, Earthwork, Tunnels, Bridges)	Conception Equipment
	RailStock	
	Catenary (Overhead Lines) Conception	
	Fleet Management System	
	Ticketing Technology	
	Designing Signaling System, Interlocking Systems & Track-side Signaling	Construction Infrastructures
	Track Construction	
	Railways Works (Hydraulic, Earthwork, Tunnels, Bridges)	Construction Equipment
	Fixed installations	
	Catenary (Overhead Lines) Construction	
	Mechanical machining	Maintenance
	Entity in Charge of Maintenance	
	Intervention Procedures (Practical cases Studies)	
	Maintenance plans	
	Reliability Theory (Failure Rate, MTBF, MTTF)	
Methods for Reliability analysis (FTA, ETA, Markov techniques, FMEA, FMECA, FRACAS)		

	Track Maintenance		
	Railways Works (Hydraulic, Earthwork, Tunnels, Bridges)		
	(RailStock) Vehicle Maintenance		
	Catenary (Overhead Lines) Maintenance		
	Repair Signaling Systems		
	Maintenance Signaling Systems		
	Electrical repairs		
	Automatic Train Operation		Automation Systems
	Automatic Train Protection		
	Automatic Train Control		
	Railways Operating Principles		Basic Operational Topics
	Delivering Passenger & Freight Services		
	Norms & Standards		Safety Norms (Rail Operations)
Safety Norms (Workers)			
Interoperability Norms			
Maintenance Norms			
Design Norms			
Regulations	National Regulations	National and European Regulations	
	European regulations		
ICT	Law of Physics (1)	Laws of Physics	
	Laws of physics for electronics, electrical engineering, automation (2)		
	Analog Electronics	Communication Technologies	
	Digital Electronics		
	Basics of Microcontrollers		
	Modeling, analysis & control of sequential systems		
	Introduction to C Language		

	Computer Aided Design in Electronics	
	Basics of Software Tools	
	Matrix calculation	
	Computer & field networks	
	Sensors - Measurement	
	Signal Processing	
	Digital transmission (1)	
	Security& Networks	
	Networks & Protocols for the Internet	
	Mobile & wireless networks	
Cybersecurity and the IoT	Introduction to cybersecurity	Cybersecurity
	Protocol basics (main protocols: LoRaWAN, BLE, Zigbee, country specifics...)	
	Computer Basics : understanding Operating System	
	Apply security measures & policies	
	Maintain appliances according to strategy measures and policies	
	Sensor installation	Internet Of Things
	Sensor calibration	
	Install appliances	
	Networking basics (TCP/IP, OSI Model)	
	System Maintenance	
	Act on breakdowns and deviations	
	Sensors initiation	
	Understanding, Installation and maintenance of Real-time OS	
Ensure MRO (maintenance in operational condition)		
BIM / Digital Modeling & Programmation	program Basics	Programmation
	Basic code	
	OOP Basics	
	Introduction to GUI	
	BIM/CIM/TIM culture (Keep)	

	BIM/CIM Model (building) (stations, maintenance facilities...)	BIM & Modeling
	Building Environmental model	
	BIM/CIM Model (infrastructure & rail equipment)	
Virtual Reality	Introduction to VR/AR devices	Introduction to VR use in Rail Works
	Being trained through XR	
	Being guided through AR (maintenance)	
	Knowledge of physical devices	
	Devices setup	
	CAD Basics	
Formal Methods & Programming	Python programming	Programming
	Algorithmic and programs 1	Data Analysis
	Advanced object-oriented apps.	
	Data analysis (Maintenance- Failure understanding - KPI)	
Safety	Railway traffic	General Rail Infrastructures
	Railway facilities	
	Safety of Railway Operations	Railway Operations
	Safety in Interactions (Co-Activity)	
	Safety of Subsystems of railway Vehicles	Railway Systems
	Railway safety devices	
	Railway vehicles operations	
Soft Skills	Business Management & Organization	Economic and Corporate skills
	Corporate Social responsibility	Common Ground of Soft Skills
	Critical Thinking I	
	Fundamentals of Communication	

	Critical Thinking II	
	Creative Ability (Soft Skills)	
	Teamwork Cooperation	
	Professional Project I	
	Professional Project II	
Foreign Language Skills	Receptive Skills: listening/reading	Language Proficiency
	Proactive Skills: speaking/writing	
	Lexical Knowledge in the Field of Study	
	Foreign Language (Specific purpose Skills for work Situations)	
Mobility and work-based learning experience		Internship
		Study period abroad

## 5.5 Rail traffic and operations engineering EQF 6

<b>Programme</b>	<b>Rail Traffic and Operations Engineering</b>
<b>EQF LEVEL</b>	<b>Bachelor (core &amp; specialized curr.) / EQF 6</b>
<b>ECTS</b>	<b>180</b>
<b>Duration (years)</b>	<b>3</b>

Field	Topics to cover	Name of the course within the programme
Learning Skills	Tools & digital culture Learning strategies for students Research Methods Academic writing processes and norms	Academic Core
Soft Skills	Culture of a modern organisation Effective Group work methods Presentation Training Group management methods Project oriented working methods Professional Team Project	
Transversal Skills	Methods of communication and presentations Professional Project	
Communication	Methods of functioning in society Strategies of negotiation	
Living Languages	Elementary English / English as a second language	English I
Transversal Skills	Academic and Professional English	English II
	English for Engineers	
	Second Language	2nd Language Course
	Third Language	3rd Language Course
Transportation Systems	History of Transport Fundamentals of Transport Sciences (modes of transport and their fundamental operation) Fundamentals of Rail Culture	Fundamentals of Transport Sciences and Railways
	Transportation Planning Spatial Planning Design of Railway infrastructure (incl. Model based planning)	Design of Railway systems

	<p>Railway technologies, vehicles and infrastructure</p> <p>Electro-, information and communication fundamentals for railway engineers</p> <p>Railway Operation</p>	<p>Operation of Railway Systems</p>
	<p>Urban railway systems</p> <p>Operation of urban railway systems</p>	<p>Urban Railway Transportation Systems</p>
<p>Transportation Systems</p> <p>Safety</p>	<p>Regular traffic and traffic safety</p> <p>Handling goods in transport</p> <p>Basic passenger transport</p> <p>Safe and rational use of railway cars</p>	<p>Railway Safety</p>
<p>Formal Methods</p>	<p>Algorithmic and programs 1</p> <p>Logical and digital systems</p>	<p>Programming I</p>
<p>Smart Cities</p>	<p>Basic Code</p> <p>Customer Oriented Programme</p> <p>Building Information Modelling and Smart station Design</p>	
<p>Virtual Reality</p>	<p>CAD Basics</p> <p>3D Capture (360°, photogrammetry)</p>	<p>CAD and Building Information Modelling</p>
<p>Cybersecurity &amp; IoT</p>	<p><b>Embedded systems</b></p> <p>Programming (C/C++ and python)</p> <p>Real-time Computing (soft and hard)</p> <p>Introduction to Assembly</p> <p>Computer Basics : understanding Operating System</p> <p><b>Internet of Things (IoT)/Sensor networking</b></p> <p>Sensor basics</p> <ul style="list-style-type: none"> <li>Sensor sampling</li> <li>Sensor measurements</li> </ul> <p>Protocol basics (main protocols: LoRaWAN, BLE, Zigbee, country specifics...)</p>	<p>Programming II</p>

	Networking basics (TCP/IP, OSI Model) Algorithm programming 1	
Big Data & AI	Introduction to Programming and programming languages (Python, Matlab, Java, R, C++) Data processing and Visualization (also in Excel)	
Global New Energies	Physics (Classical Mechanics, Thermodynamics, Electricity, Magnetism) Electric Engineering (components, circuits, measuring and automation technologies)	Physics I
	Environment and Transport Transport Ecology International and EU Environmental Law	Introduction to Environmental Policy of Transport
Big Data and AI	Algebra (Boolean) & Analysis for functions with single variables	Maths I
	Differential Calculus for functions with multiple variables	Maths II
	Probability and statistics	Fundamentals of Statistics
	Materials Engineering Electronics	Physics II
LCC	Fundamentals of Accounting Fundamentals of Transport Economics	Economics for Transport Sciences
	Economics and Public Policy Management	
Mobility and work-based learning experience		Internship
		Study period abroad



## 5.6 Railway Systems Engineering EQF 7

<b>Programme</b>	<b>Railway Systems Engineering</b>
<b>EQF LEVEL</b>	<b>Master programme (core &amp; specialized curr.) / EQF 7</b>
<b>ECTS</b>	<b>120</b>
<b>Duration (years)</b>	<b>2</b>

Field	Topics to cover	Name of the course within the programme
Transportation systems	Brief History of Railways	Fundamentals of railway engineering
	Economic structure and main actors of the European Railways	
	Principles of Railway Operation	
	Timetable definition and train composition	
	Fundamentals of Railway infrastructure and superstructure	
	Key design elements of a railway line	
	Basic elements of the railway track	
	Fixed installations for electric traction	
	Fundamentals of Rolling stock	
	Vehicle architecture	
	Vehicle locomotion	
	Traction systems on board of railway vehicles	
	Motion resistances	
	Fundamentals of "Control-command and signalling" systems	
	Essential elements and operating principle of station interlocking systems	
	Essential elements and operating principle of way-side signalling systems	
	Essential elements and operating principle of on board signalling systems	
Advanced elements of Railway infrastructure and superstructure	Advanced elements of railway engineering	
Civil works (bridges, tunnels, hydraulics works, underpasses, etc.)		
Geometric quality of the track		

	Track monitoring systems	
	Track renewal works and machinery	
	Advanced elements of Rolling stock	
	Power electronics for traction motor drives	
	Train Control Management System (TCMS)	
	Vehicle dynamics	
	Wheel-rail interaction	
	Advanced elements of "Control-command and signalling" systems	
	Architecture of station interlocking systems	
	Architecture of Way-side signalling systems	
	Architecture of on board signalling systems	
	Telecommunications for railways	
	GSM-R	
	Future Rail Mobile Communication System (FRMCS)	
	Advanced elements of Railway Operation	
	Operation regularity	
	Traffic monitoring and dispatching systems	
	Station layouts	
Dependability, Reliability, maintenance & life cycle management	Maintainability theory (MTBM)	RAM (Reliability, Availability, Maintainability) applications for railway systems
	Availability theory	
	Maintenance strategies: corrective maintenance, etc.	
	Asset management	Asset management and LCC
Safety and risk analysis	LCC Life Cycle Costs Analysis	
	Safety management system	Rail safety management
	Entity in Charge of Maintenance	
	Risk analysis	Risk analysis
Technology Risk and decision analytics		
Formal methods for system design & verification	Component-based software design approaches	Rail "control-command and signalling" system design and verification
	Concurrent, real-time and parallel apps.	

	<p>Distributed apps. &amp; cyber-physical systems</p> <p>Non-classical logics</p> <p>Logic and computation models</p> <p>Programming language semantics</p> <p>Computer (embedded) systems modeling</p> <p>Model-based system engineering (SysML)</p> <p>Certification of safety-critical software</p> <p>Formal design (abstraction &amp; refinement)</p> <p>Verification decision procedures &amp; tools</p>	
Cybersecurity	<p>Ensure testing and production follow-up</p> <p>Ensure MRO (maintenance in operational condition)</p> <p>Define security compliance</p> <p>Design Vulnerability bounty strategy</p>	Cybersecurity
Internet of Things (IoT) /Sensor networking/Embedded systems	<p>Define communication architecture</p> <p>Design communication architecture</p> <p>Select communication architecture</p> <p>Protocol architecture design</p> <p>Pre-launch phase design (test &amp; pilot)</p> <p>Rules &amp; Regulations (which frequency to use etc.)</p> <p>Big Data architecture (collect, storage and analysis) (cf Big Data table)</p> <p>IoT Security (cf IoT Security Table)</p>	Internet of Things (IoT)
	<p>Sensor selection</p> <p>Sensor Design</p> <p>Sensor Monitoring design</p>	Sensor networking
	<p>Software architecture</p> <p>Hardware architecture (microprocessors, microcontrollers)</p> <p>Hardware security</p>	Embedded systems
Norms, standards & certification	<p>Safety Norms (Rail Operations)</p> <p>Safety Norms (Workers)</p>	Safety norms

	<p>Technical Specifications of Interoperability</p> <p>Design standards</p> <p>Maintenance standards</p> <p>Asset management standards</p>	Technical norms
	<p>National Regulations</p> <p>European Regulations</p>	National and European Regulations
	<p>ERTMS</p> <p>ETCS</p> <p>CBTC and automation (ATO/ATC/ATP)</p>	Standards for rail "control-command and signalling" systems
Smart cities (Building information modeling & Smart station design)	<p>Define BIM Management and its strategic and legal documents</p> <p>BIM specifications</p> <p>BIM convention</p> <p>BIM execution plan</p> <p>Norms governing BIM (ex: ISO19650) - Advanced</p> <p>Intellectual property</p> <p>Define a collaborative approach using a BIM platform</p> <p>Comprehend smart city/smart station/ specifics (SMART) management and rail infrastructures management</p>	BIM for rail infrastructure & Smart station design
Mobile apps development	<p>Define technical specifications for mobile apps</p> <p>Define global strategies</p> <p>To be able to manage IT projects with external partners</p>	Smart applications for rail systems design, manufacturing-construction and maintenance
Virtual reality	<p>Digitalisation of railway</p> <p>Digital Twins for Predictive Maintenance</p> <p>Simulations of vehicle dynamics</p> <p>Augmented reality for maintenance</p>	
Big Data & Artificial Intelligence	<p>Big Data (Machine Learning, Deep Learning, Reinforcement Learning, Automated Machine Learning, Markov decision process, dynamic vehicle routing)</p> <p>Methods in Data Analytics (theoretical concepts, application of methods relevant for transport problems)</p>	

	<p>Advanced Methods in Data Analytics (Decision tree, Random Forest, neural Networks)</p> <p>Application of Methods in Data Analytics</p> <p>Conceptualize Methods for data analysis to find solutions for specific tasks, interpret and discuss scientific research</p> <p>Statistics (Multivariate Statistics)</p>	
Global new energies & technologies	<p>Electrical Engineering (Automation, measuring and control technologies, electrical-energy technologies)</p> <p>Microelectronics (fundamentals, design, construction and production of electric components and their quality assurance)</p>	Production of electrical/electronic components for rail systems
	<p>Information Technologies (Signal and Information Technology, communication networks, analogue and digital circuits and systems)</p>	ICT technologies for rail transport
	<p>Environmental Assessment methods ( for example Life Cycle Assessment/ Multi-Criteria Assessment)</p> <p>Integrated analysis of perceived or potential environmental and sustainability issues</p>	Ecodesign of rail subsystems
Soft Skills	<p>Communication</p> <ul style="list-style-type: none"> <li>Oral Communication</li> <li>Non Verbal Communcation</li> <li>Written Communication</li> <li>Storytelling</li> <li>Visual Communication</li> <li>Active Listening</li> <li>Networking</li> <li>Public Speaking</li> </ul> <p>Leadership</p> <ul style="list-style-type: none"> <li>Cooperation and Teamwork</li> <li>Planification</li> <li>Mentoring</li> <li>Delegation</li> <li>Diplomacy</li> </ul>	Soft skills for railway systems engineers

	<p>Negotiation</p> <p>Persuading</p> <p>Decision Making</p> <p>Remote Management</p> <p>Managing Emotions</p> <p>Emotional Intelligence</p> <p>Stress Management</p> <p>Giving - Recieving Feedback</p> <p>Work-life Balance</p> <p>Creativity</p> <p>Problem Solving</p> <p>Critical Thinking</p> <p>innovation</p> <p>Trouble shooting</p> <p>Ethics</p> <p>Business Ethics</p> <p>Diversity Awareness</p> <p>Disability Awareness</p> <p>Intercultural Competence</p>	
<p>Mobility and work-based learning experience</p>		<p>Internship</p> <p>Study period abroad</p>

## 5.7 Rail Traffic and Operations Engineering EQF 7

<b>Programme</b>	<b>Rail Traffic and Operations Engineering</b>
<b>EQF LEVEL</b>	<b>Master programme (core &amp; specialized curr.) / EQF 7</b>
<b>ECTS</b>	<b>120</b>
<b>Duration (years)</b>	<b>1.5 to 2 years</b>

Field 1	Topic	Course
Soft skills	Scientific Theory	Primer Course
	Team and organizational Management	
	Research methods and design	
	Advanced team project	
	(English) and terminology	
	Advanced presentation training	
Transport Systems	Railway Infrastructure	Rail Traffic Engineering
	Rail transport	
	Rail system engineering	
Transport Systems Formal Methods ICT Norms	Rail signalling	Rail Signaling
	Norms & standards: ERTMS, ECTS, FRMCS, CBTC	
Transport Systems Formal Methods ICT	Rail automation	Automation - Digitalization in Railways
	Railway digitalisation	
Transport Systems	Advanced transport systems design & simulation	Analysis and Simulation in Rail Traffic Engineering
	Advanced transport systems planning	
Transport Systems Safety	Rail Freight Transport	Management of Passenger Rail Transport
	Sustainable mobility & transport services	
	Rail Transport	
	User behavior & human factors	
	Multimodal transport	
Safety Big Data & AI Transport Systems	Economics	Logistics and Rail Freight Management
	Transport Economics	
	Rail Freight Transport	

	Logistics and Management	
	Smart Logistics	
	Multimodal transport	
Transport systems Global New Energies Safety Formal Methods	Transport systems safety & risk management	Rail Safety and Sustainability
	Environmental Assessment methods ( for example Life Cycle Assessment/ Multi-Criteria Assessment)	
	Safety management system	
	Risk assessment & hazard analysis	
	Modern techniques of safety control of moving railway vehicles	
	Sustainable mobility & transport services	
Norms Smart Cities Formal Methods	Norms and standards	Rail Regulations
	Regulatory, legal & economic context knowledge (RGPD-GDPR)	
	Certification of safety-critical software	
		Rail Projects and Business Cases
Smart Cities Safety Virtual Reality Formal Methods	Smart Cities Conception	System engineering
	Smart Cities Specifications	
	Requirements Engineering	
	Identification of relevant use cases	
	Smart Cities Need analysis	
	Prototyping	
	Usability testing on prototypes	
	Roll-out	
Smart Cities Cybersecurity & IoT Smart Cities Web Development Global new energies	Data storage	Data Analytics
	Data management	
	Data storage and maintenance security	
	Data Science	



	Big Data	
	Methods in Data Analytics	
	Advanced Methods in Data Analytics	
	Statistics	
Cybersecurity & IoT Big Data & AI Smart Cities	Specialised mathematics (for topic)	Programming
	Software programming (for topic)	
	Computer program design and development	
	Algorithm programming	
	Proficient application of programming languages	
	Advanced software engineering (software creation methodology, UML (OOP compatibility), document creation (for maintenance and operations use)	
	Parallel programming	
Global New Energies	Advanced Energy Analysis (energy flows, energy requirements, energy conversion processes, conversion technologies)	Rail Energy Management
	Electric Network Simulations (Sources, users, transmission and distribution, storage, applications)	
	Electrical Engineering (Automation, measuring and control technologies, electrical-energy technologies)	
	Microelectronics (fundamentals, design, construction and production of electric components and their quality assurance)	
Norms Soft skills ICT Norms Communication	Strategic Management	Management and Business Aspects
	Management Theory	
	Marketing strategies in transport services	
	Advanced marketing management	
	Social management & corporate communication for engineers	
	Advanced public policy and economics	
	Innovation	
	Change Management	
Theory of consumer behaviour		
Virtual Reality	3D development tool integration (API,SDK...)	Virtual Reality in Railways
	Standards (OpenXR)	

	Advanced object-oriented programming	
	3D Data Management	
	Motion Capture	
	Behavioural Data Analysis	
Formal Methods Cybersecurity and IoT	Distributed apps. & cyber-physical systems	Cybersecurity and IoT
	MRO (Maintenance in operational condition) (commissioning + exploitation)	
	Sensor advanced (deployment)	
	Protocol architecture deployment	
	Networking advanced	
	(Network theory, Wired/Wireless communication)	
	Network architecture (set-up, technical acceptance validation and calibration)	
	Rules & Regulations (which frequency to use etc...)	
	IoT Security (cf IoT Security table)	
	System Maintenance	
	Sensor Diagnostic/ Monitoring	
	Select sensor	
	Apply security measures & policies	
	Apply cybersecurity strategy	
	Ensure Security compliance	
	Security monitoring & response	
	Forensics	
Conduct pentests		
Understanding, Installation and maintenance of Real-time OS		
Smart Cities	Define BIM Management and its strategic and legal documents	BIM
	BIM specifications	
	BIM convention	
	BIM execution plan	
	Norms governing BIM (ex: ISO19650) - Advanced	

	Intellectual property	
	Define a collaborative approach using a BIM platform	
	Comprehend smart city/smart station/ specifics (SMART) management and rail infrastructures management	
	Define strategy	
Mobility and work-based learning experience		Internship
		Study period abroad

## 5.8 Rail transport engineering EQF7

<b>Programme</b>	<b>Rail Transport Engineering</b>
<b>EQF LEVEL</b>	<b>Master programme (core &amp; specialized curr.) / EQF 7</b>
<b>ECTS</b>	<b>120</b>
<b>Duration (years)</b>	<b>2</b>

Field	Topics to cover	Name of the course within the programme
Transportation systems	Transport systems design & simulation Transport systems planning Sustainable mobility & transport services Traffic flow theory Transportation systems theory & analysis	Advanced transport system design
	Rail transport	Integrated rail transport services

	<p>Multimodal transport</p> <p>Mobility as a Service</p> <p>ITS</p> <p>Smart logistics &amp; advance of railway freight transport</p> <p>User behavior &amp; human factors</p>	
	<p>Operational research &amp; optimization</p> <p>Artificial Intelligence techniques (Decision tree, Random Forest, Neural Networks, Markov decision process, dynamic vehicle routing)</p> <p>Methods &amp; models for decision support</p>	Artificial Intelligence, optimisation and decision support
Reliability, maintenance & life cycle management	<p>Rail infrastructure</p> <p>Railway engineering</p> <p>Maintainability theory (MTBM)</p> <p>Availability theory</p> <p>Maintenance strategies</p>	Rail transport reliability
Formal methods for system design & verification	<p>Requirements Engineering - fundamentals and principles</p> <p>Model-based system engineering (SysML)</p> <p>Certification of safety-critical systems</p> <p>Formal design &amp; verification</p>	
Safety, dependability, security	<p>Railway system performance and resilience</p> <p>Transport systems safety &amp; risk management</p> <p>Safety management system for railways</p>	Rail safety and security management
Norms, standards & certification	<p>Regulatory framework of railway transport</p> <p>ERTMS</p> <p>ETCS</p> <p>CBTC and automation</p> <p>Technical interoperability</p> <p>Interoperability regulations</p> <p>Railway standards and norms</p>	Rail transport regulations
Smart cities (Building information modeling & Smart station design)	<p>BIM development and management</p> <p>Norms governing BIM (ex: ISO19650)</p>	Rail digital twin & Smart station design

	Digital twin and BIM platform	
	Smart city/smart station/ specifics (SMART) management and rail infrastructures management	
Mobile apps development	Basics on Mobile apps development and technologies Application in the rail sector	Smart applications for rail transport
Virtual reality	Basics on virtual reality Application of virtual reality in the rail sector	
Web development	Basics on web development Application in the rail sector	
Cybersecurity & Internet of Things (IoT) /Sensor networking/Embedded systems	Distributed apps. & cyber-physical systems IoT devices and data collection	Big data & Cybersecurity in the rail sector
Big Data & Artificial Intelligence	Big Data (Machine Learning, Deep Learning, Reinforcement Learning, Automated Machine Learning) Methods in Data Analytics (theoretical concepts, application of methods relevant to transport problems) Statistics (Multivariate Statistics)	
Global new energies & technologies	Advanced Energy Analysis (energy flows, energy requirements, energy conversion processes, conversion technologies) Electric Network Simulations (Sources, users, transmission and distribution, storage, applications) Electrical Engineering (Automation, measuring and control technologies, electrical-energy technologies)	Rail energy management
	Environmental and Energy policy (Historical Evolution, Understand Challenges, understand the roles of actors) Environmental Assessment methods (for example Life Cycle Assessment/ Multi-Criteria Assessment) Economics incl. Environmental Economics (Macroeconomics and Economic Modelling, instruments, management) Integrated analysis of perceived or potential environmental and sustainability issues	Sustainable and green rail transport

	Interdisciplinary approaches to environmental problem solving and sustainable resource management	
Networking & ICT technologies	Information Technologies (Signal and Information Technology, communication networks, analogue and digital circuits and systems) Cellular networks 4G (LTE) & 5G Radio -frequency communication Technologies based on the Global Navigation Satellite System GNSS	ICT technologies for rail transport
Economics	Selected problems of economics Regulation and public policies Understanding Econometrics and Statistics Railway market regulation and liberalisation framework Understanding financial data	Transport economics
Management	Strategic management Marketing management Marketing research methods and design Marketing strategies in transport services Business process management IT systems in management	Company Management
	Project Management Leadership Risk Management	Project and team Management
Soft skills	Advanced presentation training Theory of consumer behaviour Social management & corporate communication Cross-cultural communication Professional Languages and rail terminology	Communication theory and practice
Mobility and work-based learning experience		Internship
		Study period abroad

## 5.9 Rail transport engineering EQF8

<b>Programme</b>	<b>Rail Transport Engineering</b>
<b>EQF LEVEL</b>	<b>PhD / EQF 8</b>
<b>Duration (years)</b>	<b>3</b>

Field	Topics to cover	Name of the course within the programme
Transportation systems	Integrated approaches for rail operations & management	Advanced rail operations & management
	Advanced simulation methods	
	Advanced rail transport modelling	
	Multimodal transport solutions	Integrated rail transport services
	Mobility as a Service	
	Rail freight transport and logistics	
	Innovative rail transport services	
	Rail automation	Rail automation & innovative signalling systems
New signalling systems		
ERTMS		
Norms, standards & certification	ETCS	Railway interoperability
	CBTC and automation	
	Railway market regulation	
	Technical Interoperability	
	Regulatory interoperability	
	Railway standards and norms	
Networking & ICT technologies	Cellular networks 4G (LTE) & 5G	Innovative ICT technologies for railways
	Satellite technologies in the rail sector	
	Role of telecommunications in the new mobility systems	
Big Data & Artificial Intelligence	Advanced optimisation models	Advanced optimisation and decision support in rail sector
	Multi-criteria decision-making	

	Artificial intelligence techniques	Artificial Intelligence techniques and Big Data analysis for rail applications
	Machine and Deep Learning for data analysis	
Cybersecurity & Internet of Things (IoT) /Sensor networking/Embedded systems	Cybersecurity in the rail sector	Rail digitalisation
	IoT devices for rail applications	
	Smart metering	
	Sensors and Embedded systems	
Smart cities (Mobile apps development, Building information modeling & Smart station design)	Digital twin	Smart rail design and maintenance
	Building Information Modeling	
	Smart station design	
	Innovative rail maintenance strategies	Smart rail services for users
	Mobile apps and user interfaces	
	Smart applications and web services	
Global new energies & technologies	Environmental aspects of rail transport	Sustainable rail energy management
	Innovative energy management solutions	
	Innovative traction systems	
	Design of smart transmission/ distribution networks	
	Design and implementation of predicting models for renewable energies	
	Predictive load management in electric networks	
	Network balancing and quality control with integration of electric vehicles	
Safety, dependability, security	Risk assessment methods and techniques	Advanced methods for rail safety and security management
	Rail Safety Management System	
	Security in the rail sector	
	Reliability and Resilience of rail systems	
Economics and management	Railway business strategy	Railway business management and regulation
	Advanced marketing management	
	Advanced techniques for project management	
	Railway liberalisation framework and track access regulation	
Soft Skills	Academic writing (English for Academic Purposes)	Seminar on academic writing
	Innovative didactic methods in the modern teaching process	Seminar on innovative teaching approaches



	Commercialization of scientific outcomes	Seminar on patent law and commercialisation of scientific outcomes
	Writing grant application	Seminar on grant application writing
	Workshops in research ethics	Seminar on research ethics
Mobility		Research period abroad on specific research topics

## 6 ANNEX 3 – MOBILITY REQUIREMENTS ANALYSIS PER COUNTRIES

### 6.1 AUSTRIA

#### AUSTRIA– EQF LEVEL 8

#### PROGRAMME REQUIREMENTS

University	University of Applied Sciences St. Pölten (UASSP) - In Austria (and Germany) Universities of Applied Sciences cannot offer Doctorate Programmes. This is only possible in cooperation with Universities. Therefore, the Technical University of Vienna is given here as an example
Country	Austria
EQF level	8
Type of Programme	Doctorate
Legislation	Universitätsgesetz 2002 BGBl. I Nr. 120/2002 (UG) ( <a href="https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&amp;Gesetzesnummer=20002128">https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&amp;Gesetzesnummer=20002128</a> )
ECTS	180 of which: at least 18 from courses, 162 ECTS from thesis activities,
Duration (years)	3

#### ACCREDITATION PROCESS

Accreditation body	Rectorate
Accreditation process	Curricula and amendments thereto shall be submitted to the Rectorate before a decision is taken.
Needed documents	
Other constraints	
Requirements	Curricula of ordinary studies and amendments thereto shall enter into force on 1 October of the same year if published in the Official Gazette before 1 July.

#### JOINT DOCTORATE

Accreditation body	Rectorate
Accreditation process	see above
Needed documents	
Other constraints	see above

## JOINT CURRICULA

Activation process	see above
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## INDUSTRIAL DOCTORATE/DUAL SYSTEM

Activation process	see above
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## VISITING PHD STUDENTS

Agreement process	No fixed processes
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## AUSTRIA – EQF LEVEL 7

### PROGRAMME REQUIREMENTS

University	University of Applied Sciences St. Pölten (UASSP)
Country	Austria
EQF level	7
Type of Programme	Master of Science degree
Legislation	Bundesgesetz über Fachhochschulen (Fachhochschulgesetz – FHG)
ECTS	120
Duration (years)	2
Classification of degree	no definition available
Grade scale for graduation	1 = EXCELLENT: Outstanding Performance 2 = GOOD: Generally good, but with some errors 3 = SATISFACTORY: Generally sound work with a number of substantial errors 4 = SUFFICIENT: Performance meets the minimum criteria 5 = UNSATISFACTORY: <50 % Substantial improvement necessary; requirement of further work
Grade scale for a single course within the programme	
Entry requirements (needed study title)	<ul style="list-style-type: none"> <li>Completed relevant Bachelor's degree programme at a university of applied sciences</li> </ul>

	<ul style="list-style-type: none"> <li>• Completed equivalent studies at a recognised domestic post-secondary educational institution</li> <li>• Completed equivalent studies at a recognised foreign post-secondary educational institution ("relevant" means a study programme with similar content to our bachelor's programme)</li> <li>• Written test</li> <li>• Admission interview</li> </ul>
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## FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Significant changes to be approved by an external Accreditation body
Changes in the title and content within the degree programme	Simple changes to be approved by the internal board
Needed documents	Template from the university
Time constraints	Within the academic year we have three deadlines for submitting a proposal to the internal board. For the external board there are no deadlines, but the significant changes have to go first to the internal board then to the external accreditation body

## ACCREDITATION PROCESS

Accreditation body	Agentur für Qualitätssicherung und Akkreditierung Austria ( <a href="http://www.aq.ac.at">www.aq.ac.at</a> )
Accreditation process	Applications can be submitted to AQ Austria at any time. It should be noted that the accreditation procedure can take up to nine months. In order for accreditation to be granted for the following academic year, the application must be submitted by 15 October at the latest. In order to speed up the process of selecting the experts, meaningful documents on the programme should be submitted by 15 September.
Needed documents	Curriculum Vitae Head of Development Team Curricula vitae development team (confirmations of teaching) Curricula vitae of teachers Application for approval of reallocation or allocation of study places Extract from the commercial register B & A Analysis Examination regulations Cooperation agreements, letters of intent, contracts (depending on the type of application)
Relevant legislation	§ 23 Hochschul-Qualitätssicherungsgesetz (HS-QSG), BGBl. I Nr. 74/2011 § 8 Fachhochschul-Studiengesetz (FHStG), BGBl. I Nr. 340/1993

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	One Degree certificate issued by both universities – a difficult process
International Course	All the students will receive the double degree at the end of the course
Accreditation body	Agentur für Qualitätssicherung und Akkreditierung Austria ( <a href="http://www.aq.ac.at">www.aq.ac.at</a> )
Accreditation process	see description of "Accreditation process" above
Needed documents	see description of "Accreditation process" above

Relevant legislation	see description of "Accreditation process" above
Other constraints	see description of "Accreditation process" above

## DOUBLE DEGREE

Double Degree	Two Degree certificates one for each university, it is an option for the interested students that want to spend a study period abroad
Activation process	Possibly accreditation relevance is given! If no joint curriculum development has taken place, there is no accreditation relevance.

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised Procedure See: <a href="https://www.fhstp.ac.at/de/mediathek/pdfs/infoblaetter/incoming-student-guide.pdf">https://www.fhstp.ac.at/de/mediathek/pdfs/infoblaetter/incoming-student-guide.pdf</a> The application deadlines are as follows: <ul style="list-style-type: none"> <li>■ 15 May for the winter semester</li> <li>■ 15 May for the whole academic year</li> <li>■ 15 November for the summer semester</li> </ul>
Needed documents	Students wishing to study at the St. Pölten University of Applied Sciences are requested to ask their home university's International Office to send an official nomination via e-mail in time. They will receive an e-mail by the St. Pölten UAS' International Office with further instruction on the application process. Documents: <ul style="list-style-type: none"> <li>• Learning Agreement</li> <li>• Copy of German language certificate (minimum requirement: B1 level) OR</li> <li>• Copy of English language certificate (minimum requirement: B1 level, needed if courses from the English-taught modules are chosen)</li> <li>• Passport (proof of identity)</li> <li>• Proof of technical admission requirements</li> <li>• Study programme-specific documents (e.g. letter of motivation, project work, etc.)</li> </ul>
Relevant legislation	ERASMUS Framework
Other requirements/constraints	number of students that can apply
Entry requirements for students	Linguistic

## AUSTRIA– EQF LEVEL 6

### PROGRAMME REQUIREMENTS

University	University of Applied Sciences St. Pölten (UASSP)
Country	Austria
EQF level	6
Type of Programme	Bachelor degree
Legislation	Bundesgesetz über Fachhochschulen (Fachhochschulgesetz – FHG)
ECTS	180
Duration (years)	3
Classification of degree	no definition available
Grade scale for graduation	<p>1 = EXCELLENT: Outstanding Performance</p> <p>2 = GOOD: Generally good, but with some errors</p> <p>3 = SATISFACTORY: Generally sound work with a number of substantial errors</p> <p>4 = SUFFICIENT: Performance meets the minimum criteria</p> <p>5 = UNSATISFACTORY: &lt;50 % Substantial improvement necessary; requirement of further work</p>
Grade scale for single course within the programme	
Entry requirements (needed study title)	<ul style="list-style-type: none"> <li>• Austrian school-leaving certificate (Reifeprüfungszeugnis), certificate of secondary vocational education (Berufsreifeprüfungszeugnis) or nostrified certificate</li> <li>• University entrance qualification examination</li> <li>• Equivalent foreign certificate (school-leaving examination, university entrance qualification examination, certificate of secondary vocational education (Berufsreifeprüfung))</li> <li>• International Baccalaureat (IB) Diploma or European Baccalaureate</li> <li>• At least 3 years of study in Austria</li> <li>• Completion of at least 3 years of study abroad</li> </ul>

## FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Significant changes to be approved by an external Accreditation body
Changes in the title and content within the degree programme	Simple changes to be approved by the internal board
Needed documents	Template from the university
Time constraints	Within the academic year, we have three deadlines for submitting a proposal to the internal board. For the external board there are no deadlines, but the significant changes have to go first to the internal board then to the external accreditation body

## ACCREDITATION PROCESS

Accreditation body	Agentur für Qualitätssicherung und Akkreditierung Austria ( <a href="http://www.aq.ac.at">www.aq.ac.at</a> )
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Accreditation process	Applications can be submitted to AQ Austria at any time. It should be noted that the accreditation procedure can take up to nine months. In order for accreditation to be granted for the following academic year, the application must be submitted by 15 October at the latest. In order to speed up the process of selecting the experts, meaningful documents on the programme should be submitted by 15 September.
Needed documents	Curriculum Vitae Head of Development Team Curricula vitae development team (confirmations of teaching) Curricula vitae of teachers Application for approval of reallocation or allocation of study places Extract from the commercial register B & A Analysis Examination regulations Cooperation agreements, letters of intent, contracts (depending on the type of application)
Relevant legislation	§ 23 Hochschul-Qualitätssicherungsgesetz (HS-QSG), BGBl. I Nr. 74/2011 § 8 Fachhochschul-Studiengesetz (FHStG), BGBl. I Nr. 340/1993

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	One Degree certificate issued by both universities – a difficult process
International Course	All the students will receive the double degree at the end of the course
Accreditation body	Agentur für Qualitätssicherung und Akkreditierung Austria ( <a href="http://www.aq.ac.at">www.aq.ac.at</a> )
Accreditation process	see description of "Accreditation process" above
Needed documents	see description of "Accreditation process" above
Relevant legislation	see description of "Accreditation process" above
Other constraints	see description of "Accreditation process" above

## DOUBLE DEGREE

Double Degree	Two Degree certificates one for each university is an option for the interested students that want to spend a study period abroad
Activation process	Possibly accreditation relevance is given! If no joint curriculum development has taken place, there is no accreditation relevance.

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	<p>Standardised Procedure See: <a href="https://www.fhstp.ac.at/de/mediathek/pdfs/infoblaetter/incoming-student-guide.pdf">https://www.fhstp.ac.at/de/mediathek/pdfs/infoblaetter/incoming-student-guide.pdf</a></p> <p>The application deadlines are as follows:</p> <ul style="list-style-type: none"> <li>■ 15 May for the winter semester</li> <li>■ 15 May for the whole academic year</li> <li>■ 15 November for the summer semester</li> </ul>
Needed documents	<p>Students wishing to study at the St. Pölten University of Applied Sciences are requested to ask their home university's International Office to send an official nomination via e-mail in time. They will receive an e-mail from the St. Pölten UAS' International Office with further instructions on the application process.</p> <p>Documents:</p> <ul style="list-style-type: none"> <li>• Learning Agreement</li> <li>• Copy of German language certificate (minimum requirement: B1 level) OR</li> <li>• Copy of English language certificate (minimum requirement: B1 level, needed if courses from the English-taught modules are chosen)</li> <li>• Passport (proof of identity)</li> <li>• Proof of technical admission requirements</li> <li>• Study programme-specific documents (e.g. letter of motivation, project work, etc.)</li> </ul>
Relevant legislation	ERASMUS Framework
Other requirements/constraints	number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	<p>Standard Erasmus SMT Scholarship Application must be submitted to the FH International Relations Service at least four weeks before the start of the internship.</p>
mandatory or optional	
Procedure for traineeship activation	<ul style="list-style-type: none"> <li>• Standard Erasmus SMT Scholarship</li> <li>• Application must be submitted to the FH International Relations Service at least four weeks before the start of the internship.</li> <li>• Letter of application</li> <li>• Curriculum vitae</li> <li>• Certificates</li> <li>• Confirmation of academic relevance</li> <li>• Learning Agreement for Traineeships</li> </ul>
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic



## AUSTRIA – EQF LEVEL 5

### PROGRAMME REQUIREMENTS

Country	AUSTRIA
EQF level	5
Type of Programme	Vocational Training (HTL – Höhere Technische Lehranstalt)
Legislation	Austrian Law (Ministry of Education; Ministry of Economics)
Duration (years)	5
Classification of diploma	Final examination
Grade scale for the final exam/evaluation	Passed; Passed with honours
Entry requirements (needed study title)	Finalisation of Secondary level I; 8 years of school;
Language requirement	German/English

### TRAINEESHIP

Traineeship (Mandatory or optional)	Mandatory: from 8 weeks (technical) to 32 weeks (Tourism)
Traineeship abroad (Mandatory or optional)	Optional;
Procedure for traineeship activation	Activation by student; recognition by school
Procedure for traineeship activation abroad	Application for Erasmus+
Needed documents	Traineeship national: Work confirmation and work report and oral debriefing Traineeship international: Learning agreement and Work confirmation and work report
Relevant legislation	School laws of Austria (SHUG; SCHOG, etc.)
Other requirements/constraints	

### STUDENTS MOBILITY

Mandatory or possible	Optional/Erasmus+ School exchange/International traineeships
Procedure for student exchange	Depends on School
Needed documents	Mainly Erasmus+ Documents (Learning Agreement; Europass)
Relevant legislation	School law and European Law (Erasmus)
Other requirements/constraints	

## AUSTRIA – EQF LEVEL 3/4

### PROGRAMME REQUIREMENTS

Country	AUSTRIA
EQF level	4
Type of Programme	Vocational Training (Fachschule)

Legislation	Austrian Law (Ministry of Education; Ministry of Economics)
Duration (years)	3-4 years
Classification of diploma	Final Exam of BMS; Apprenticeship exam
Grade scale for the final exam/evaluation	Passed; Passed with honours
Entry requirements (needed study title)	Finalisation of Secondary school I (8 years of school)
Language requirement	German

## TRAINEESHIP

Traineeship (Mandatory or optional)	Mandatory: Depending on the type of education: Between 4 weeks (Technical) and 32 weeks (Tourism)
Traineeship abroad (Mandatory or optional)	Optional via Erasmus+
Procedure for traineeship activation	Activation by students; recognition by school
Procedure for traineeship activation abroad	Application for Erasmus+
Needed documents	Traineeship national: Work confirmation and work report and oral debriefing Traineeship international: Learning agreement and Work confirmation and work report
Relevant legislation	School laws of Austria (SHUG; SCHOG, etc.)
Other requirements/constraints	

## STUDENTS MOBILITY

Mandatory or possible	Optional/Erasmus+ School exchange/International traineeships
Procedure for student exchange	Depends on School
Needed documents	Mainly Erasmus+ Documents (Learning Agreement; Europass)
Relevant legislation	School law and European Law (Erasmus)
Other requirements/constraints	

## 6.2 CZECH REPUBLIC

### CZECH REPUBLIC – EQF LEVEL 8

#### PROGRAMME REQUIREMENTS

University	CTU - Czech Technical University in Prague
Country	CZECH REPUBLIC
EQF level	8

Type of Programme	Doctorate
Legislation	Act No. 111/1998 Coll.
ECTS	180
Duration (years)	3
Entry requirements	magister study certificate and entrance exams
Language requirement	English B2

## ACCREDITATION PROCESS

Accreditation body	Review process by NAB (National Accreditation Bureau)
Needed documents	<ul style="list-style-type: none"> <li>•The attachments submitted along with the Application (Legally attested copy of a Diploma or similar proof of completion of studies issued by a foreign university;</li> <li>•Legally attested copy of a Diploma Supplement or copy of a list of completed courses;</li> <li>•Certified translations of both documents into Czech or English (documents issued in English are exempt from this clause);</li> <li>•Certified written power of attorney, if submitted by a person other than the graduate;</li> <li>•Ruling on grant refugee status, if submitted by a person who has been granted this status).</li> </ul>

## JOINT DOCTORATE

Accreditation body	Accreditation Board
Accreditation process	Any CTU Faculty seeking to implement a Jointly Accredited Degree Programme in cooperation with institutions abroad has to arrange for accreditation for said programme
Needed documents	Its accreditation request will be put to the Accreditation Board, including a Cooperation Agreement signed by all the cooperating institutions, drawn up in compliance with the terms and standards of the Accreditation Board and in conjunction with the "Accreditation of Degree Programmes and Habilitation and Nomination Proceedings at the CTU"
Other constraints	Accreditation request is submitted for rector's signature via the Office for Research (Doctoral degrees) at the Rector's Office.

## JOINT CURRICULA

Activation process	Request that can be done also by existing PhD Programmes
Needed documents	Agreement between the involved entities
Requirements	Definition of the activity organisation, time period spent at the different universities

## INDUSTRIAL DOCTORATE/DUAL SYSTEM

Activation process	PhD student position for Company staff member. Request that can be done also within an existing PhD Programmes - fast procedure - Approval from the Teacher Board and from the Department Board
Needed documents	Agreement between the involved entities. Agreement with foreign companies (optional)
Requirements	Definition of the research project, training plan, number of employees, exploitation of the results - Call for applications dedicated to highly qualified employees of the company - two tutors: an enterprise tutor and a university tutor

## CO-TUTORING

Activation process	Flexible procedure - Request that can be done in any moment of the year but before the end of the second year- Fast procedure: a couple of months are needed - approval by the Teaching Boards and the Departments and signature of the two Rectors
Needed documents	Agreement between the involved entities - Co-tutoring agreement - request before the end of the second year
Requirements	<ul style="list-style-type: none"> <li>•The Academic Board must check the compatibility and equivalence of the programmes of the two courses.</li> <li>•The time period at each University cannot be shorter than six months.</li> <li>•There must be two advisors one for each university.</li> <li>•There must be only one thesis discussion.</li> <li>•Examining commission shall comprise an equal number of scientific representatives from both countries and will be jointly designated by both Universities and approved by both Rectors.</li> <li>•The certificate awarded by each University will mention the other University at which the co-tutored activity will have been carried out.</li> </ul>

## VISITING PHD STUDENTS

Agreement process	Fast and flexible procedure - approval by PhD Course Coordinator and Teachers Board
Needed documents	Invitation letter from the hosting university
Other requirements/constraints	Research period abroad of 3-5 months

## CZECH REPUBLIC – EQF LEVEL 7

### PROGRAMME REQUIREMENTS

University	CTU - Czech Technical University in Prague
Country	CZECH REPUBLIC
EQF level	7
Type of Programme	Master of Science degree
Legislation	Act No. 111/1998 Coll.
ECTS	120
Duration (years)	2
Classification of degree	Degree class
Grade scale for graduation	_/110
Grade scale for single course within the programme	_/30
Entry requirements (needed study title)	bachelor study certificate and entrance exams
Language requirement	English B2

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses in the programme
Changes in the title and content within the degree programme	All the courses in the programme
Needed documents	Content short description - approval by the Board of the Programme
Time constraints	In advance with respect to the beginning of the academic year

### ACCREDITATION PROCESS

Accreditation body	Review process by NAB (National Accreditation Bureau)
Accreditation process	Written application of the university for the accreditation of the study program. The NAB will decide on the application for accreditation within 120 days.
Needed documents	The application must in particular contain: <ul style="list-style-type: none"> <li>•the name of the university, or its part, which will implement the study programme;</li> <li>•parts of the study program according to Section 44 of the Act No. 111/1998 Coll.; in the case of a distance learning program, there must be also the percentage of basic thematic areas belonging to individual areas of education in teaching;</li> <li>•documents on the personnel, financial, material and other matters of the study program for at least the standard period of study, including data on the consideration of the need to ensure the conditions of equal access to higher education;</li> <li>•the intention of the development of the study program, its justification and the expected number of admitted applicants for study and information on the expected applicability of the graduates of the study program on the labour market;</li> </ul>

	<ul style="list-style-type: none"> <li>• a self-assessment report describing and evaluating the fulfilment of individual requirements arising from the relevant standards for accreditation pursuant according to Section 78 of the Act No. 111/1998 Coll.</li> </ul>
Relevant legislation	Act No. 111/1998 Coll.

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both universities – a difficult process
International Course	All the students will receive the joint degree at the end of the course
Accreditation body	Accreditation Board
Accreditation process	Any CTU Faculty seeking to implement a Jointly Accredited Degree Programme in cooperation with institutions abroad has to arrange for accreditation for said programme
Needed documents	Cooperation Agreement signed by all the cooperating institutions, drawn up in compliance with the terms and standards of the Accreditation Board and in conjunction with the "Accreditation of Degree Programmes and Habilitation and Nomination Proceedings at the CTU
Other constraints	Accreditation request is submitted for rector's signature via the Office for Studies.

## DOUBLE DEGREE

Double Degree	Two Degree certificates one for each university is an option for the interested students that want to spend a study period abroad
Activation process	More flexible procedure - No need for accreditation
Needed documents	<ul style="list-style-type: none"> <li>• Agreement signed by both Universities;</li> <li>• agreed study plan for each student;</li> <li>• course/ECTS recognition tables;</li> <li>• mark conversion table.</li> </ul>
Entry requirements	At least twelve years of education and have to hold a document certifying their passing of a qualifying examination (if needed) for admission to a University course in the same or similar scientific area, of the afore-mentioned double Bachelor, in their home Country.

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. Our internal deadlines: to present and sign the agreement on May 22 for the academic year 22-23 and May 23 for the academic year 23-24; Call for student application in February each year; the period abroad usually starts in July
Needed documents	<ul style="list-style-type: none"> <li>•Signed agreement</li> <li>•course/ETCS recognition tables</li> <li>•Mark conversion Table</li> <li>•Call for students application</li> </ul>
Relevant legislation	ERASMUS Framework
Other requirements/constraints	Number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement	Within the ERASMUS framework there is the possibility of establishing agreements between Universities and Companies or Research Centres to activate traineeship abroad for students. The procedure and the deadlines are the same with a first phase in which the agreements are signed and a second phase in which the call is published and the interested students can apply.
mandatory or optional	Optional for the students that apply - number of positions according to the available European funding
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## CZECH REPUBLIC – EQF LEVEL 6

### PROGRAMME REQUIREMENTS

University	CTU - Czech Technical University in Prague
Country	CZECH REPUBLIC
EQF level	6
Type of Programme	Bachelor Degree
Legislation	Act No. 111/1998 Coll.
ECTS	180
Duration (years)	3
Classification of degree	Degree class
Grade scale for graduation	_/110

Grade scale for single course within the programme	_/30
Entry requirements (needed study title)	possession of a High school leaving certificate
Language requirement	English B2

## FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme
Needed documents	Content short description - approval by the Board of the Programme
Time constraints	In advance with respect to the beginning of the academic year

## ACCREDITATION PROCESS

Accreditation body	Review process by NAB (National Accreditation Bureau)
Accreditation process	Written application of the university for the accreditation of the study program. The NAB will decide on the application for accreditation within 120 days.
Needed documents	<ul style="list-style-type: none"> <li>•the name of the university, or its part, which will implement the study programme;</li> <li>•parts of the study program according to Section 44 of the Act No. 111/1998 Coll.; in the case of a distance learning program, there must be also the percentage of basic thematic areas belonging to individual areas of education in teaching;</li> <li>•documents on the personnel, financial, material and other matters of the study program for at least the standard period of study, including data on the consideration of the need to ensure the conditions of equal access to higher education;</li> <li>•the intention of the development of the study program, its justification and the expected number of admitted applicants for study and information on the expected applicability of the graduates of the study program on the labour market;</li> <li>•a self-assessment report describing and evaluating the fulfilment of individual requirements arising from the relevant standards for accreditation pursuant according to Section 78 of the Act No. 111/1998 Coll.</li> </ul>
Relevant legislation	Act No. 111/1998 Coll.

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both universities – a difficult process
International Course	All the students will receive the joint degree at the end of the course
Accreditation body	Accreditation Board



Accreditation process	Any CTU Faculty seeking to implement a Jointly Accredited Degree Programme in cooperation with institutions abroad has to arrange for accreditation for said programme
Needed documents	Cooperation Agreement signed by all the cooperating institutions, drawn up in compliance with the terms and standards of the Accreditation Board and in conjunction with the "Accreditation of Degree Programmes and Habilitation and Nomination Proceedings at the CTU
Other constraints	Accreditation request is submitted for rector's signature via the Office for Studies.

## DOUBLE DEGREE

Double Degree	Two Degree certificates one for each university is an option for the interested students that want to spend a study period abroad
Activation process	More flexible procedure - No need for accreditation
Needed documents	<ul style="list-style-type: none"> <li>• Agreement signed by both Universities;</li> <li>• agreed study plan for each student;</li> <li>• course/ECTS recognition tables;</li> <li>• mark conversion table.</li> </ul>
Entry requirements	At least twelve years of education and have to hold a document certifying their passing of a qualifying examination (if needed) for admission to a University course in the same or similar scientific area, of the afore-mentioned double Bachelor, in their home Country.

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. Our internal deadlines: to present and sign the agreement May 22 for the academic year 22-23 and May 23 for the academic year 23-24; Call for student application in February each year; Period abroad usually starts in July
Needed documents	<ul style="list-style-type: none"> <li>• Signed agreement</li> <li>• course/ETCS recognition tables</li> <li>• Mark conversion Table</li> <li>• Call for students application</li> </ul>
Relevant legislation	ERASMUS Framework
Other requirements/constraints	Number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement	Within the ERASMUS framework there is the possibility of establishing agreements between Universities and Companies or Research Centres to activate traineeship abroad for students. The procedure and the deadlines are the same with a first phase in which the agreements are signed and a second phase in which the call is published and the interested students can apply.
mandatory or optional	Optional for the students that apply - number of positions according to the available European funding
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## 6.3 FRANCE

### FRANCE – EQF LEVEL 7

#### PROGRAMME REQUIREMENTS

University	Conservatoire National des Arts et Métiers(CNAM)	CESI	CESI
Country	FRANCE	France	France
EQF level	7	7	7
Type of Programme	Electronic Systems - Railway Signalling Apprenticeship Training Programme	Mastère Spécialisé <sup>®</sup> (Post executive Master's degree) - Construction Project Management - Specialization in "Railway and Urban Transport and New Mobilities" Apprenticeship	Engineering master's degree in construction and civil engineering under apprenticeship program
Legislation	CTI (Commission des Titres d'Ingénieur)	RNCP title – registered professional qualification	CTI (Commission des Titres d'Ingénieur) – engineering accreditation body
ECTS	180	75	180
Duration (years)	3	1	3
Classification of degree	Engineering Degree (Master degree)	Engineering degree (master degree)	Engineering Degree (Master degree)
Grade scale for graduation	-/20	A to D (-/20 equivalence)	A to D (-/20 equivalence)



Grade scale for singlecourse within the programme	-/20	A to D (-20/equivalence)	A to D (-20/equivalence)
Entry requirements (needed study title)	<p>Holder of Bac + 2 or Bac + 3 level ( first yearof training ) :</p> <ul style="list-style-type: none"> <li>- BTS in Electronics, Electronic Systems, or equivalent (Technician level or EQF5)</li> <li>- DUT in Telecommunications and Networking, Electrical Engineering andIndustrial or applied physics, or an equivalent diploma; (Technician level or EQF5)</li> <li>- Bachelor of Electronics, or appliedphysics or equivalent (EQF6)</li> <li>- Have followed scientific preparatory classes and validated 120 ECTS (EQF5)</li> </ul> <p>Holder of Bac + 4 (second year of training -under certain strict conditions). Being under the age of 30. Validation of the diploma partly or entirely via VAE (Acquired competences validation) process for employees in companies or VES (High level study validation) process</p>	<p>Bac + 5 level holders (engineering degree, master degree RNCP title level 7) with knowledge/experience in construction first year of master + 3 years of experience in construction Second year university of master, architects and town planners canaccess through derogation</p>	<p>After completion of the first two years in the higher education system (high selective classes préparatoires), on transcripts and interview After a bachelor's degree in related field of study</p>
Language requirement	English (Linguaskill B2)	Indirect - English B2 level (785 TOEIC score) (needed for engineerdegree validation)	B1 level in EnglishB1 B2 level upon graduation

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within thedegree programme	YES
Changes in the title and content within the degreeprogramme	YES
Needed documents	Content short description - approval by the CTI In advanced as the CESI Post executive master's degree is registered and labelled by CGE
Time constraints	in advanced respect to the beginning of the academic year



## ACCREDITATION PROCESS

University	Conservatoire National des Arts et Métiers (CNAM)	CESI	CESI
Accreditation body	Review process by the CTI	France compétences & CGE	Review process by the CTI
Accreditation process	Accreditation process for 5 years by the CTI	Presentation of programme to be registered (certifiers, partners, short résumé, skill blocks, content, eventual link with other certifications, etc..)	
Needed documents	A CTI report document for the accreditation	Frame provided by France Competences	A CTI report document for the accreditation
Relevant legislation	The CTI is an independent body, charged by French law since 1934 with evaluating all engineering schools with a view to their accreditation, developing the quality of training, promoting the engineer title and profession in France and abroad.	National law for the freedom to choose one's professional future of September 5, 2018 Under national labour law	The CTI is an independent body, charged by French law since 1934 with evaluating all engineering schools with a view to their accreditation, developing the quality of training, promoting the engineer title and profession in France and abroad.  Labour law regarding apprenticeship programs
Other requirements/constraints	Review process by the CTI	Title of the programme cannot be changed nor its skill blocks / such changes imply the presentation of a new application	CTI prerequisites

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

University	Conservatoire National des Arts et Métiers (CNAM)	CESI	CESI
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Erasmus Agreement process (internal deadlines)	<p>Planning and provisional number of mobilities especially for outgoing must be submitted to DDEI (Direction du Développement Européen et International) one year in advance. Agreements (IIA and OLA) must be signed before the mobilities. Internal deadlines: Calls for student application: March and September; List of students nomination: May and November; Autumn mobilities usually start in October, Spring mobilities usually start in April.</p>	Executive Post Master's degree don't get any required mobility in their academic framework	<p>Only students can get a study period abroad: full time students must spend one semester abroad during their 4th year (out of 5). Students can choose between an academic semester at a partner university or a 20 weeks internship.</p> <p>Each apprentice willing to get a placement at an Erasmus+ partner must either apply through CESI mobility on line tool or address directly to the European partner.</p> <p>Once the international internship agreement is signed between all parties (CESI, French company, European partner and the apprentice engineer) the candidate can apply for an Erasmus+ grant to our central office at least 3 weeks before departure</p>
Needed documents	Agreements, Call for application, Nomination decision, Invitation, Erasmus+ KIT		Erasmus+ application kit downloadable on CESI's website, signed copy of the internship agreement
Relevant legislation	Erasmus framework		Erasmus framework
Other requirements/constraints	Availability and value of grants, work and study schedules, visa, housing		CESI gets 25 campuses across France: all grants are monitored by the central office in order to spread all the grants on an equal manner between applicants and campuses
Entry requirements for students	Enrolment, language, academic result, motivation, commitment		Language test before and after mobility, on line report, attendance sheet

## ERASMUS TRAINEESHIP ABROAD

University	Conservatoire National des Arts et Métiers (CNAM)	CESI – Mastère spécialisé	CESI
Erasmus Agreement process (internal deadlines)	<p>Planning and provisional number of mobilities especially for outgoing must be submitted to DDEI one year in advance. Agreements (IIA and OLA) must be signed before the mobilities. Internal deadlines: Calls for student application: March and September; List of students nomination: May and November; Autumn mobilities usually start in October, Spring mobilities usually start in April.</p>	NA: mobility is not part of this curriculum	<p>Full time students must validate 20 weeks internship if they don't opt for an academic semester abroad.</p> <p>Apprentice engineers in civil engineering must spend at least 12 weeks abroad during their 4th year out of 5</p> <p>Each apprentice willing to get a placement at an Erasmus+ partner must either apply through CESI mobility on line tool or address directly to the European partner.</p> <p>Once the international internship agreement is signed between all parties (CESI, French company, European partner and the apprentice engineer) the candidate can apply for an Erasmus+ grant to our central office at least 3 weeks before departure</p>
mandatory or optional	Optional		mandatory
Procedure for traineeship activation	Agreement with a company/organization to be approved by the professor referent before contacting DDEI		<p>Academic approval, signature of an international agreement signed by all parties.</p> <p>!/ \ apprentice engineers will get their French contract suspended during their mobility</p> <p>!/ \ students can choose between an academic or an internship mobility</p>
Needed documents	Agreements, Call for application, Nomination		Erasmus+ kit, academic approval, internship agreement adapted to the

	decision, Invitation, Erasmus+ KIT		status (apprentice Vs student)
Relevant legislation	Erasmus framework		Erasmus+ framework for students French labour law for apprentice engineers
Entry requirements for students	enrolment, language, academic result, motivation, commitment		Language test before and after mobility, on line report, attendance sheet

## DUAL SYSTEM/ APPRENTICESHIP

University	Conservatoire National des Arts et Métiers (CNAM)	CESI
Mandatory or possible	Mandatory	Mandatory only for Engineering Master's degree under apprenticeship program.  See above: they must spend 12 weeks internship abroad.
Apprenticeship abroad (Mandatory or optional)	Optional	Mandatory but the status abroad depends on the local legislation. They spend 12 weeks in a company. They can't study in a partner university
Procedure for apprenticeship/dual system activation	Selection Exam - Audition	When applying for the Master's degree. Candidates apply either for full time student status or for apprenticeship program. Each status gets its own selection process and its own requirements.
Procedure for apprenticeship/dual system activation abroad	Agreement with a company/organization/HEI to be approved by the professor referent before contacting DDEI	Academic approval, internship agreement signed by all parties (apprentice, French company, CFA – French training center, host institution)  The French company will deactivate the contract during the time of mobility
Needed documents	Apprenticeship contract (Apprentice/Company/Training centre)	Internship agreement signed by all parties, addendum to the apprenticeship program, specific check list to sign, copy of Fil Ariane (get registered on French Ministry of foreign affairs in case of local emergencies), insurance
Relevant legislation	Ministry of Labour, Employment and Integration	French labour law

Other requirements/constraints	Age Constraints/Time and Schedule Constraints	Relevant local labour law
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## 6.4 GERMANY

### GERMANY – EQF LEVEL 8

#### PROGRAMME REQUIREMENTS

University	Technische Universität Dresden	University of Applied Sciences Erfurt
Country	Germany	Germany
EQF level	8	8
Type of Programme	Doctorate	Doctorate - cooperative doctorate
Legislation	§§ 40, 88 Abs. 1 Nr.2, 13 Abs. 4 Satz 1 Sächsisches Hochschulfreiheitsgesetz- SächsHSFG 10. December 2008	In Germany only Universities (not Universities of Applied Sciences) can offer PhD programmes and have the right to confer doctorates. Universities of Applied Sciences can sign agreements with Universities for so called cooperative doctorates. The PhD Students have 2 supervisors, all regulations depend on the doctoral regulations of the faculty of the university.
Duration (years)	3 (can be extended in some cases)	
Entry requirements	Due to the federal system and the high level of individuality of PhD Programmes there are rarely general requirements, the Qualifications Framework for German Higher Education Qualifications define the entry requirements: Must hold a Masters Degree (or Highly qualified Bachelor Graduates (Fast Track)). In some cases, 15 ECTS are required in case the student comes from a field other than transport sciences.	
Language requirement	German B2 or English B2 (Depends on the language of the written dissertation)	

There are two ways to get a PhD in Germany: 1) individual doctorates and 2) structured PhD Programmes.

- 1) Individual doctorate is the most common way to get a PhD in Germany. PhD Students have one supervisor and do their research at a university/ university of applied sciences, in a non-university research organization or in a company.
- 2) In Structured PhD programmes a group of supervisors look after a group of students. They are structured study programmes with Credit Points and often with fixed curricula. There are three types of structured PhD Programmes:



- a. Doctoral Programmes (at universities) (Promotionsstudiengang): similar to Bachelor and Master programmes, subject-specific,
- b. Research Training Groups (Graduiertenkolleg): small group of PhD Students doing research to a (the same) specific topic
- c. Graduate Schools (Gaduiertenschulen): large group of (international) PhD Students from various disciplines doing research to a greater complex of topics

## ACCREDITATION PROCESS

Accreditation body	Accreditation Council of the TU Dresden (system accreditation). Only structured PhD Programmes (no individual doctorates) are subject to accreditation procedures and not every accreditation agency offers the accreditation of these programmes.
Accreditation process	Automatic accreditation every 5 to 8 years, review of state and university requirements, issuance of conditions and recommendations as appropriate.  Some of the accreditation criteria are: <ul style="list-style-type: none"> <li>• Objectives of the programme</li> <li>• Infrastructure and organization</li> <li>• Supervision</li> <li>• Content of the programme</li> <li>• Quality Assurance</li> </ul>
Needed documents	Diploma, Master or Magister degree of a certified university or state exam or a Bachelor degree in a similar field. Diplomas of degrees, overview of grades of bachelor and master degree, in some cases the high school diploma, supervisor agreement with professor
Other constraints	Degree and Master thesis must completed with at least a 2,0; Bachelor Degree with 1,0... 1,3; "Personal requirements of conduct" for the candidate, meaning that they do not have police record; They have not failed a doctorate twice; If a candidate has not completed a degree in transportation sciences or similar field or has not achieved the grades, additional exams of at least 15 ECTS must be completed by the candidate with at least 2,0 (good), foreign grades will be translated by the university
Requirements	Committee of professors of faculty Coordinator, full professor

## JOINT DOCTORATE

Description	For a joint dissertation, the regulations for starting a dissertation must be compared and a joint agreement between universities must be reached. This can be done either on an individual basis or through a larger cooperation
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	agreement/contract between universities. These larger agreements can take several months. The student must be a doctoral student at one university, so these documents are needed. Otherwise only an agreement is needed between universities.
Accreditation body	Accreditation Council of the TU Dresden (system accreditation)
Accreditation process	Universities are allowed to accredit themselves based on certification from the German accreditation council. The automatic accreditation is done every 5 to 8 years. For a joint dissertation, the regulations for starting a dissertation must be compared and a joint agreement between universities must be reached. This can be done either on an individual basis or through a larger cooperation agreement/contract between universities. These larger agreements can take several months.
Needed documents	The student must be a doctoral student at one university, so these documents are needed. Otherwise only an agreement is needed between universities
Other constraints	Must be handed in 14 days before next convention of committee of professors

## JOINT CURRICULA

Activation process	Same as joint doctorate
Needed documents	Same as joint doctorate
Requirements	Same as joint doctorate

## INDUSTRIAL DOCTORATE/DUAL SYSTEM

Description	Industrial doctorates are possible in form of individual doctorates as well as PhD Programmes. It's a (individual) cooperation between universities and companies. The PhD Students have contracts with the companies and the programme requirements (or requirements for the individual doctorate) depend on the Doctoral Regulations of the faculty. Most of the German Doctoral Regulations allow Industrial Doctorates. Further there is an agreement between the supervisors, the company and the university.
Activation process	Agreement reached with the supervisor, the university and the company.
Needed documents	Largely the same as the with the normal PhD. Additionally with an agreement between the company and the university and the student

Requirements	Same as the PhD, with a supervision agreement between the university, the company and the student, with the two supervisors assigned in the agreement
Cost for the enterprise	Costs for the use of university facilities (depends on the university), wages for the student (dependent on the company contract)

## CO-TUTORING

Activation process	Same as joint doctorate
Needed documents	Same as joint doctorate
Requirements	Compatibility and equivalence of the two programmes must be checked, the time spent at each organisation must be checked on.
Entry requirements for PhD students	Same as PhD requirements

## VISITING PHD STUDENTS

Agreement process	It's a fast, individual and flexible procedure. It requires agreements of faculty, institute and professor as well as an agreement of supervision by the host institute, Online registration, agreement of Faculty, Institute and Professor
Needed documents	Agreement of supervision by the host institute, immatriculation certificate of home university, transcript of records, master degree, if needed translated into German or English, Copy of passport or ID
Other requirements/constraints	Period of 1 to 2 semesters

## GERMANY – EQF LEVEL 7

### PROGRAMME REQUIREMENTS

University	Technische Universität Dresden	University of Applied Sciences Erfurt
Country	Germany	Germany
EQF level	7	7
Type of Programme	Master of Science degree, Engineering	Master of Science degree
Legislation	SächsHSFG vom 15. Januar 2013	HRG §9(2), §19, §72 (Higher Education Framework Act) and Resolution of the Standing Conference of the Ministers of

		Education and Cultural Affairs from 10.10.2003
ECTS	120	120
Duration (years)	2	2
Classification of degree	Level 2: Master level // EQF 7	degree class
Grade scale for graduation	1,0 (best) ... 4,0 (passed) ... 5,0 (failed)	1,0 - 5,0
Grade scale for a single course within the programme	1,0 (best) ... 4,0 (passed) ... 5,0 (failed)	1,0 - 5,0
Entry requirements (needed study title)	Admission to the Master's program in Railway Systems Engineering is open to students who have a first university degree in an engineering field (civil engineering, industrial engineering, traffic engineering, mechanical engineering, electrical engineering or computer science), in a natural science field (physics, mathematics, geography or geodesy), in transport economics or another university degree in a course of study with comparable previous knowledge or a degree from a state or state-recognized university of cooperative education in one of the above-mentioned fields. in one of the above-mentioned fields. The examination board decides on the equivalence of degrees.	In general: Bachelor's degree or ; M.Sc. Traffic and Transport (regular programme): Bachelor's degree (in Engineering, Industrial Engineering/Business Administration and Engineering) (final mark: 2,5 or better) or Bachelor's degree > 2,5 + special approval procedure; M.Sc. European Railway Systems (part-time continuing education): 1) Bachelor's degree or master craftsman's examination or state-certified technician/state-certified business economist AND 2) at least 2 years of occupational experience
Language requirement	German B1	no

## FLEXIBILITY IN CHANGING THE PROGRAMME

	Technische Universität Dresden	University of Applied Sciences Erfurt
New courses within the degree programme	Elective courses of the programme immediately; Mandatory module with 2 years lead time	Elective courses of the programme
Changes in the title and content within the degree programme	with 2 to 3 years lead time	all the courses of the programme
Needed documents	Module description, description of program objectives (if applicable).	content description (+programme specific regulations), course title, programme specific regulations (if necessary)
Time constraints	Elective courses immediately; Mandatory modules with 2 years lead time	In advance with respect to the beginning of the academic year

Besides the reaccreditation process (every 6 or 8 years) there is the possibility of making (non-substantial) changes in existing programmes:

- adding new elective courses within existing programmes
- changes in titles and content of existing courses and modules (according to the scientific state-of-the-art and within in the framework of the degree programme objectives)
- changes/adjustments of the ECTS-system (without changing the total score)

Needed documents for these changes are:

- course title
- content description of the course
- programme specific regulations (if necessary)

## ACCREDITATION PROCESS

	Technische Universität Dresden	University of Applied Sciences Erfurt
Accreditation body	Accreditation Council of the TU Dresden (system accreditation)	Review process and preparation of accreditation report by accreditation agencies (i.e., ACQUIN), decision on accreditation by accreditation council
Accreditation process	Automatic accreditation every 5 to 8 years, review of state and university requirements, issuance of conditions and recommendations as appropriate.	Submission of self-assessment in May (previous year); inspection and assessment by accreditation agency in December (previous year); remedy of shortcomings until February; accreditation by accreditation council until June --> request for accreditation at accreditation council: 12 weeks prior to accreditation council meeting (4 meeting each year)
Needed documents	Study documents and module descriptions	Concept/profile of the programme + self-assessment
Relevant legislation	§22 SächsStudAkkVO ( <a href="https://www.revosax.sachsen.de/vorschrift/18231#x25">https://www.revosax.sachsen.de/vorschrift/18231#x25</a> )	Treaty on the on the organisation of a joint accreditation system for quality assurance in teaching and learning at German universities, model law ordinance of 07.12.2017 and the law on the foundation accreditation council (accreditation council law), State Treaty on the Accreditation of Studies
Other requirements/constraints	Requirements for teaching content, teaching quality, examinations and marginal conditions of the study program	Formal criteria: structure and duration; type of profile; entry requirements; type of degree; modules and ECTS-system; subject and content related criteria: resources requirements; quality requirements; teacher requirements/qualifications;

The accreditation process is defined by the State Treaty on the Accreditation of Studies/ Decree of the Standing Conference of the Ministers of Education and Cultural Affairs from 01.01.2018. The legal foundation for the German accreditation system is constituted by the State Treaty on the Organisation of a Joint Accreditation System for Quality Assurance in Teaching and Learning at German Universities, the Model Law Ordinance of 07.12.2017 and the Law on the Foundation Accreditation Council (Accreditation Council Law) and federal legislation (Framework Acts for Higher Education and Decrees on the accreditation of studies)

There are two types of accreditation procedures: 1) Programme Accreditation and 2) System Accreditation, which are divided/defined by the type of review process (external (1) and internal (2)). The official accreditation body for both procedures is the Foundation accreditation council.

1) Programme Accreditation:

Review process of the individual degree program by an (certified) accreditation agency. Decision on accreditation of individual study programme by accreditation council (6- or 8-year-cycles). For the accreditation of the degree programmes necessary documents (to hand in at the accreditation council) are the self-assessment (considering the criteria defined by the accreditation council/ Model Law Ordinance) of the programme/university and the accreditation report by a certified accreditation agency.

2) System Accreditation:

Accreditation of the quality management system (QMS) and internal processes (for developing study programmes) of a university. Review process by external experts and internal accreditation board. Decision on accreditation of individual degree programmes only by the internal accreditation board of the university, considering the criteria defined by the accreditation council/ Model Law Ordinance (6- or 8-year-cycles). Decision on accreditation of the QMS of a university by accreditation council (6- or 8-year-cycles).

For programme accreditation the accreditation request must be submitted at least 12 weeks before the meeting of the accreditation council, the council has four meetings per year (March, June, September, December). Universities with system accreditation have internal deadlines.

Criteria for degree courses, defined in part 2 (formal criteria) and part 3 (subject and content related criteria) of the Model Law Ordinance (07.12.2017), are:

- formal criteria:
  - structure and duration
  - type of profile
  - entry requirements
  - type of degree
  - modules and ECTS-system
- subject and content related criteria:

- resources requirements
- quality requirements
- teacher requirements/qualifications
- concept/vision of the project

## JOINT DEGREE/ INTERNATIONAL COURSE

	Technische Universität Dresden	University of Applied Sciences Erfurt
Joint Degree	yes	unique degree issued by all cooperating universities (2 or more)
International Course	All the students will receive the joint degree at the end of the course	
Accreditation body	Accrediting bodies of the individual Universities	accreditation bodies of the cooperating countries/universities
Accreditation process	Accreditation of all universities are needed.	The programme must obtain accreditation from all cooperating universities/countries.
Needed documents	Joint degree Programme	Joint Degree Programme
Relevant legislation		Model Law Ordinance (MRVO) (§§ 10, 16, 33)
Other constraints	In this particular programme, the first three semesters are to be spent consecutively at each of the other universities.	25% study time abroad

A Joint-Degree-Programme is Programme, which is coordinated and offered by a domestic university together with one or more foreign universities. All students will receive one joint degree. Relevant legislation for joint, double and multiple degrees is the Model Law Ordinance (MRVO) (§§ 10, 16, 33) Furthermore, it has the following criteria (cf. Model Law Ordinance):

- integrated curriculum
- study time abroad – at least 25 %
- contractually regulated cooperation, must contain:
  - **definition/title of the degree**
  - **coordination and responsibilities of the partners with regard to management and financial organization**

- **admission and selection procedures**
  - **mobility of students and teachers**
  - **examination regulations**
  - **involvement of all cooperating institutions in the implementation of the programme**
- concerted/coordinated admission and examination system
  - common Quality Assurance

In addition, the participating universities have to be recognized as higher education institutions by the authorities of their states and the national legal frameworks have to allow the participation in joint degree programmes and the granting of joint degrees.

It's a complex procedure regarding the high level of cooperation between the participating universities as well as the accreditation process in both Countries including different types of accreditation. The Mode Law Ordinance allows/provides the opportunity to use the European Approach for Quality Assurance of Joint Programmes, which means that the accreditation council approves the review of a foreign (EQAR-listed) agency (instead of the normal procedure).

## DOUBLE DEGREE

	Technische Universität Dresden	University of Applied Sciences Erfurt
Double Degree	Double Degrees are agreements between two universities, where students have the possibility to study abroad and receive two Degrees, one for each university. These are individual agreements between the universities. Double degree programmes are encouraged. None currently available.	
Activation process	Agreement on study concept, cooperation agreement between the universities necessary, numerous agreements on enrolment, examination law, etc. necessary.	
Needed documents	Individual course concepts of both universities, overall concept, agreement between the universities, tables for the recognition of courses/ECTS, table for the conversion of grades	
Relevant legislation		
Entry requirements	General university entrance qualification, language requirements, subject knowledge to be defined in advance, other requirements agreed between the universities.	



## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

	Technische Universität Dresden	University of Applied Sciences Erfurt
Erasmus Agreement process (internal deadlines)	Finalize an agreement and apply by June 15 (Jan. 15) to start Oct. 1 (Apr. 1). <a href="https://tu-dresden.de/studium/vor-dem-studium/internationales/austauschprogramm">https://tu-dresden.de/studium/vor-dem-studium/internationales/austauschprogramm</a> e?set_language=en	Application 9 months prior to departure
Needed documents	Study plan confirmed by the home university, transcript of records, certificate of enrolment from the home university, proof of the required language skills, copy of passport	Application Form/ Learning Agreement
Relevant legislation	ERASMUS Framework	Standard ERASMUS+ Documents
Other requirements/constraints	–	Confirmation of relevant department
Entry requirements for students	German B1, enrollment at a university, subject knowledge to be defined in advance	Working Language Certificate

## ERASMUS TRAINEESHIP ABROAD

	Technische Universität Dresden	University of Applied Sciences Erfurt
Erasmus Agreement process (internal deadlines)	Application to ERASMUS coordinator by 28.02., review and forwarding, acceptance by May, start in October.	Application with Consortium 4-5 months prior to departure
mandatory or optional	Optional	Optional
Procedure for traineeship activation	Agreement with foreign Company or University (Erasmus agreement)	Agreement with relevant department
Needed documents	Erasmus agreement, Application letter, Proof of previous studies, Curriculum vitae, proof of language skills	Application Form/ Training Agreement
Relevant legislation	ERASMUS Framework	Standard ERASMUS+ documents
Entry requirements for students	Proof of previous studies, proof of language skills	Working Language Certificate

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	Currently no possibility. Certificate programmes planned.
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## GERMANY– EQF LEVEL 6

### PROGRAMME REQUIREMENTS

University	University of Applied Sciences Erfurt
Country	Germany
EQF level	6
Type of Programme	Bachelor Degree (B.Eng)
Legislation	HRG §9(2), §19, §72 (Higher Education Framework Act) + Resolution of the Standing Conference of the Ministers of Education and Cultural Affairs from 10.10.2003
ECTS	180
Duration (years)	3 (4)
Classification of degree	Degree class
Grade scale for graduation	1,0 - 5,0
Grade scale for single course within the programme	1,0 - 5,0
Entry requirements (needed study title)	General university entrance qualification (high school certificate) OR subject-specific university entrance qualification (from specialized high schools, vocational colleges or academies etc.) OR entrance qualification for studying at a university of applied sciences (completion of one or two years at a technical college) OR master craftsman's examination OR state-certified technician/state-certified business economist
Language requirement	no

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme
Needed documents	Content description (+programme specific regulations), course title, programme specific regulations (if necessary)
Time constraints	In advance with respect to the beginning of the academic year

Besides the reaccreditation process (every 6 or 8 years) there is the possibility of making (non-substantial) changes in existing programmes:

- adding new elective courses within existing programmes
- changes in titles and content of existing courses and modules (according to the scientific state-of-the-art and within in the framework of the degree programme objectives)
- changes/adjustments of the ECTS-system (without changing the total score)

Needed documents for these changes are:

- course title
- content description of the course

- programme specific regulations (if necessary)

## ACCREDITATION PROCESS

Accreditation body	Review process and preparation of accreditation report by accreditation agencies (i.e. ACQUIN), decision on accreditation by accreditation council
Accreditation process	Submission of self-assessment in May (previous year); inspection and assessment by accreditation agency in December (previous year); remedy of shortcomings until February; accreditation by accreditation council until June --> request for accreditation at accreditation council: 12 weeks prior to accreditation council meeting (4 meeting each year)
Needed documents	Concept/profile of the programme + self-assessment
Relevant legislation	Treaty on the on the organisation of a joint accreditation system for quality assurance in teaching and learning at German universities, model law ordinance of 07.12.2017 and the law on the foundation accreditation council (accreditation council law), State Treaty on the Accreditation of Studies
Other requirements/constraints	formal criteria: structure and duration; type of profile; entry requirements; type of degree; modules and ECTS-system; subject and content related criteria: resources requirements; quality requirements; teacher requirements/qualifications;

The accreditation process is defined by the State Treaty on the Accreditation of Studies/ Decree of the Standing Conference of the Ministers of Education and Cultural Affairs from 01.01.2018. The legal foundation for the German accreditation system is constituted by the State Treaty on the Organisation of a Joint Accreditation System for Quality Assurance in Teaching and Learning at German Universities, the Model Law Ordinance of 07.12.2017 and the Law on the foundation Accreditation Council (Accreditation Council Law) and federal legislation (Framework Acts for Higher Education and Decrees on the accreditation of studies)

There are two types of accreditation procedures: 1) Programme Accreditation and 2) System Accreditation, which are divided/defined by the type of review process (external (1) and internal (2)). The official accreditation body for both procedures is the Foundation accreditation council.

### 1) Programme Accreditation:

Review process of the individual degree program by an (certified) accreditation agency. Decision on accreditation of individual study programme by accreditation council (6- or 8-year-cycles). For the accreditation of the degree programmes necessary documents (to hand in at the accreditation council) are the self-assessment (considering the criteria defined by the accreditation council/ Model Law Ordinance) of the programme/university and the accreditation report by a certified accreditation agency.

### 2) System Accreditation:

Accreditation of the quality management system (QMS) and internal processes (for developing study programmes) of a university. Review process by external experts and internal accreditation board. Decision on accreditation of individual degree programmes only by the internal accreditation board of the university, considering the criteria defined by the accreditation council/ Model Law Ordinance (6- or 8-year-cycles). Decision on accreditation of the QMS of a university by accreditation council (6- or 8-year-cycles).

For programme accreditation the accreditation request must be submitted at least 12 weeks before the meeting of the accreditation council, the council has four meetings per year (March, June, September, December). Universities with system accreditation have internal deadlines.

Criteria for degree courses, defined in part 2 (formal criteria) and part 3 (subject and content related criteria) of the Model Law Ordinance (07.12.217), are:

- formal criteria:
  - structure and duration
  - type of profile
  - entry requirements
  - type of degree
  - modules and ECTS-system
- subject and content related criteria:
  - resources requirements
  - quality requirements
  - teacher requirements/qualifications
  - concept/vision of the project

## JOINT DEGREE/ INTERNATIONAL COURSE

	Technische Universität Dresden	University of Applied Sciences Erfurt
Joint Degree	yes	Unique degree issued by all cooperating universities (2 or more)
International Course	All the students will receive the joint degree at the end of the course	
Accreditation body	Accrediting bodies of the individual Universities	Accreditation bodies of the cooperating countries/universities
Accreditation process	Accreditation of all universities are needed.	The programme must obtain accreditation from all cooperating universities/countries.
Needed documents	Joint degree Programme	Joint Degree Programme
Relevant legislation		Model Law Ordinance (MRVO) (§§ 10, 16, 33)

Other constraints	In this particular programme, the first three semesters are to be spent consecutively at each of the other universities.	25% study time abroad
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A **Joint-Degree-Programme** is Programme, which is coordinated and offered by a domestic university together with one or more foreign universities. All students will receive one joint degree. Relevant legislation for joint, double and multiple degrees is the Model Law Ordinance (MRVO) (§§ 10, 16, 33) Furthermore, it has the following criteria (cf. Model Law Ordinance):

- integrated curriculum
- study time abroad – at least 25 %
- contractually regulated cooperation, must contain:
  - o definition/title of the degree
  - o coordination and responsibilities of the partners with regard to management and financial organization
  - o admission and selection procedures
  - o mobility of students and teachers
  - o examination regulations
  - o involvement of all cooperating institutions in the implementation of the programme
- concerted/coordinated admission and examination system
- common Quality Assurance

In addition, the participating universities have to be recognized as higher education institutions by the authorities of their states and the national legal frameworks have to allow the participation in joint degree programmes and the granting of joint degrees.

It's a complex procedure regarding the high level of cooperation between the participating universities as well as the accreditation process in both Countries including different types of accreditation. The Model Law Ordinance allows/provides the opportunity to use the European Approach for Quality Assurance of Joint Programmes, which means that the accreditation council approves the review of a foreign (EQAR-listed) agency (instead of the normal procedure).

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Application 9 months prior to departure
Needed documents	Application Form/ Learning Agreement
Relevant legislation	Standard ERASMUS+ Documents
Other requirements/constraints	Confirmation of relevant department

Entry requirements for students	Working Language Certificate
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## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Application with Consortium 4-5 months prior to departure
mandatory or optional	Optional
Procedure for traineeship activation	Agreement with relevant department
Needed documents	Application Form/ Training Agreement
Relevant legislation	Standard ERASMUS+ documents
Entry requirements for students	Working Language Certificate

## DUAL SYSTEM/ APPRENTICESHIP

There is the possibility for students to do their Bachelor Degree in a dual system at Universities of Applied Sciences. Usually this type of study programme includes alternating study stages at the university and practical stages in a company. Students in dual system need a contract with a company (practice partner).

Mandatory or possible	2 options for dual system possible (not mandatory): 1) practice-integrated - 3-year-bachelor with practical stages, degree: B.Eng; 2) VET/training-integrated - 4-year-programme including vocational training (2 years), degrees: 1) railroader/railworker in operational service, specialized in tracks (VET) 2) B.Eng.
Apprenticeship abroad (Mandatory or optional)	Possible internship abroad
Procedure for apprenticeship/dual system activation	Employment by practice partner and fulfilment of formal study requirements
Procedure for apprenticeship/dual system activation abroad	Only for apprenticeship abroad --> individual agreements
Needed documents	Programme specific regulations
Relevant legislation	
Other requirements/constraints	Numerous clauses

## GERMANY – EQF LEVEL 5

### PROGRAMME REQUIREMENTS

Country	Germany
EQF level	5
Type of Programme	Professional development qualification
Legislation	Vocational Training Act (BbIG) - Conference of Ministers of Education - German Qualifications Framework (DQR) for lifelong learning

Duration (years)	Different for each qualification
Classification of diploma	Proof of Qualification/Certificate
Grade scale for the final exam/evaluation	1 (very good) - 5 (insufficient)
Entry requirements (needed study title)	Admission requirements are a successfully completed final or skilled worker examination in a recognized training occupation
Language requirement	German: Level B 2

## FLEXIBILITY IN CHANGING THE PROGRAMME

Adding a new course	Flexibility given due to specific advanced training qualifications – it is possible adding a new course
Changes in contents/subjects within an existing programme	Possible

## TRAINEESHIP

Traineeship (Mandatory or optional)	Specific to each advanced training qualification
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## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	Specific to each advanced training qualification
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## STUDENTS MOBILITY

Mandatory or possible	Specific to each advanced training qualification
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## GERMANY – EQF LEVEL 3-4

### PROGRAMME REQUIREMENTS

Country	Germany
EQF level	3 and 4
Type of Programme	Dual vocational training
Legislation	Vocational Training Act (BBiG) - Conference of Ministers of Education - German Qualifications Framework (DQR) for lifelong learning
Duration (years)	Level 3: 2 years / Level 4: 3 to 3 1/2 years
Classification of diploma	Examination before the Chamber of Industry and Commerce (IHK) or Chamber of Crafts (HWK)
Grade scale for the final exam/evaluation	1 (very good) - 5 (insufficient)
Entry requirements (needed study title)	General compulsory schooling of nine or ten full-time school years
Language requirement	German: Level B 2

## FLEXIBILITY IN CHANGING THE PROGRAMME

Adding a new course	Only possible via legislative procedures within the framework of a reorganization - binding training regulation
Changes in contents/subjects within an existing programme	Not possible

## TRAINEESHIP

Traineeship (Mandatory or optional)	Structurally specified practical assignments in the training companies (dual training)
Traineeship abroad (Mandatory or optional)	Not provided
Procedure for traineeship activation	According to the training plan
Procedure for traineeship activation abroad	Not provided
Needed documents	Structurally specified practical assignments in the training companies (dual training)
Relevant legislation	Not provided

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	<p>Compulsory (company and vocational school). In Germany, training in the dual system, i.e. training in companies and in the Berufsschule (part-time vocational school), has a leading role. This form of training is complemented by a range of school based forms of vocational training.</p> <p>Access to many occupational fields is achieved through dual vocational education and training where other countries require education at a higher education institution. This means that the share of higher education graduates in the workforce is lower in Germany compared to other European countries. For that reason, further training qualifications such as Meister (master craftsman) and Techniker (technician) are comparatively more important. Individuals with these further training qualifications – like academics – are regarded as highly qualified workers and make up 10 per cent of the overall working population. Basic and further vocational education and training are closely interlinked and build upon each other.</p> <p>For more detailed information see the German EQF Referencing Report,  <a href="https://www.dqr.de/dqr/shareddocs/downloads/medi a/content/german_eqf_referencing_report.pdf?_blo b=publicationFile&amp;v=1">https://www.dqr.de/dqr/shareddocs/downloads/medi a/content/german_eqf_referencing_report.pdf?_blo b=publicationFile&amp;v=1</a></p>
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Apprenticeship abroad (Mandatory or optional)	Optional
Procedure for apprenticeship/dual system activation	Company and vocational school
Procedure for apprenticeship/dual system activation abroad	Optional

## 6.5 GREECE

### GREECE – EQF LEVEL 8

#### PROGRAMME REQUIREMENTS

University	Aristotle University of Thessaloniki
Country	Greece
EQF level	8
Type of Programme	Doctorate
Legislation	DECREE 14 December 2021 , n. 226
ECTS	
Duration (years)	Minimum of 3 years- Maximum 6+2
Language requirement	B2 in at least one foreign language

#### ACCREDITATION PROCESS

Accreditation body	Vacant slots and topics are issued by the Universities as indicated in their PHD regulations handbook
Accreditation process	Any vacant slots regard a specific department and are issued through press and internet. Entry requirements, deadlines, etc. are specifically stated.
Needed documents	
Relevant legislation	
Other requirements/constraints	A coordinator (supervising Professor) A supervisory board of 3 people and A supervisory board of 7 people

#### JOINT DOCTORATE

Accreditation body	University Senate/ Ministry of Education, Lifelong Learning and Religious Affairs
Accreditation process	In the case of already accredited foreign institutions, the process is based on the associated memorandum of cooperation between the two institutions and approved by the Senate of the university that holds the administrative responsibility. One supervisor from each university is appointed. In the case of non-accredited institutions an approval by the Minister is

	required and published in the Official Government Gazette.
Needed documents	Memorandum of cooperation between institutions. List of Erasmus+ memorandums is given at ( <a href="https://eurep.auth.gr/el/agreementsform/viewall">https://eurep.auth.gr/el/agreementsform/viewall</a> )
Other constraints	Typical entry requirement

## INDUSTRIAL DOCTORATE/DUAL SYSTEM

Activation process	Requires memorandum of cooperation between the Educational Institution and the Industrial partner that is approved by the Senate of Educational Institution. The memorandum is required to detail the terms of the partnership, the rights of each involved party (including intellectual rights).
Needed documents	Memorandum of Cooperation, Senate approval
Requirements	1 Industrial and 1 Academic Supervisor (If the Industrial supervisor holds a PhD they are part of the 3 person supervisory board, otherwise the attend board meeting in an advisory capacity and without voting rights). The student must be insured with the National Social Security Body (EFKA). This burdens the industrial partner unless the PhD is funded through a research grand by the university.
Cost for the enterprise	PhD candidate insurance in cases where a research grand is not in effect. Any other costs as otherwise stated in the memorandum.

## CO-TUTORING

Activation process	Decision of the Department Assembly
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## VISITING PHD STUDENTS

Agreement process	Within the ERASMUS process, Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. In AUTH invitations are typically in February and regard the following academic year.
Needed documents	Academic ID, CV, Motivational Letter, Copy of Language Certificates, Detailed Records of Bachelor Degree Grades, Detailed Records of Master Degree Grade, Disability Certificate (when applicable)

## GREECE – EQF LEVEL 7

### PROGRAMME REQUIREMENTS

University	Aristotle University of Thessaloniki
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Country	Greece
EQF level	7
Type of Programme	Master of Science/Master of Arts
Legislation	(Law 4926/2022 O.G.G 82/A/20-4-2022);(Law 4485/2017 O.G.G. 114/A/4-8-2017)
ECTS	Minimum of 60 ECTS points
Duration (years)	Typically one or two years
Classification of degree	Post-Graduate-Diploma
Grade scale for graduation	10 points scale
Grade scale for a single course within the programme	10 points scale
Entry requirements (needed study title)	Typically a bachelor degree in a relevant subject (Must be by an institution accredited by the Hellenic National Academic Recognition and Information Center)
Language requirement	B2 in a foreign language or as indicated in the particular programme

## ACCREDITATION PROCESS

Accreditation body	Created with a decision (majority vote) by the Senate of the university, after a proposal by the department assembly.
Accreditation process	
Needed documents	Proposal, Cost Benefit Analysis, Detailed Budget for the first 5 consecutive years (format is indicated by the Ministry), report of the hosting Department regarding housing and equipment, 1/3 of the hosting department indicating high standards and giving approval, proposal by the Department Assembly to the University Senate
Relevant legislation	(Law 4485/2017 O.G.G. 114/A/4-8-2017)
Other requirements/constraints	The aforementioned documents are communicated to the Minister of Education, who is required to give approval

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	In the case of already accredited foreign institutions, the process is based on the associated memorandum of cooperation between the two institutions and approved by the Senate of the university that holds the administrative responsibility. In the case of non-accredited institutions an approval by the Minister is required and published in the Official Government Gazette.
International Course	
Accreditation body	University Senate/ Ministry of Education, Lifelong Learning and Religious Affairs

Accreditation process	As normal plus in the case of non-accredited institutions In the case of an approval by the Minister is required and published in the Official Government Gazette.
Needed documents	As normal plus memorandum of cooperation
Relevant legislation	(Law 4485/2017 O.G.G. 114/A/4-8-2017)
Other constraints	The aforementioned documents are communicated to the Minister of Education, who is required to give approval.

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. In AUTH invitations are typically in February and regard the following academic year.
Needed documents	Academic ID, CV, Motivational Letter, Copy of Language Certificates, Detailed Records of Bachelor Degree Grades, Disability Certificate (when applicable)
Relevant legislation	ERASMUS Framework
Other requirements/constraints	
Entry requirements for students	Mainly Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. In AUTH invitations are typically in May and regard the following academic year.
mandatory or optional	Optional
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Academic ID, Letter of Acceptance by Employer, CV, Motivational Letter, Copy of Language Certificates, Letter of Recommendation by Teaching Staff, Detailed Records of Bachelor Degree Grades, Disability Certificate (when applicable)
Relevant legislation	ERASMUS Framework
Entry requirements for students	Mainly Linguistic

## GREECE – EQF LEVEL 6

### PROGRAMME REQUIREMENTS

University	Aristotle University of Thessaloniki
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Country	Greece
EQF level	6
Type of Programme	Bachelor Degree (or Combined Master)
Legislation	(Law 4926/2022 O.G.G 82/A/20-4-2022);(Law 4485/2017 O.G.G. 114/A/4-8-2017)
ECTS	Dependent on programme type and duration
Duration (years)	3 or 4 years (5 years for combined masters/5 or 6 years for specific departments)
Classification of degree	Diploma (Bachelor or Combined Master) (e.g. Civil Engineering is given only as a combined master programme)
Grade scale for graduation	10 points scale
Grade scale for single course within the programme	10 points scale
Entry requirements (needed study title)	High School Diploma (or Equivalent) Entry is typically given based on scores in the Panhelleninc Examinations which are held at the end of the last year of High School
Language requirement	Typically Programmes are taught in Greek

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Requires majority approval by the Department Assembly
Time constraints	New courses are long and difficult process

### ACCREDITATION PROCESS

Accreditation process	Extremely long process that requires approval by the ministry at multiple points
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### JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both universities – a difficult process
International Course	All the students will receive the joint degree at the end of the Programme

### DOUBLE DEGREE

Double Degree	Typically does not exist unless joint with an international course
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## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. In AUTH invitations are typically in February and regard the following academic year.
Needed documents	Academic ID, CV, Motivational Letter, Copy of Language Certificates, Disability Certificate (when applicable)
Relevant legislation	ERASMUS Framework
Other requirements/constraints	
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. In AUTH invitations are typically in May and regard the following academic year.
mandatory or optional	Optional
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Academic ID, Letter of Acceptance by Employer, CV, Motivational Letter, Copy of Language Certificates, Letter of Recommendation by Teaching Staff, Disability Certificate (when applicable)
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## GREECE – EQF LEVEL 3-4

### PROGRAMME REQUIREMENTS

Country	Greece
EQF level	3-4
Type of Programme	Vocational Training

## FLEXIBILITY IN CHANGING THE PROGRAMME

Adding a new course	The course structure in Greece is rigid. New courses may only be introduced as extracurricular activities.
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Accreditation process	An application must be made by the following: -In the case of a single school, the Director of the school unit. -In the case of multiple schools in a single jurisdiction by the Education Directorate -In the case of multiple schools in multiple jurisdictions by the Regional Education Directorate -
Needed documents	The following material is attached to the applications: -Filled out a standardized form -Programme description -Standardized CV of all people involved (both in the design and execution of the course) -A formal declaration that if approved the course will be conducted in the year for which it was approved.
Other requirements/constraints	The duration of the course is a maximum of 4 academic hours (may be extended to six). It appears the permission for multiple programmes by a single entity could be proposed (but this requires clarification).

## 6.6 ITALY

### ITALY – EQF LEVEL 8

#### PROGRAMME REQUIREMENTS

University	University of Genoa
Country	Italy
EQF level	8
Type of Programme	Doctorate
Legislation	DECREE 14 December 2021, n. 226
ECTS	180 of which for example: At least 30 from courses, Maximum 40 from research period abroad, at least 100 from thesis activities
Duration (years)	3
Language requirement	English B2

#### ACCREDITATION PROCESS

Accreditation body	MUR and ANVUR
Accreditation process	Approval from MUR and ANVUR also for new curricula
Needed documents	Analysis of the course sustainability and the available study grants The definition of research topics, teaching objectives and occupational profiles

Other constraints	European Higher Education Area (EHEA) Standard for quality assurance
Requirements	Board of at least 12 members composed by full professors, associate professors and researchers A coordinator (full professor)

## JOINT DOCTORATE

Accreditation body	MUR and ANVUR
Accreditation process	Long process of approval from MUR and ANVUR
Needed documents	Agreement between the involved entities, Definition of the activities organisation, period spent at the different university, number of grants
Other constraints	Deadline each year in spring

## JOINT CURRICULA

Activation process	Request that can be done also by existing PhD Programmes
Needed documents	Agreement between the involved entities
Requirements	Definition of the activity organisation, time period spent at the different universities

## INDUSTRIAL DOCTORATE/DUAL SYSTEM

Activation process	PhD student position for Company staff member. Request that can be done also within an existing PhD Programmes - fast procedure - Approval from the Teacher Board and from the Department Board
Needed documents	Agreement between the involved entities. Possible agreement also with foreign companies - Agreement Template available
Requirements	Definition of the research project, training plan, number of employees, exploitation of the results - financing by the enterprise - Call for applications dedicated to high qualified employees of the company - two tutors: an enterprise tutor and a university tutor
Cost for the enterprise	The Enterprise commits itself to pay the University an amount equal to 4.950 Euro, that is € 1.650 per year as budget for the research and vocational activities carried out in Italy and abroad (the amount equals 10 % of the total sum of the scholarship).



## CO-TUTORING

Activation process	Flexible procedure - Request that can be done in any moment of the year but before the end of the second year- Fast procedure: a couple of months are needed - approval by the Teaching Boards and the Departments and signature of the two Rectors
Needed documents	Agreement between the involved entities - Co-tutoring agreement template available - request before the end of the second year
Requirements	The Academic Board must check the compatibility and equivalence of the programmes of the two courses . Definition of the activity organisation, time period spent at the different universities: the period at each University cannot be shorter than six months - two advisors one for each university - only one thesis discussion -examining commission shall comprise an equal number of scientific representatives of both countries and will be jointly designated by both Universities and approved by both Rectors - The certificate awarded by each University will mention the other University at which the co-tutored activity will have been carried out.
Entry requirements for PhD students	The PhD student must have an equivalent degree and education level according to the entry requirements of the Italian PhD Course

## VISITING PHD STUDENTS

Agreement process	Fast and flexible procedure - approval by PhD Course Coordinator and Teachers Board
Needed documents	Invitation letter from the hosting university
Other requirements/constraints	Research period abroad of 3-5 months

## OTHER TYPES OF PROGRAMME

University	Sapienza University of Rome
Country	Italy
EQF level	8
Type of Programme	"Master di secondo livello" (Post Master Degree)
Legislation	Ministerial decree 22th October 2004 n. 270, n. 509; Law n. 341 of 19th November 1990
ECTS	60 of which for example: 48 from courses, 6 from an internship period, 6 from the final exam
Duration (years)	1 year
Language requirement	English B2
Entry requirements	Master of Science Degree
Internship	Mandatory (6 ECTS)
Internship abroad	Possible
Agreement with companies	Yes

Accreditation body	University
Accreditation process	Approval from Department, Faculty and University
Needed documents	"Ordinamento": the document which contains the teaching objectives, the subjects of the course, the registration fee and the didactic and logistic resources (teachers, classrooms, laboratories) for the preparation of the course
Relevant legislation	"Piano formativo": the document which contains information about the Didactic Board, the Secretary's office, the admission requirements and any scholarships offered by the partner companies of the course
Other requirements/constraints	Board of at least 5 members composed by full professors, associate professors and researchers A coordinator (full professor, associate professor or researcher)

## ITALY – EQF LEVEL 7

### PROGRAMME REQUIREMENTS

University	University of Genoa
Country	Italy
EQF level	7
Type of Programme	Master of Science degree
Legislation	DM 270/2004 L240/2010 (under Bologna Process umbrella)
ECTS	120
Duration (years)	2
Classification of degree	Degree class e.g. LM - 26
Grade scale for graduation	_/110
Grade scale for a single course within the programme	_/30
Entry requirements (needed study title)	1. possession of a bachelor's degree or master's degree, obtained at an Italian University or equivalent qualifications; 2. possession of at least 36 CFU ( equivalent to ECTS) or equivalent knowledge, acquired in any university degree course (bachelor's, master's, five-year master's, first and second level "Master Universitario") in the disciplinary-scientific sectors (SSD) indicated for the basic educational activities of the classes L-7, L-8, L-9; 3. possession of at least 45 CFU or equivalent knowledge, acquired in any university degree course (bachelor's, master's, five-year master's, first and second level "master universitario") in the SSD indicated for the educational activities characterising the classes L-7, L-8, L-9

Language requirement	English B2
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## FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme
Needed documents	Content short description - approval by the Board of the Programme
Time constraints	In advance with respect to the beginning of the academic year

## ACCREDITATION PROCESS

Accreditation body	Review process by CUN (National University Council)
Accreditation process	Submission of the accreditation request by 15 of January - Positive evaluation about the degree programme from CUN, requirements verification from ANVUR (ITALIAN NATIONAL AGENCY FOR THE EVALUATION OF UNIVERSITIES AND RESEARCH INSTITUTES)
Needed documents	Vision of the project and labour market analysis
Relevant legislation	Ministry Decree 987/2017 - DM 6/2019 - DM 1154 /14-10-2021 - Directorial Decree 2711/ 22-11-2021
Other requirements/constraints	REQUIREMENTS DEFINED IN THE ANNEX A OF Directorial Decree 2711/2021: Minimum number of ECTS per basic or characteristic scientific disciplinary sector; activation before the next academic year; Teaching requirements - number of teachers; Resources requirements; quality requirements

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both the universities - a difficult process
International Course	All the students will receive the joint degree at the end of the course
Accreditation body	CUN and ANVUR
Accreditation process	The Programme must obtain the accreditation from both the Countries. From the Italian side, the positive evaluation about the degree programme from CUN and the requirements verification from ANVUR are needed
Needed documents	Jointly defined degree programme
Relevant legislation	Directorial Decree 2711/ 22-11-2021
Other constraints	REQUIREMENTS DEFINED IN THE ANNEX A OF DM 2711/2021 The Degree Programme and Regulation are jointly defined - at least 30 ECTS abroad - at least 6 months spent abroad- the requirements of both the countries must be considered

## DOUBLE DEGREE

Double Degree	Two Degree certificates one for each university, it is an option for the interested students that want to spend a study period abroad
Activation process	More flexible procedure - No need for accreditation - available agreement template
Needed documents	Double degree agreement with a foreign university - the compatibility check of the two Programmes- agreed study plan - course/ECTS recognition tables- mark conversion table - number of students that can apply
Relevant legislation	Directorial Decree 2711/ 22-11-2021 (Table A)
Entry requirements	A) Hold a Laurea (undergraduate degree or bachelor) in _____, and have accomplished at least _____% of ECTS established in the first/second year of the Laurea Magistrale in _____ of the University B) Submit a certificate issued by Italian University confirming compliance with these requirements Students of both Parties are required to have an adequate knowledge of the _____/_____, that will be the main languages(s) used during lectures

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. Our internal deadlines: to present and sign the agreement May 22 for the academic year 22-23 and May 23 for the academic year 23-24; Call for student application in February each year; Period abroad usually starts in July
Needed documents	Standard Erasmus Agreement - course/ETCS recognition tables - Mark conversion Table
Relevant legislation	ERASMUS Framework
Other requirements/constraints	Number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. Our internal deadlines: to present and sign the agreement May 22 for the academic year 22-23 and May 23 for the academic year 23-24; Call for student application in February each year; Period abroad usually starts in July
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mandatory or optional	Optional for the students that apply - number of positions according to the available European funding
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	There is no dual system but there is the possibility for students to do internship during the last year of the course to prepare their thesis project
Apprenticeship abroad (Mandatory or optional)	Possible internship abroad

## ITALY – EQF LEVEL 6

### PROGRAMME REQUIREMENTS

University	University of Genoa
Country	Italy
EQF level	6
Type of Programme	Bachelor Degree
Legislation	DM 270/2004 (under Bologna Process umbrella)
ECTS	180
Duration (years)	3
Classification of degree	degree class
Grade scale for graduation	_/110
Grade scale for single course within the programme	_/30
Entry requirements (needed study title)	High school title
Language requirement	English B2

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme
Needed documents	Content short description - approval by the Board of the Programme
Time constraints	In advance with respect to the beginning of the academic year

## ACCREDITATION PROCESS

Accreditation body	Review process by CUN (National University Council)
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Accreditation process	Submission of the accreditation request by 15 of January - Positive evaluation about the degree programme from CUN, requirements verification from ANVUR (ITALIAN NATIONAL AGENCY FOR THE EVALUATION OF UNIVERSITIES AND RESEARCH INSTITUTES)
Needed documents	Vision of the project and labour market analysis
Relevant legislation	Ministry Decree 987/2017 - DM 6/2019 - DM 1154 /14-10-2021 - Directorial Decree 2711/ 22-11-2021
Other requirements/constraints	REQUIREMENTS DEFINED IN THE ANNEX A OF DM 2711/2021: Minimum number of ECTS per basic or characteristic scientific disciplinary sector; activation before the next academic year; Teaching requirements - number of teachers; Resources requirements; quality requirements

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both universities – a difficult process
International Course	All the students will receive the joint degree at the end of the Programme
Accreditation body	CUN and ANVUR
Accreditation process	The Programme must obtain the accreditation from both the Countries. From the Italian side, the positive evaluation about the degree programme from CUN and the requirements verification from ANVUR are needed
Needed documents	Jointly defined degree programme
Relevant legislation	Directorial Decree 2711/ 22-11-2021
Other constraints	REQUIREMENTS DEFINED IN THE ANNEX A OF Directorial Decree 2711/2021 The Degree Programme and Regulation are jointly defined - at least 30 ECTS abroad - at least 6 months spent abroad

## DOUBLE DEGREE

Double Degree	Two Degree certificates from two different universities, it is an option for the interested students
Activation process	more flexible procedure - form available
Needed documents	Double degree agreement with a foreign university - agreed study plan - course/ETCS recognition tables - mark conversion table - number of students that can apply
Relevant legislation	Directorial Decree 2711/ 22-11-2021

Entry requirements	At least twelve (12) years of education and must hold the document certifying they passed the qualifying examination (if needed) for the admission to a University course in the same or similar scientific area, of the afore-mentioned double Bachelor, in their home Country. Copy of the certification must be provided to the hosting Institution by the sending Institution/the student at the moment of the enrolment. Students of both Parties are required to have an adequate knowledge of the_____/_____, that will be the main languages(s) used during lectures
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## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. Our internal deadlines: to present and sign the agreement May 22 for the academic year 22-23 and May 23 for the academic year 23-24; Call for student application in February each year; Period abroad usually starts in July
Needed documents	Standard Erasmus Agreement - course/ETCS recognition tables - Mark conversion Table
Relevant legislation	ERASMUS Framework
Other requirements/constraints	number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries. Our internal deadlines: to present and sign the agreement May 22 for the academic year 22-23 and May 23 for the academic year 23-24; Call for student application in February each year; Period abroad usually starts in July
mandatory or optional	Optional for the students that apply - number of positions according to the available European funding
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	There is no dual system but there is the possibility for students to do an internship during the last year of the course to prepare their thesis project of within one year after the graduation
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Apprenticeship abroad (Mandatory or optional)	Possible internship abroad
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## ITALY – EQF LEVEL 3/4

### PROGRAMME REQUIREMENTS

Country	ITALY
EQF level	3-4
Type of Programme	Secondary school
Legislation	DM 270/2004 (under Bologna Process umbrella)
Duration (years)	5 years
Classification of diploma	Secondary school diploma
Grade scale for the final exam/evaluation	___/100
Entry requirements (needed study title)	Lower secondary certificate
Language requirement	Italian

### DUAL SYSTEM/APPRENTICESHIP

Traineeship (Mandatory or optional)	<p>The Italian “school-work alternance” has been introduced with the aim of improving young learners work-related skills.</p> <p>It starts with an agreement between school and companies; young applicants are students, not employees, and the school is responsible for the entire learning process.</p> <p>The Legislative Decree 107/2015 has reformed school-work alternance in secondary education, making it mandatory. The Italian Apprenticeship is a labour and training contract with a specific supporting legislation; it is located mainly in the labour market, with limited connections with the education system.</p>
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### EUROPEAN TRAIN DRIVERS LICENCE

Country	Italy
EQF level	4
Type of Programme	Vocational training: European Train drivers licence
Legislation	Decreto Legislativo 247/2010; Decreto ANSF 08/2011; DIRETTIVA 2014/82/UE; DM DEL MIT 26/06/2015- RECEPIMENTO DIRETTIVA 2014/88/UE; Decreto Legislativo n.50/2019
Duration (years)	20 days
Classification of diploma	Licence
Grade scale for the final exam/evaluation	xx/30
Entry requirements (needed study title)	"- The minimum age of 18 years; Applicants shall have successfully completed at least nine



	years' education (primary and secondary) and have successfully concluded basic training equivalent to level 3 referred to in Council Decision 85/368/EEC of 16 July 1985 on the comparability of vocational training qualifications between the Member States of the European Community; - Applicants shall provide confirmation of their physical fitness by passing a medical examination.
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## ACCREDITATION PROCESS

Accreditation body	ANSFISA - National Safety Agency
Accreditation process	Training Centre's programmes must be authorized by ANSFISA
Needed documents	Written communication of the opening of the course to ANSFISA; Teachers' engagement letter.
Relevant legislation	Linee Guida ANSF 7/2010
Other requirements/constraints	Teachers must be recognized by ANSFISA

## TRAIN DRIVERS

Country	Italy
EQF level	4
Type of Programme	Community certification Category A-B
Legislation	Decreto Legislativo 30 dicembre 247/2010; Decreto ANSF n.8/2011; D.lgs n.50 del 14 maggio 2019
Duration (years)	- A: 20 days; - B: 48 days.
Classification of diploma	Community certification model Category A and/or B
Grade scale for the final exam/evaluation	xx/30
Entry requirements (needed study title)	<p>We don't have entry requirements that need to be respected, but in order to collect the community certification model at the end of course, drivers must satisfy specific requirements established by our legislation:</p> <ul style="list-style-type: none"> <li>-The linguistic knowledge;</li> <li>-Applicants shall have passed an examination testing their professional knowledge and competence relating to the infrastructures for which the certificate is sought;</li> <li>-All train drivers shall have the necessary fitness and qualifications to drive trains;</li> <li>-They shall hold a licence demonstrating that the driver satisfies minimum conditions as regards medical requirements, basic education and general professional skills. The licence shall identify the driver and the issuing authority and shall state the duration of its validity.</li> </ul>

## ACCREDITATION PROCESS

Accreditation body	ANSFISA - National Safety Agency
Accreditation process	Training Centre's programmes must be authorized by ANSFISA
Needed documents	Written communication of the opening of the course to ANSFISA; Teachers' engagement letter.
Relevant legislation	Linee Guida ANSF 7/2010
Other requirements/constraints	Teachers must be recognized by ANSFISA

## TRAINEESHIP

Traineeship (mandatory or possible)	Mandatory
Traineeship abroad (mandatory or possible)	---
Procedure for traineeship activation	Traineeships must be activated by Railway undertaking or by infrastructure managers.
Procedure for traineeship activation abroad	---
Needed documents	Traineeship register
Relevant legislation	Decreto Legislativo 30 dicembre 247/2010; Decreto ANSF n.8/2011; D.lgs n.50 del 14 maggio 2019
Other requirements/constraints	The student must have a certificate that proves his theoretical knowledge

## TRAIN ATTENDANT

Country	Italy
EQF level	4
Type of Programme	Train attendant
Legislation	Decreto ANSF n.4/2012; Regolamento UE n.773/2019
Duration (years)	25 days
Classification of diploma	Train attendant
Grade scale for the final exam/evaluation	xx/30
Entry requirements (needed study title)	We don't have entry requirements that need to be satisfied, but in order to collect the certification at the end of course, students must pass a medical examination that provides confirmation of their physical fitness.

## ACCREDITATION PROCESS

Accreditation body	ANSFISA - National Safety Agency
Accreditation process	Training Centre's programmes must be authorized by ANSFISA

Needed documents	Written communication of the opening of the course to ANSFISA; Teachers' engagement letter.
Relevant legislation	Linee Guida ANSF 7/2010
Other requirements/constraints	Teachers must be recognized by ANSFISA

## TRAINEESHIP

Traineeship (mandatory or possible)	Mandatory
Traineeship abroad (mandatory or possible)	---
Procedure for traineeship activation	Traineeships must be activated by Railway undertaking or by infrastructure managers.
Procedure for traineeship activation abroad	---
Needed documents	Traineeship register
Relevant legislation	Decreto ANSF n.4/2012; Regolamento UE n.773/2019
Other requirements/constraints	The student must have a certificate that proves his theoretical knowledge

## RAIL TRAFFIC MANAGEMENT

Country	Italy
EQF level	4
Type of Programme	Rail traffic management
Legislation	Decreto ANSF n.4/2012
Duration (years)	As we develop this type of course specifically for railway companies', the duration changes depending on their needs.
Classification of diploma	Rail traffic manager
Grade scale for the final exam/evaluation	xx/30
Entry requirements (needed study title)	We don't have entry requirements that need to be satisfied, but in order to collect the certification at the end of course, students must pass a medical examination that provides confirmation of their physical fitness.

## ACCREDITATION PROCESS

Accreditation body	ANSFISA - National Safety Agency
Accreditation process	Training Centre's programmes must be authorized by ANSFISA
Needed documents	Written communication of the opening of the course to ANSFISA; Teachers' engagement letter.
Relevant legislation	Linee Guida ANSF 7/2010
Other requirements/constraints	Teachers must be recognized by ANSFISA

## TRAINEESHIP

Traineeship (mandatory or possible)	Mandatory
Traineeship abroad (mandatory or possible)	---
Procedure for traineeship activation	Traineeships must be activated by Railway undertaking or by infrastructure managers.
Procedure for traineeship activation abroad	---
Needed documents	Traineeship register
Relevant legislation	Decreto ANSF n.4/2012; Regolamento UE n.773/2019
Other requirements/constraints	The student must have a certificate that proves his theoretical knowledge

## INFRASTRUCTURE MAINTENANCE

Country	Italy
EQF level	4
Type of Programme	Infrastructure Maintenance
Legislation	Decreto ANSF n.4/2012
Duration (years)	As we develop this type of course specifically for railway companies', the duration changes depending on their needs.
Classification of diploma	Infrastructure maintainer
Grade scale for the final exam/evaluation	xx/30
Entry requirements (needed study title)	We don't have entry requirements that need to be satisfied, but in order to collect the certification at the end of course, students must pass a medical examination that provides confirmation of their physical fitness.

## ACCREDITATION PROCESS

Accreditation body	ANSFISA - National Safety Agency
Accreditation process	Training Centre's programmes must be authorized by ANSFISA
Needed documents	Written communication of the opening of the course to ANSFISA; Teachers' engagement letter.
Relevant legislation	Linee Guida ANSF 7/2010
Other requirements/constraints	Teachers must be recognized by ANSFISA

## TRAINEESHIP

Traineeship (mandatory or possible)	Mandatory
Traineeship abroad (mandatory or possible)	---
Procedure for traineeship activation	Traineeships must be activated by Railway undertaking or by infrastructure managers.

Procedure for traineeship activation abroad	---
Needed documents	Traineeship register
Relevant legislation	Decreto ANSF n.4/2012; Regolamento UE n.773/2019
Other requirements/constraints	The student must have a certificate that proves his theoretical knowledge

## VEHICLE MAINTENANCE

Country	Italy
EQF level	4
Type of Programme	Vehicle maintenance
Legislation	Decreto ANSF n.4/2012
Duration (years)	As we develop this type of course specifically for railway companies', the duration changes depending on their needs.
Classification of diploma	Vehicle maintainer
Grade scale for the final exam/evaluation	xx/30
Entry requirements (needed study title)	We don't have entry requirements that need to be satisfied, but in order to collect the certification at the end of course, students must pass a medical examination that provides confirmation of their physical fitness.

## ACCREDITATION PROCESS

Accreditation body	ANSFISA - National Safety Agency
Accreditation process	Training Centre's programmes must be authorized by ANSFISA
Needed documents	Written communication of the opening of the course to ANSFISA; Teachers' engagement letter.
Relevant legislation	Linee Guida ANSF 7/2010
Other requirements/constraints	Teachers must be recognized by ANSFISA

## TRAINEESHIP

Traineeship (mandatory or possible)	Mandatory
Traineeship abroad (mandatory or possible)	---
Procedure for traineeship activation	Traineeships must be activated by Railway undertaking or by infrastructure managers.
Procedure for traineeship activation abroad	---
Needed documents	Traineeship register
Relevant legislation	Decreto ANSF n.4/2012; Regolamento UE n.773/2019

Other requirements/constraints	The student must have a certificate that proves his theoretical knowledge
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## 6.7 POLAND

### POLAND – EQF LEVEL 8

#### PROGRAMME REQUIREMENTS

University	Warsaw School of Economics
Country	Poland
EQF level	8
Type of Programme	Doctorate
Legislation	Act of 20 July 2018. - Law on higher education and science (Journal of Laws, item 1861)
ECTS	The Act does not impose the dimension of courses specified in ECTS credits or hours.
Duration (years)	6 to 8 semesters
Entry requirements	"Admission to the doctoral programme shall be open to persons who hold the professional title of magister, master engineer or equivalent
Language requirement	A declaration that he/she has a sufficient command of English to the extent enabling participation in the educational process at the Doctoral School SGH

#### FLEXIBILITY IN CHANGING THE PROGRAMME

Adding new courses within the programme	Member of the Board of the Doctoral School. The framework programme of training at the Doctoral School and its changes are adopted by the Senate upon a motion of the Rector. The Council and the doctoral students' self-government shall give their opinion on the proposal. A motion for an amendment to the educational framework programme may be submitted by the Council.
Changes in the title and content of courses within the programme	Member of the Board of the Doctoral School. The framework programme of training at the Doctoral School and its changes are adopted by the Senate upon a motion of the Rector. The Council and the doctoral students' self-government shall give their opinion on the proposal. A motion for an amendment to the educational framework programme may be submitted by the Council.
Needed documents	Council request
Time constraints	The training programmes shall be reviewed annually by the by the Council. As a result of the review, the Council may formulate a proposal to amend in the training programme.

## ACCREDITATION PROCESS

Accreditation body	Supervision is carried out by the Ministry of Education and Science. No accreditation process required. The Act defines the authorised entities to run doctoral schools.
Accreditation process	Submission of applications in the POLON System by authorised entities.
Needed documents	The doctoral school has to be registered by the operating entity in the POLON system. It is required that the University is authorised to award the doctoral degree.
Other requirements/constraints	"The Doctoral School must have a Dean." "The Council of the Doctoral School advises the Rector. It consists of: the Vice-Chancellor for Science, the chairpersons of the Scientific Councils, the chairperson of the Senate Committee for Science, two doctoral students, two academic teachers, two other staff members (professors), a representative of the social sciences. "

## JOINT DOCTORATE

Accreditation body	The joint doctorate must meet the requirements set out in Polish legislation. The Ministry of Education and Science is the supervising body, but the Universities are free to establish joint degree programmes on their own, within the limits of the law.
Accreditation process	Submission of applications in the POLON System by authorised entities.
Needed documents	The doctoral school has to be registered by the operating entity in the POLON system. It is required that the University is authorised to award the doctoral degree. The foreign university must also have this qualification. An agreement must be signed between the universities.
Other constraints	The diploma issued must comply with Polish regulations. It is not possible for it to be issued on a foreign model, which is incompatible with the Act.

## JOINT CURRICULA

Activation process	Both universities must be authorised to offer doctoral programmes. The agreement shall specify the conditions between the universities.
Needed documents	Agreement between the involved entities
Requirements	Time period spent at the different universities

## INDUSTRIAL DOCTORATE/DUAL SYSTEM

Activation process	The candidate must submit an application form for the Implementation PhD (SGH by 25 April). The candidate will undergo the admission procedure to the Doctoral School
Needed documents	SGH signs a contract with the company whose employee will carry out the implementation doctorate, specifying, among other things, the rights to the solutions presented in the implementation doctorate and the employee's possible share in the profits,
Requirements	<p>"The work of the doctoral student is supervised by two supervisors - a supervisor from the university and a project supervisor from the company,</p> <p>The enterprise shall be obliged to provide a doctoral student pursuing an implementation doctorate with an assistant supervisor who monitors the doctoral student's progress in conducting scientific activities in preparation of the doctoral dissertation.</p> <p>The assistant supervisor can be a person with a PhD degree or with experience in developing and implementing in the economic/social sphere an original design, construction, technological solution of a permanent character; and his/her qualifications should be confirmed by documents/statements of the candidate for the assistant supervisor,</p> <p>preparation of a doctoral dissertation within the "Implementation Doctorate" programme cannot last longer than 4 years.</p> <p>Individuals who are qualified for the programme by the Ministry of Science and Higher Education and who are admitted to the Doctoral School should complete an 8-semester training programme obligatory for all participants in the Doctoral School.</p>
Cost for the enterprise	No cost to the company. A company may apply for funding for research infrastructure

## VISITING PHD STUDENTS

Agreement process	Procedure available in the framework of the Erasmus+ programme
Needed documents	Standard requirements specified for the Erasmus+ programme

## OTHER TYPES OF PROGRAMME

Type	Postgraduate studies
Entry requirements	Master of Science Degree
Duration	Must take a minimum of 2 semesters (1 year)
Internship	Mandatory
Internship abroad	Possible
Agreement with companies	Yes
Legislation	Act of 20 July 2018. - Law on higher education and science (Journal of Laws, item 1861)



## POLAND – EQF LEVEL 7

### PROGRAMME REQUIREMENTS

University	Warsaw School of Economics
Country	Poland
EQF level	7
Type of Programme	Master of Science degree
Legislation	Law of 20 July 2018 on higher education and science
ECTS	120
Duration (years)	2
Classification of degree	degree class
Grade scale for graduation	_/5
Grade scale for a single course within the programme	_/5
Entry requirements (needed study title)	Completed higher education 1 degree. In the case of students from the Warsaw School of Economics, they can be recruited at the level of the obtained average (3.5 - currently graduating). Other candidates must additionally write a knowledge test which counts towards recruitment.
Language requirement	English B2

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme
Needed documents	Content description - approval by the Board of the Programme
Time constraints	In advance with respect to the beginning of the academic year

### ACCREDITATION PROCESS

	Full mode	Simplified mode
Accreditation body	Review process by PKA (Polish Accreditation Committee). Applies to the "full" procedure in which the entire procedure must be followed (for a higher education institution which is not entitled to confer the academic degree of doctor habilitation in a given field)	Accreditation shall not be required for the establishment of degree programmes as belonging to the leading discipline in which the higher education institution is classified as A+, A or B+. Approval for the launch of a degree programme shall be given by the University Senate
Accreditation process	The application to the Minister of Education and Science is submitted a maximum of 6 months before the start of the course. The consent is given after a positive opinion of PKA (Polish Accreditation Committee) and the	A team appointed by the Dean or Rector of the University prepares a draft curriculum. By October 31st of the year preceding the year in which the programme is to be realised, the Dean reports the draft

	competent minister supervising the university.	curriculum to the Rector. It is then submitted to the Senate Education Committee. The committee submits it to the University Senate. The University Senate takes a decision.
Needed documents	The application must include the concept of education (including an indication of the socio-economic needs for its establishment), a description of actions for the improvement of the programme, a description of the competencies expected from the candidates, a description of the conditions of study (including a list of teachers, information on infrastructure). Documents supporting the data submitted in the application should be attached.	Documentation of the curriculum for the degree programme Description of the assumed educational results Curriculum of studies Information about the internal system of education quality management Conditions for the realisation of the curriculum
Relevant legislation	Act of 20 July 2018. - Law on higher education and science (Journal of Laws, item 1861)	Resolution no. 97 of the SGH Senate of 15 February 2017
Other requirements/constraints	The requirements are defined in detail by the Act of 20 July 2018. - Law on higher education and science (Journal of Laws, pos. 1861)	The requirements are defined in detail by the Act of 20 July 2018. - Law on higher education and science (Journal of Laws, pos. 1861). Master's degree programmes may be conducted provided that in scientific units involved in the programme of study research is conducted in at least one area of knowledge ascribed to a given field of study

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	No such courses exist at national level. Formally, there are inter-university courses, but the diploma is issued by one university, with information on the additional universities where the studies took place
International Course	A difficult process, formally it can be done. In practice difficult to achieve.
Accreditation body	PKA (Polish Accreditation Committee). If the conditions are met - no need for accreditation in PKA.

Accreditation process	"Formally it is possible to create such programmes, but in practice the process is very difficult. On the Polish side, accreditation is handled by the Polish Accreditation Committee (PKA). A university may run joint degree programmes with another university, institute of the Polish Academy of Sciences, a research institute, an international institute, a foreign university or a scientific institution. The rules of cooperation shall be laid down in an agreement concluded in writing, which shall in particular indicate the entity responsible for the input of data into POLON , and entitled to receive funding for the teaching of students for full-time studies conducted jointly."
Needed documents	Jointly defined degree programme
Relevant legislation	Law of 20 July 2018 on higher education and science
Other constraints	"Permission shall not be required for the establishment of degree programmes

## DOUBLE DEGREE

Double Degree	Two Degree certificates from two different universities, it is an option for the interested students
Activation process	"A contract between the two universities is needed. No accreditation process required
Needed documents	Double degree agreement with a foreign university - the compatibility check of the two Programmes- agreed study plan - course/ECTS recognition tables- mark conversion table - number of students that can apply
Relevant legislation	Decree of the Rector No. 17 of 16 April 2013 with annex 1
Entry requirements	Students must apply to the international exchange office in their 1st year of study and go through the application process. In the case of SGH, you must pass a competency test and also confirm your language skills at a minimum level of B2

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Recruitment for ERASMUS is organised twice a year: a main recruitment in January and a supplementary one in May. For 2022/23 the core recruitment has already taken place and the next one in May. 400 places have been offered, not all are filled.
Needed documents	Standard Erasmus Agreement - course/ETCS recognition tables - Mark conversion Table
Relevant legislation	ERASMUS Framework
Other requirements/constraints	number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Student applications are accepted on a rolling basis and are reviewed on an ongoing basis. There is no fixed deadline for applications. Graduates (before their defence) may also apply. At this point, every willing student receives a scholarship.
mandatory or optional	Optional for the students that apply - number of positions according to the available European funding
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	There is no dual system.
Apprenticeship abroad (Mandatory or optional)	optional

## POLAND – EQF LEVEL 6

### PROGRAMME REQUIREMENTS

University	Warsaw School of Economics
Country	Poland
EQF level	6
Type of Programme	Bachelor Degree
Legislation	Law of 20 July 2018 on higher education and science
ECTS	180
Duration (years)	3
Classification of degree	degree class
Grade scale for graduation	_/5
Grade scale for single course within the programme	_/5
Entry requirements (needed study title)	High school title. The candidate must also write a placement test on entrepreneurial knowledge.
Language requirement	two modern languages first:B1, second: A1; For studies in English, documented level B2

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme

Needed documents	Content short description - approval by the Board of the Programme
Time constraints	In advance with respect to the beginning of the academic year

## ACCREDITATION PROCESS

	Full mode	Simplified mode
Accreditation body	Review process by PKA (Polish Accreditation Committee). Applies to the "full" procedure in which the entire procedure must be followed (for a higher education institution which is not entitled to confer the academic degree of doctor habilitation in a given field)	Accreditation shall not be required for the establishment of degree programmes as belonging to the leading discipline in which the higher education institution is classified as A+, A or B+. Approval for the launch of a degree programme shall be given by the University Senate
Accreditation process	The application to the Minister of Education and Science is submitted a maximum of 6 months before the start of the course. The consent is given after a positive opinion of PKA (Polish Accreditation Committee) and the competent minister supervising the university.	"A team appointed by the Dean or Rector of the University prepares a draft curriculum. By October 31st of the year preceding the year in which the programme is to be realised, the Dean reports the draft curriculum to the Rector. It is then submitted to the Senate Education Committee. The committee submits it to the University Senate. The University Senate takes a decision.
Needed documents	The application must include the concept of education (including an indication of the socio-economic needs for its establishment), a description of actions for the improvement of the programme, a description of the competencies expected from the candidates, a description of the conditions of study (including a list of teachers, information on infrastructure). Documents supporting the data submitted in the application should be attached.	Documentation of the curriculum for the degree programme Description of the assumed educational results Curriculum of studies Information about the internal system of education quality management Conditions for the realisation of the curriculum
Relevant legislation	Act of 20 July 2018. - Law on higher education and science (Journal of Laws, item 1861)	Resolution no. 97 of the SGH Senate of 15 February 2017
Other requirements/constraints	The requirements are defined in detail by the Act of 20 July 2018. - Law on higher education and science (Journal of Laws, pos. 1861)	The requirements are defined in detail by the Act of 20 July 2018. - Law on higher education and science (Journal of Laws, pos. 1861)

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	No such courses exist at national level. Formally, there are inter-university courses, but the diploma is issued by one university, with information on the additional universities where the studies took place
International Course	A difficult process, formally it can be done. In practice difficult to achieve.
Accreditation body	PKA (Polish Accreditation Committee). If the conditions are met - no need for accreditation in PKA.
Accreditation process	Formally it is possible to create such programmes, but in practice the process is very difficult. On the Polish side, accreditation is handled by the Polish Accreditation Committee (PKA). A university may run joint degree programmes with another university, institute of the Polish Academy of Sciences, a research institute, an international institute, a foreign university or a scientific institution. The rules of cooperation shall be laid down in an agreement concluded in writing, which shall in particular indicate the entity responsible for the input of data into POLON, and entitled to receive funding for the teaching of students for full-time studies conducted jointly.
Needed documents	Jointly defined degree programme
Relevant legislation	Law of 20 July 2018 on higher education and science
Other constraints	Permission shall not be required for the establishment of degree programmes as belonging to the leading discipline in which the higher education institution is classified as A+, A or B+. In the case of the SGH, only faculties that can be done under a simplified procedure are opened. Then the procedure must be approved by the Curriculum Committee, the Senate and the Rector.

## DOUBLE DEGREE

Double Degree	Two Degree certificates from two different universities, it is an option for the interested students
Activation process	In general, the Legislature allows for the creation of such studies. There must be a consent to launch such a course (or lack thereof, in the cases specified above)
Needed documents	In theory, the main document is the agreement between the Polish and foreign universities.
Relevant legislation	Law of 20 July 2018 on higher education and science
Entry requirements	Each university has different admission requirements for these courses. There are some that only require a high school diploma, others that require a minimum of a passing grade. Some require a minimum of 2 semesters of studies, others have recruitment interviews. There is a lot of freedom in creating entrance requirements - if the university offers such a diploma. In the case of SGH, you must pass a competency test and also confirm your language skills at a minimum level of B2

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Recruitment for ERASMUS is organised twice a year: a main recruitment in January and a supplementary one in May. For 2022/23 the core recruitment has already taken place and the next one in May. 400 places have been offered, not all are filled.
Needed documents	Standard Erasmus Agreement - course/ETCS recognition tables - Mark conversion Table
Relevant legislation	ERASMUS Framework
Other requirements/constraints	number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Student applications are accepted on a rolling basis and are reviewed on an ongoing basis. There is no fixed deadline for applications. Graduates (before their defense) may also apply. At this point, every willing student receives a scholarship.
mandatory or optional	Optional for the students that apply - number of positions according to the available European funding
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	There is no dual system.
Apprenticeship abroad (Mandatory or optional)	optional

## POLAND – EQF LEVEL 5

### PROGRAMME REQUIREMENTS

Country	Poland
EQF level	5
Type of Programme	Technical College
Legislation	Law of 14 December 2016 - Education Law
Duration (years)	4
Classification of diploma	Level IV of the Polish Qualifications Framework

Grade scale for the final exam/evaluation	_ /100
Entry requirements (needed study title)	Primary school leaving certificate / Primary school leaving test result
Language requirement	No requirements

## FLEXIBILITY IN CHANGING THE PROGRAMME

Adding a new course	The Framework Curriculum (set out in the Act) sets out the requirements for compulsory (general) subjects. It is strictly defined and includes a minimum curriculum. There is no problem in adding new content, provided that the mandatory ones are implemented.
Changes in contents/subjects within an existing programme	Changes to curriculum content on the basis of the Ministerial Decree. There is no specific pathway. The change process is difficult, requiring direct contacts with the Ministry.
Needed documents	No procedure defined
Time constraints	Before recruitment / one year before

## PROGRAMME ACCREDITATION PROCESS

Accreditation body	On the establishment of a school/profile: the leading authority (county, city with county rights). On curriculum content: Ministry of Education and Science
Accreditation process	On the establishment of a school/profile: Application by the school to the governing body. For this an opinion from the Marshal's Office (Education Department) is required.
Needed documents	No procedure defined
Relevant legislation	Law of 14 December 2016 Education Law; REGULATION THE MINISTER OF NATIONAL EDUCATION of 18 August 2017 on the detailed principles and conditions for granting and withdrawing permission to establish a public school or institution by a legal or natural person
Other requirements/constraints	Agreement with railway companies providing staff and equipment. Currently, education is allowed in the profiles: Railway traffic control automatic technician; Railway construction technician; Electric rail transport technician; Railway vehicle technician; Rail transport technician;

## TRAINEESHIP

Traineeship (Mandatory or optional)	Mandatory
Traineeship abroad (Mandatory or optional)	Optional
Procedure for traineeship activation	The traineeship shall be based on an agreement between the school and the railway company



Procedure for traineeship activation abroad	Possible e.g. in the framework of the ERASMUS programme
Needed documents	Agreement between the school and the enterprise
Relevant legislation	Law of 14 December 2016 Education Law
Other requirements/constraints	

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	No solutions
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## STUDENTS MOBILITY

Mandatory or possible	Possible
Procedure for student exchange	Students can benefit from the ERASMUS+ programme
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Other requirements/constraints	Linguistic

## POLAND – EQF LEVEL 3/4

### PROGRAMME REQUIREMENTS

Country	Poland
EQF level	3-4
Type of Programme	Vocational Training
Legislation	Law of 14 December 2016 - Education Law
Duration (years)	3
Classification of diploma	Level III of the Polish Qualifications Framework
Grade scale for the final exam/evaluation	_/100
Entry requirements (needed study title)	Primary school leaving certificate / Primary school leaving test result
Language requirement	No requirements

## FLEXIBILITY IN CHANGING THE PROGRAMME

Adding a new course	The Framework Curriculum (set out in the Act) sets out the requirements for compulsory (general) subjects. It is strictly defined and includes a minimum curriculum. There is no problem in adding new content, provided that the mandatory ones are implemented.
Changes in contents/subjects within an existing programme	Changes to curriculum content on the basis of the Ministerial Decree. There is no specific pathway. The change process is difficult, requiring direct contacts with the Ministry.
Needed documents	No procedure defined
Time constraints	Before recruitment / one year before

## PROGRAMME ACCREDITATION PROCESS

Accreditation body	On the establishment of a school/profile: the leading authority (county, city with county rights). On curriculum content: Ministry of Education and Science
Accreditation process	"On the establishment of a school/profile: Application by the school to the governing body. For this an opinion from the Marshal's Office (Education Department) is required.
Needed documents	No procedure defined
Relevant legislation	Law of 14 December 2016 Education Law; REGULATION THE MINISTER OF NATIONAL EDUCATION of 18 August 2017 on the detailed principles and conditions for granting and withdrawing permission to establish a public school or institution by a legal or natural person
Other requirements/constraints	Agreement with railway companies providing staff and equipment. Currently, education is allowed in the profiles: - Mechanic of railway vehicles; - Railway surface fitter

## TRAINEESHIP

Traineeship (Mandatory or optional)	Mandatory
Traineeship abroad (Mandatory or optional)	Optional
Procedure for traineeship activation	The traineeship shall be based on an agreement between the school and the railway company
Procedure for traineeship activation abroad	Possible e.g., in the framework of the ERASMUS programme
Needed documents	Agreement between the school and the enterprise
Relevant legislation	Law of 14 December 2016 Education Law
Other requirements/constraints	

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	Not applicable
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## STUDENTS MOBILITY

Mandatory or possible	Possible
Procedure for student exchange	Students can benefit from the ERASMUS+ programme
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Other requirements/constraints	Linguistic

## 6.8 SERBIA

### SERBIA – EQF LEVEL 8

#### PROGRAMME REQUIREMENTS

University	University of Belgrade
Country	Serbia
EQF level	8
Type of Programme	Doctorate
Legislation	The Law of higher education and the Rulebook on the standards and procedure for accreditation higher education institutions
ECTS	180 of which for example: 10 for presentation of annual work, 20 for defense of research proposals within the PhD theses, 30 preparation of PhD dissertation
Duration (years)	2
Entry requirements	1) completed master's academic studies, i.e. integrated studies with at least 300 ECTS credits, i.e. completed at least four-year studies, and a general average grade of at least 8 in basic academic and master's academic studies, ie integrated studies, or 2) completed master's academic studies, ie integrated studies, with at least 300 ECTS credits and realized scientific papers published in journals in accordance with the general acts of the faculty, ie the University.

#### ACCREDITATION PROCESS

Accreditation body	National Entity for Accreditation and Quality Assurance in High Education (NEAQA) and Commission for accreditation and quality assurance (CAQA)
Accreditation process	Approval from NEAQA and CAQA also for new curricula
Needed documents	Standards and instructions for Accreditation of Study Programs of Doctoral Studies in educational scientific fields
Other requirements/constraints	Board of at least 4 members composed by full professors and associate professors

#### JOINT DOCTORATE

Accreditation body	NEAQA and CAQA
Accreditation process	Long process of approval from NEAQA and CAQA and UB senate
Needed documents	Agreement between the involved entities, Definition of the activities organisation, period spent at the different university, number of grants

Other constraints	Deadline each year in spring
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## JOINT CURRICULA

Activation process	Request that can be done also by existing PhD Programmes
Needed documents	Agreement between the involved entities
Requirements	Definition of the activity organisation, time period spent at the different universities

## CO-TUTORING

Activation process	Flexible procedure - Request that can be done in any moment of the year but before the end of the second year- Fast procedure: a couple of months are needed - approval by the Teaching -Scientific Council and the Departments and signature of the two Rectors
Needed documents	Original letter from the Dean of the Faculty of the University of Belgrade, where the study program for which the Student is enrolled is conducted. Certificate of enrolment in doctoral studies at the University of Belgrade. Decision of the Teaching-Scientific Council of the Faculty appointing a mentor to the Student; Decision of the competent body of the University which gave consent to the proposed topic of the doctoral dissertation. Certificate of enrolment in doctoral studies at a partner university.
Requirements	The condition for the realization of international joint mentoring is the International Agreement on Joint Mentoring in the preparation of a doctoral dissertation, better known under the internationally accepted term - Cotutelle, ie the Agreement on Commentary, concluded between the University of Belgrade and the partner university.
Entry requirements for PhD students	The PhD student must have an equivalent degree and education level according to the entry requirements of the Serbian PhD Course

## VISITING PHD STUDENTS

Agreement process	Fast and flexible procedure - approval by PhD Course Coordinator and Teachers Board
Needed documents	Invitation letter from the hosting university
Other requirements/constraints	Research period abroad of 3-5 months

## SERBIA – EQF LEVEL 7

### PROGRAMME REQUIREMENTS

University	University of Belgrade - Faculty of transport and traffic Engineering
Country	Serbia
EQF level	7.1
Type of Programme	Master of Science degree
Legislation	The Law of higher education and the Rulebook on the standards and procedure for accreditation higher education institutions
ECTS	60
Duration (years)	one year
Classification of degree	Equivalence to the seventh level, sublevel one (level 7.1) – professional title acquired by completing undergraduate studies at the faculty lasting four to six years, which until the entry into force of the Law on National Qualifications Framework of the Republic of Serbia in terms of rights derived from it was equated with academic title of master, ie graduate master.
Grade scale for graduation	100
Grade scale for a single course within the programme	30
Entry requirements (needed study title)	Possession of a bachelor's degree or a master's degree, obtained at a Serbian University or equivalent qualifications; taking differential exams if the candidate with bachelor's or master's degree comes from faculty that are not related
Language requirement	Serbian, English

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme
Needed documents	Content short description
Time constraints	In advance with respect to the beginning of the academic year

### ACCREDITATION PROCESS

Accreditation body	National Entity for Accreditation and Quality Assurance in High Education (NEAQA) and Commission for accreditation and quality assurance (CAQA)
Accreditation process	Accreditation is performed every 7 years. Regular external quality control in the 4th year of accreditation. (quality control, according to the regulations according to the accreditation standards, reviewers report)
Needed documents	Initial accreditation, at least 3 programmes
Relevant legislation	Regulations on Standards and Procedure for accreditation of Study Programmes

Other requirements/constraints	Minimum number of ECTS per basic or characteristic scientific disciplinary sector; activation before the next academic year; Teaching requirements - number of teachers and specific competence; Resources requirements; quality requirements
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## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both universities – a difficult process
International Course	All the students will receive the joint degree at the end of the Programme
Accreditation body	National Entity for Accreditation and Quality Assurance in High Education
Accreditation process	The Programme must obtain the accreditation from both the Countries. From the Serbian side, the positive evaluation about the degree programme from NEAQUA and the requirements verification from CAQA are needed
Needed documents	Jointly defined degree programme
Relevant legislation	The Law of higher education and the Rulebook on the standards and procedure for accreditation higher education institutions:
Other constraints	The Degree Programme and Regulation are jointly defined - at least 30 ECTS abroad - at least 6 months spent abroad

## DOUBLE DEGREE

Double Degree	Two Degree certificates one for each university, it is an option for the interested students that want to spend a study period abroad
Activation process	More flexible procedure - No need for accreditation - available agreement template
Needed documents	Double degree agreement with a foreign university - the compatibility check of the two Programmes- agreed study plan - course/ECTS recognition tables- mark conversion table - number of students that can apply
Relevant legislation	The Law of higher education and the Rulebook on the standards and procedure for accreditation higher education institutions:
Entry requirements	Two Degree certificates one for each university, it is an option for the interested students that want to spend a study period abroad

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardized procedure set and coordinated by the University of Belgrade. Requires time. Partner institutions are required to sign an Inter-institutional agreement - IIA (signed by the Rector of the University of Belgrade with each individual foreign higher education institution). The cooperation i.e. the agreement is initiated by the Faculty
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	<p>(through the online platform of the University of Belgrade – MobiON: <a href="https://mobion.bg.ac.rs/erasmus+">https://mobion.bg.ac.rs/erasmus+</a>) and sent to the University for further processing. Standard forms of ERASMUS IIA is used (as in <a href="https://erasmus-plus.ec.europa.eu/resources-and-tools/inter-institutional-agreement">https://erasmus-plus.ec.europa.eu/resources-and-tools/inter-institutional-agreement</a>). It contains basic information about partner institutions (name, contact); number of incoming and ongoing students, teachers or staff; duration of mobility (number of months) per student/teacher/staff, education field according to ISCED (e.g. for University of Belgrade - Faculty of Transport and Traffic Engineering 104-Transport service or in some cases 061 Information and Communication Technologies (ICTs); level of studies, language requirements. List of inter-institutional agreements signed by University of Belgrade is available at <a href="http://bg.ac.rs/files/sr/saradnja/Lista-sporazuma2022.pdf">http://bg.ac.rs/files/sr/saradnja/Lista-sporazuma2022.pdf</a>. Internal deadlines: call for applications for the European Commission's deadline which is in February each year, is internally published in December the previous year and has a month-long deadline given to the members of the University to submit their cooperation proposals. Calls for applications for individual mobility are announced twice a year (in February for the fall application round and in July for the spring application round) and for individual cooperation to be included in the call the IIA's needs to be signed beforehand (no set deadline).</p>
<p>Needed documents</p>	<p>Students apply for mobility via MobiOn platform. Requested documents are photography, First page of the students booklet - index, Certificate of enrolled year of study - especially important for students which move from a lower to a higher cycle, Diploma / diplomas (if any) in a foreign language, Transcript of records (grade) in a foreign language, Proof of knowledge of the program language - certificate, Biography, Motivational letter, Learning agreement (the most important, standardised form, template available). Evaluations and nomination of candidates is done by ERASMUS coordinators, also via MobiOn platform using standardized criteria.</p>
<p>Relevant legislation</p>	<p>ERASMUS Framework. From February 2019, the Republic of Serbia became a fully-fledged member of the Erasmus+ Program and is now eligible, as a so called “program country”, to participate in all parts of the program. Rulebook on Student Mobility and the relevant study rules and regulations of the University of Belgrade are also included in the legislative documents (<a href="http://bg.ac.rs/sr/univerzitet/univ-propisi.php">http://bg.ac.rs/sr/univerzitet/univ-propisi.php</a>)</p>
<p>Other requirements/constraints</p>	<p>As indicated above (description of Erasmus Agreement process) the conditions of cooperation with the mentioned institutions from the program and partner countries are specified by signing the appropriate Inter-institutional agreement. The International Relations Office of the University of Belgrade or any faculty/school of the University of Belgrade do not accept direct mobility applications from foreign students or staff. Nominations of the candidates for mobility are accepted from the relevant International Coordinator of the foreign university (e.g. the Erasmus Office, International Relations Office, etc.). Nomination and</p>

	<p>application procedures, go through online mobility platform of the University of Belgrade – MobiON: <a href="https://mobion.bg.ac.rs/erasmus+">https://mobion.bg.ac.rs/erasmus+</a>. Minimum duration of the mobility period is 2 months in case of internship mobility and 3 months in case of study mobility for PhD students and full semester mobility for MA (MSc) and BA (BSc) students. The minimum ECTS requirement on behalf of the University of Belgrad for outgoing students is 19 ECTS per semester.</p>
Entry requirements for students	<p>Language requirements min B1 for students, B2 for teachers, signed learning agreement by both institutions. The minimum number of ECTS credits that one must agree upon in their LA is 19 ECTS per semester. However, this requirement may vary depending on your host institution and may be up to 30 ECTS per semester. For more information: <a href="https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students">https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students</a>.</p>

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	There are no set deadlines, other than the fact that the traineeship mobility has to last a minimum of 2 months and has to be completed within the specific project deadline.
mandatory or optional	optional
Procedure for traineeship activation	The student needs an official invitation letter by the hosting organization. However, please note that for the time-being, UB can send only students for traineeships at other partner universities and not other entities, due to the current regulations at UB.
Needed documents	<a href="https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students">https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students</a>
Relevant legislation	ERASMUS Framework. From February 2019, the Republic of Serbia became a fully-fledged member of the Erasmus+ Program and is now eligible, as a so called “program country”, to participate in all parts of the program. Rulebook on Student Mobility and the relevant study rules and regulations of the University of Belgrade are also included in the legislative documents ( <a href="http://bg.ac.rs/sr/univerzitet/univ-propisi.php">http://bg.ac.rs/sr/univerzitet/univ-propisi.php</a> )
Entry requirements for students	<a href="https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students">https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students</a>

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	There is no dual system but there is the possibility for students to do internship during the last year of the course to prepare their thesis project
Apprenticeship abroad (Mandatory or optional)	Possible internship abroad



## SERBIA – EQF LEVEL 6

### PROGRAMME REQUIREMENTS

University	University of Belgrade
Country	Serbia
EQF level	6.2
Type of Programme	Bachelor Degree -academic studies
Legislation	The Law of higher education and the Rulebook on the standards and procedure for accreditation higher education institutions:
ECTS	240
Duration (years)	4
Classification of degree	degree class/ The sixth level, sub-level two (level 6.2) of NOKS, which is acquired by completing an OAS of at least 240 ECTS, is marked with 6.2 A. The condition for acquiring this level is previously acquired level 4 of NOKS and passed general, professional, in accordance with the laws governing secondary education and upbringing and higher education.
Grade scale for graduation	100
Grade scale for single course within the programme	30
Entry requirements (needed study title)	High school title
Language requirement	Serbian

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme, only 20% of the programme content
Needed documents	Content short description - approval by the Teaching and Scientific Council and University Senate
Time constraints	In advance with respect to the beginning of the academic year (during September in the current year)

### ACCREDITATION PROCESS

Accreditation body	National Entity for Accreditation and Quality Assurance in High Education (NEAQA) and Commission for accreditation and quality assurance (CAQA)
Accreditation process	Accreditation of the institutions and programme as well is performed every 7 years. Regular external quality control in the 4th year of accreditation.
Needed documents	Initial accreditation at least 3 programmes, self-quality control report, documents prepare according to the accreditation standards and reviewers report.

Relevant legislation	Regulations on Standards and Procedure for accreditation of Study Programmes
Other requirements/constraints	Minimum number of ECTS per basic or characteristic scientific disciplinary sector; activation before the next academic year; Teaching requirements - number of teachers and specific competence; Resources requirements; quality requirements

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both universities - a difficult process
International Course	All the students will receive the joint degree at the end of the Programme
Accreditation body	National Entity for Accreditation and Quality Assurance in High Education
Accreditation process	The Programme must obtain the accreditation from both the Countries. From the Serbian side, the positive evaluation about the degree programme from NEAQUA and the requirements verification from CAQA are needed
Needed documents	Jointly defined degree programme accepted by Teaching and Scientific Council and University Senate in Serbia
Relevant legislation	The Law of higher education and the Rulebook on the standards and procedure for accreditation higher education institutions:
Other constraints	The Degree Programme and Regulation are jointly defined - at least 30 ECTS abroad - at least 6 months spent abroad.

## DOUBLE DEGREE

Double Degree	Two Degree certificates from two different universities, it is an option for the interested students* Double degree and joint degree are not recognized as separate degrees in Serbia in this moment.
Activation process	more flexible procedure - form available
Needed documents	Double degree agreement with a foreign university. Agreed study plan - course/ECTS recognition tables- mark conversion table - number of students that can apply. This Agreement needed to be
Relevant legislation	The Law of higher education and the Rulebook on the standards and procedure for accreditation higher education institutions:
Entry requirements	At least twelve (12) years of education and must hold the document certifying they passed the qualifying examination (if needed) for the admission to a University course in the same or similar scientific area,

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

<p>Erasmus Agreement process (internal deadlines)</p>	<p>Standardized procedure set and coordinated by the University of Belgrade. Requires time. Partner institutions are required to sign an Inter-institutional agreement - IIA (signed by the Rector of the University of Belgrade with each individual foreign higher education institution). The cooperation i.e. the agreement is initiated by the Faculty (through the online platform of the University of Belgrade – MobiON: <a href="https://mobion.bg.ac.rs/erasmus+">https://mobion.bg.ac.rs/erasmus+</a>) and sent to the University for further processing. Standard forms of ERASMUS IIA is used (as in <a href="https://erasmus-plus.ec.europa.eu/resources-and-tools/inter-institutional-agreement">https://erasmus-plus.ec.europa.eu/resources-and-tools/inter-institutional-agreement</a>). It contains basic information about partner institutions (name, contact); number of incoming and ongoing students, teachers or staff; duration of mobility (number of months) per student/teacher/staff, education field according to ISCED (e.g. for University of Belgrade - Faculty of Transport and Traffic Engineering 104-Transport service or in some cases 061 Information and Communication Technologies (ICTs); level of studies, language requirements. List of inter-institutional agreements signed by University of Belgrade is available at <a href="http://bg.ac.rs/files/sr/saradnja/Lista-sporazuma2022.pdf">http://bg.ac.rs/files/sr/saradnja/Lista-sporazuma2022.pdf</a>. Internal deadlines: call for applications for the European Commission's deadline which is in February each year, is internally published in December the previous year and has a month-long deadline given to the members of the University to submit their cooperation proposals. Calls for applications for individual mobility are announced twice a year (in February for the fall application round and in July for the spring application round) and for individual cooperation to be included in the call the IIA's needs to be signed beforehand (no set deadline).</p>
<p>Needed documents</p>	<p>Students apply for mobility via MobiOn platform. Requested documents are photography, First page of the students booklet - index, Certificate of enrolled year of study - especially important for students which move from a lower to a higher cycle, Diploma / diplomas (if any) in a foreign language, Transcript of records (grade) in a foreign language, Proof of knowledge of the program language - certificate, Biography, Motivational letter, Learning agreement (the most important, standardised form, template available). Evaluations and nomination of candidates is done by ERASMUS coordinators, also via MobiOn platform using standardized criteria.</p>
<p>Relevant legislation</p>	<p>ERASMUS Framework. From February 2019, the Republic of Serbia became a fully-fledged member of the Erasmus+ Program and is now eligible, as a so called “program country”, to participate in all parts of the program. Rulebook on Student Mobility and the relevant study rules and regulations of the University of Belgrade are also included in the legislative documents (<a href="http://bg.ac.rs/sr/univerzitet/univ-propisi.php">http://bg.ac.rs/sr/univerzitet/univ-propisi.php</a>)</p>
<p>Other requirements/constraints</p>	<p>As indicated above (description of Erasmus Agreement process) the conditions of cooperation with the mentioned institutions from the program and partner countries are specified by signing the appropriate Inter-institutional agreement. The International Relations Office of the University of Belgrade or any faculty/school of the University of Belgrade do not accept direct mobility applications from foreign students or staff. Nominations</p>

	<p>of the candidates for mobility are accepted from the relevant International Coordinator of the foreign university (e.g. the Erasmus Office, International Relations Office, etc.). Nomination and application procedures, go through online mobility platform of the University of Belgrade – MobiON:  <a href="https://mobion.bg.ac.rs/erasmus+">https://mobion.bg.ac.rs/erasmus+</a>. Minimum duration of the mobility period is 2 months in case of internship mobility and 3 months in case of study mobility for PhD students and full semester mobility for MA (MSc) and BA (BSc) students. The minimum ECTS requirement on behalf of the University of Belgrad for outgoing students is 19 ECTS per semester.</p>
Entry requirements for students	<p>Language requirements min B1 for students, B2 for teachers, signed learning agreement (LA) by both institutions. The minimum number of ECTS credits that one must agree upon in their LA is 19 ECTS per semester. However, this requirement may vary depending on your host institution and may be up to 30 ECTS per semester. For more information:  <a href="https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students">https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students</a>.</p>

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	There are no set deadlines, other than the fact that the traineeship mobility has to last a minimum of 2 months and has to be completed within the specific project deadline.
mandatory or optional	Optional
Procedure for traineeship activation	The student needs an official invitation letter by the hosting organization. However, please note that for the time-being, UB can send only students for traineeships at other partner universities and not other entities, due to the current regulations at UB.
Needed documents	<a href="https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students">https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students</a>
Relevant legislation	ERASMUS Framework. From February 2019, the Republic of Serbia became a fully-fledged member of the Erasmus+ Program and is now eligible, as a so called “program country”, to participate in all parts of the program. Rulebook on Student Mobility and the relevant study rules and regulations of the University of Belgrade are also included in the legislative documents ( <a href="http://bg.ac.rs/sr/univerzitet/univ-propisi.php">http://bg.ac.rs/sr/univerzitet/univ-propisi.php</a> )
Entry requirements for students	<a href="https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students">https://mobion.bg.ac.rs/erasmus+/how-to-apply/ka103/required-documents-ka103-outgoing-students</a>

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	Possible but Not applicable in the case of UB in this moment. In the UB strategy, dual system studies are the preferred model of study from 2030.
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Apprenticeship abroad (Mandatory or optional)	Possible internship abroad
Needed documents	Agreements between institutions (universities and business institutions)

## SERBIA – EQF LEVEL 6.1

### PROGRAMME REQUIREMENTS

Country	Republic of Serbia
EQF level	6.1
Type of Programme	Bachelor of Applied Science - Traffic engineer
Legislation	Law on Higher Education
Duration (years)	3
Classification of diploma	level 6.1
Grade scale for the final exam/evaluation	from 5 to 10
Entry requirements (needed study title)	High school, completed 3th or 4th level of qualification
Language requirement	Serbian language

### FLEXIBILITY IN CHANGING THE PROGRAMME

Adding a new course	No
Changes in contents/subjects within an existing programme	Allowed change of the content of the subject in the amount of up to 20%
Needed documents	Subject curriculum
Time constraints	15 days

### PROGRAMME ACCREDITATION PROCESS

Accreditation body	Accreditation and Quality Assurance Commission
Accreditation process	The request for accreditation is submitted to the Commission for Accreditation and Quality Assurance on the prescribed form through the Ministry of Education, Science and Technological Development
Needed documents	"Scanned request for accreditation with attachments - general acts, which are submitted with the request, Proof of payment of the appropriate accreditation fee, documentation for accreditation of the study program (description of standards with relevant attachments and tables), documentation for accreditation of the institution (Standards

	6 and 9), reports on the parameters of the study program and the institution, which are generated from the NAT2019 software
Relevant legislation	Rulebook on standards and procedure for accreditation of study programs

## TRAINEESHIP

Traineeship (Mandatory or optional)	The practical training is conducted by a selected employer who meets the requirements for the required practical training
Traineeship abroad (Mandatory or optional)	
Procedure for traineeship activation	The practical training begins when the student is employed by an employer for the type of qualification he gained in College or if the practical training is regulated by a special contract with the employer who meets the conditions for it
Procedure for traineeship activation abroad	
Needed documents	Signing an employment contract or a contract for taking a professional exam within the apprenticeship
Relevant legislation	Employment act

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	Possible in colleges that have dual education approval for certain educational profiles
Apprenticeship abroad (Mandatory or optional)	Practical training can also be conducted abroad if the college has a contract with a training center abroad
Procedure for apprenticeship/dual system activation	Students enrolled in a dual education program attend an internship with an employer with whom they and the college have entered into a dual education agreement
Procedure for apprenticeship/dual system activation abroad	
Needed documents	Dual education agreement with the employer
Relevant legislation	Rulebook on the dual model of studies of the Railway College of Applied Sciences, Rulebook on the organization, composition and manner of work of the Commission for determining the fulfilment of conditions for conducting learning through work with the employer

## SERBIA – EQF LEVEL 4

### PROGRAMME REQUIREMENTS

Country	Republic of Serbia
EQF level	4
Type of Programme	Traffic and transport technician

Legislation	Law on Secondary Education
Duration (years)	4
Classification of diploma	Level 4
Grade scale for the final exam/evaluation	from 1-5
Entry requirements (needed study title)	Primary School
Language requirement	Serbian language

## FLEXIBILITY IN CHANGING THE PROGRAMME

Adding a new course	No
Changes in contents/subjects within an existing programme	Allowed change of the content of the subject in the amount of up to 20%
Needed documents	subject curriculum
Time constraints	30 days

## PROGRAMME ACCREDITATION PROCESS

Accreditation body	The Ministry of Education, Science and Technological Development
Accreditation process	A request is submitted to the Ministry of Education, Science and Technological Development, to national accreditation body that checks the fulfillment of conditions for accreditation of a teaching content.
Needed documents	training standards and conditions that the lecturer must meet
Relevant legislation	Law on Secondary Education

## TRAINEESHIP

Traineeship (Mandatory or optional)	The practical training is conducted by a selected employer who meets the requirements for the required training
Traineeship abroad (Mandatory or optional)	
Procedure for traineeship activation	The practical training begins when the student is employed by an employer for the type of qualification she/he gained at school or if the training is regulated by a special contract with the employer who meets the conditions for that
Procedure for traineeship activation abroad	
Needed documents	
Relevant legislation	Employment act
Other requirements/constraints	

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	It is possible in schools that have dual education approval for certain educational profiles
Apprenticeship abroad (Mandatory or optional)	The training can also be conducted abroad if the school has a contract with a training centre abroad
Procedure for apprenticeship/dual system activation	Students enrolled in a dual education program attend training with an employer with whom they and the school have entered into a dual education agreement
Procedure for apprenticeship/dual system activation abroad	
Needed documents	Dual education agreement with the employer
Relevant legislation	Law on dual education

## 6.9 SPAIN

### SPAIN– EQF LEVEL 8

#### PROGRAMME REQUIREMENTS

University	Universidad Politecnica de Madrid
Country	Spain
EQF level	8
Type of Programme	PhD Degree
Legislation	RD 99/2011
ECTS	
Duration (years)	4
Entry requirements	Master Degree

#### ACCREDITATION PROCESS

Accreditation body	MADRI+D (Regional Accreditation Board)
Accreditation process	Submission of the accreditation request by December - Positive evaluation about the degree programme from Madri+D (Regional Agency for Degrees Accreditation)
Needed documents	Accreditation Auto-Report and Madri+D Audit Report
Relevant legislation	RD 99/2011



## JOINT DOCTORATE

Accreditation body	MADRI+D (Regional Accreditation Board)
Accreditation process	Long process of approval from MADRI+D (Regional Accreditation Board)
Needed documents	Agreement between the involved entities, Definition of the activities organisation, period spent at the different university, number of grants
Other constraints	Deadline each year in spring

## JOINT CURRICULA

Activation process	Request that can be done also by existing PhD Programmes
Needed documents	Agreement between the involved entities
Requirements	Definition of the activity organisation, time period spent at the different universities

## INDUSTRIAL DOCTORATE/DUAL SYSTEM

Activation process	PhD student position for Company staff member. Request that can be done also within an existing PhD Programmes - fast procedure - Approval from the Teacher Board and from the Department Board
Needed documents	Agreement between the involved entities. Possible agreement also with foreign companies - Agreement Template available
Requirements	Definition of the research project, training plan, number of employees, exploitation of the results - financing by the enterprise - Call for applications dedicated to high qualified employees of the company - two tutors: an enterprise tutor and a university tutor
Cost for the enterprise	Not Defined

## CO-TUTORING

Activation process	Flexible procedure - Request that can be done in any moment of the year but before the end of the second year- Fast procedure: a couple of months are needed - approval by the Teaching Boards and the Departments and signature of the two Rectors
Needed documents	Agreement between the involved entities - Co-tutoring agreement template available - request before the end of the second year
Requirements	The Academic Board must check the compatibility and equivalence of the programs of the two courses . Definition of the activity organisation, time period spent

	at the different universities: the period at each University cannot be shorter than six months - two advisors one for each university - only one thesis discussion -examining commission shall comprise an equal number of scientific representatives of both countries and will be jointly designated by both Universities and approved by both Rectors - The certificate awarded by each University will mention the other University at which the co-tutored activity will have been carried out.
Entry requirements for PhD students	The PhD student must have an equivalent degree and education level according to the entry requirements of the PhD Course

## VISITING PHD STUDENTS

Agreement process	Fast and flexible procedure - approval by PhD Course Coordinator and Teachers Board
Needed documents	Invitation letter from the hosting university
Other requirements/constraints	Research period abroad of 3-5 months

## SPAIN – EQF LEVEL 7

### PROGRAMME REQUIREMENTS

University	Universidad Politecnica de Madrid
Country	Spain
EQF level	7
Type of Programme	Master of Science degree
Legislation	RD 581/2017
ECTS	240
Duration (years)	4
Classification of degree	
Grade scale for graduation	_/10
Grade scale for single course within the programme	_/10
Entry requirements (needed study title)	Bachelor's degree or master's degree, obtained at an European University or equivalent qualifications
Language requirement	English B2

## ACCREDITATION PROCESS

Accreditation body	MADRI+D (Regional Accreditation Board)
Accreditation process	Submission of the accreditation request by December - Positive evaluation about the degree programme from Madri+D (Regional Agency for Degrees Accreditation)
Needed documents	Accreditation Auto-Report and Madri+D Audit Report
Relevant legislation	RD 581/2017

## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both universities – a difficult process
International Course	All the students will receive the joint degree at the end of the course
Accreditation body	Madri+D
Accreditation process	The Programme must obtain the accreditation from both the Countries. From the Spanish side, the positive evaluation about the degree programme from Madri+D is needed
Needed documents	Jointly defined degree programme
Relevant legislation	RD 581/2017

## DOUBLE DEGREE

Double Degree	Two Degree certificates one for each university, it is an option for the interested students
Activation process	More flexible procedure – form available
Needed documents	Double degree agreement with a foreign university - agreed study plan - course/ETCS recognition tables - mark conversion table - number of students that can apply
Relevant legislation	RD 581/2017

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries
Needed documents	Standard Erasmus Agreement - course/ETCS recognition tables - Mark conversion Table
Relevant legislation	ERASMUS Framework
Other requirements/constraints	number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries
mandatory or optional	Optional for the students that apply - number of positions according to the available European funding
Procedure for traineeship activation	Agreement with foreign Company or University

Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	There is no dual system but there is the possibility for students to do internship during the last year of the course to prepare their thesis project
Apprenticeship abroad (Mandatory or optional)	Possible internship abroad

## SPAIN – EQF LEVEL 6

### PROGRAMME REQUIREMENTS

University	Universidad Politecnica de Madrid
Country	Spain
EQF level	6
Type of Programme	Bachelor Degree
Legislation	RD 822/2021
ECTS	240
Duration (years)	4
Classification of degree	
Grade scale for graduation	_/10
Grade scale for single course within the programme	_/10
Entry requirements (needed study title)	High School Degree (National Exam EVAU)
Language requirement	English B2

### FLEXIBILITY IN CHANGING THE PROGRAMME

New courses within the degree programme	Elective courses of the programme
Changes in the title and content within the degree programme	All the courses of the programme
Needed documents	Content short description - approval by the Board of the Programme
Time constraints	In advance with respect to the beginning of the academic year

### ACCREDITATION PROCESS

Accreditation body	MADRI+D (Regional Accreditation Board)
Accreditation process	Submission of the accreditation request by December - Positive evaluation about the degree programme from Madri+D (Regional Agency for Degrees Accreditation)
Needed documents	Accreditation Auto-Report and Madri+D Audit Report

Relevant legislation	RD 822/2021
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## JOINT DEGREE/ INTERNATIONAL COURSE

Joint Degree	Unique degree certificate issued by both the universities - difficult process
International Course	All the students will receive the joint degree at the end of the Programme
Accreditation body	Madri+D
Accreditation process	The Programme must obtain the accreditation from both the Countries. From the Spanish side, the positive evaluation about the degree programme from Madri+D is needed
Needed documents	Jointly defined degree programme
Relevant legislation	RD 822/2021

## DOUBLE DEGREE

Double Degree	Two Degree certificates from two different universities, it is an option for the interested students
Activation process	more flexible procedure - form available
Needed documents	Double degree agreement with a foreign university - agreed study plan - course/ETCS recognition tables - mark conversion table - number of students that can apply
Relevant legislation	RD 822/2021
Entry requirements	Two Degree certificates from two different universities, it is an option for the interested students

## ERASMUS AGREEMENT FOR STUDY PERIOD ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries
Needed documents	Standard Erasmus Agreement - course/ETCS recognition tables - Mark conversion Table
Relevant legislation	ERASMUS Framework
Other requirements/constraints	number of students that can apply
Entry requirements for students	Linguistic

## ERASMUS TRAINEESHIP ABROAD

Erasmus Agreement process (internal deadlines)	Standardised procedure but not fast - Need to sign the agreement more than one year in advance. Moreover, the internal deadlines may vary between universities and countries
mandatory or optional	Optional for the students that apply - number of positions according to the available European funding
Procedure for traineeship activation	Agreement with foreign Company or University
Needed documents	Standard Erasmus Agreement
Relevant legislation	ERASMUS Framework
Entry requirements for students	Linguistic

## DUAL SYSTEM/ APPRENTICESHIP

Mandatory or possible	There is no dual system but there is the possibility for students to do an internship during the last year of the course to prepare their thesis project of within one year after the graduation
Apprenticeship abroad (Mandatory or optional)	Possible internship abroad