Generic Dual Higher Education Model (DUALMON model) - draft

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Abstract

The document specifies two models:

1. The model of the legal framework of dual higher education in Montenegro (LF-MDHE) and
2. The generic and flexible model of dual higher education in Montenegro (GF-MDHE).

Each model is specified by its important features called attributes. The first model specifies 15 attributes, and the second one 38 attributes of these models. Concrete features of LF-MDHE and GF-MDHE are specified by values of used attributes. Table representation is used for representation of possible values of these attributes. The models presented here should serve as guidelines for creation of the legislation of dual higher education of Montenegro, as well as guidelines for specification of a concrete implementation of dual higher education that a higher education institution (HEI) and its partner companies agreed to practice.

Five parallel or sequential scheduling models are also specified in the document. By these scheduling models working and teaching/learning time intervals during an academic year are specified. These models can be also extended and modified according to specific implementation contexts.

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V.3.0	16.12.2021.	Third draft of document is completed and it is ready for discussions	Working Group
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DISCLAIMER

Table of Content

1. Introduction

The flexible and generic *Model of* Dual *Higher Education* (MDHE) for Montenegro has been developed as part of the activities performed within WP2. The obtained model is described in this document. As it is specified by the Project proposal, this model represents a synthesis of the needs of different stakeholders (companies, HEIs, students) identified in WP1.

The following generic model, given in this document was created based on the experiences and recommendations stemming from similar projects that are already implemented in partner counters such as Serbia, Slovenia and Austria, as well as in other countries such as Germany and Spain. Detailed overview of practices in implementation of dual higher education can be found in a document *Review of best practices and experiences in DHE (https://drive.google.com/drive/folders/1I6VoIBys2lXL1ByemLt3vHwh1YFSUlIW)*, which is already submitted to all project partners.

Having in mind experience of similar projects already implemented in the mentioned countries, two basic characteristics of the model are crucial in order to obtain high quality and sustainable model. The model needs to be *flexible* in terms of Dual Higher Education (DHE) program concepts, durations of engagement of students, their working time, kind of contracts, tutorship, selection of candidates, assessment of dual students, and other features of study programs, teaching and learning processes, and active educational design.

The model needs to be *generic* in order to generate specific models that satisfy needs and expectations of three major stakeholders: dual students, higher education institutions (HEIs) and companies in which selected dual student are going to perform internship during their studies.

Specific MDHEs will be developed based on this MDHE, according to the needs of each HEI and its industrial partners. During the realisation of this project, few specific MDHEs are planned to be initially specified and tested by project partners within their piloting in WP4. It should be borne in mind that this is a pilot project, the idea is that in period of its duration, dual higher education will be implemented in academic studies. The aforementioned stems from the fact that so far no practical classes have been realized in academic studies, at most faculty units at UoM. Additionally, it is important to point out that there is a limited number of students who can be involved in DHE as part of a pilot project. The limited number of students is conditioned by the fact that there is a large number of students in academic studies, while on the other hand the capacities of companies and the number of available mentors within them are limited.

This document also specifies the model of the legal framework of dual higher education in Montenegro (LF-MDHE) as crucial condition for implementation of dual education in Montenegro. The specified model can serve as a guide for policy makers and legislators during preparation of the legal framework and the legislation of dual higher education in Montenegro.

Section 2 describe the methodology suggested for creation of the legal framework of dual higher education in Montenegro and for specification of a specific model od dual higher education agreed between a HEI and one or more companies / its dual education partners.

Section 3 specifies the model of legal framework of dual education in Montenegro.

Section 4 specifies the generic and flexible model of dual higher education. The presented model may serve as base for the specification of particular model of dual higher education for a HEI and

its company-partners. Five parallel and sequential scheduling models are presented within this section. These models can be used for specification of working and teaching/learning time intervals during an academic year.

It is especially important to point out that the generic model should serve as a basis that defines the main aspects of the implementation of dual higher education. This means that the generic model defines only the key aspects of dual education, whereby detailed elaboration should be included in specific models, which will be developed by each of the faculties individually, taking into account the needs and requirements of project partners. For this reason, several variations have been proposed for this generic model, so that the project partners can choose the one that is most acceptable to them and adapt it to their own needs. Also, it should be borne in mind that a given generic model is not binding on member projects and its main goal is to serve as an example on the basis of which specific models could be formulated and implemented. This means that partners in the development of specific models can retain all or only some of the attributes contained in the generic model, but also can add those that are adequate, taking into account the specificities of activity in which they are engaged. For this reason, the generic model suggests ways to model some of the key issues that arise in the implementation of dual higher education (such as schedule of learning and working time) and points to important issues to consider, while more detailed aspects (such as selection of students, formal relationship between student and company, etc.) should be specified through the development of specific models, which activity is planned within WP4 - Pilot testing of the generic DUALMON model. The two examples on how a concrete and specific model of dual higher education (MDHE) may be generated from the generic and flexible model of dual higher education (GF-MDHE) in a specific DHE implementation context are given in the Appendix of this document.

Concluding Section 5 gives a short overview of contributions of this document and suggestions how it could be used by HEIs, companies and legislators interested for DHE implementation in Montenegro.

2. The methodology

The first step toward implementation of **Dual Higher Education (DHE**) is specification of the needs and implementation possibilities of Higher Education Institution (HEI), in our case faculties and their partner companies. This should be done by **Model of Dual Higher Education (MDHE)**. In order to implement DHE, the legal framework should be defined at national level, having in mind good practice of countries from the Region, which have already implemented dual education, as well as specific needs of Montenegro. Therefore, the proposed methodology for specification of a flexible and generic MDHE for Montenegro has two phases (Figure 2.1):

1. Phase 1: Speciation of the legal framework of DHE;
2. Phase 2: Specification of the flexible and generic MDHE for implementation by HEIs and companies

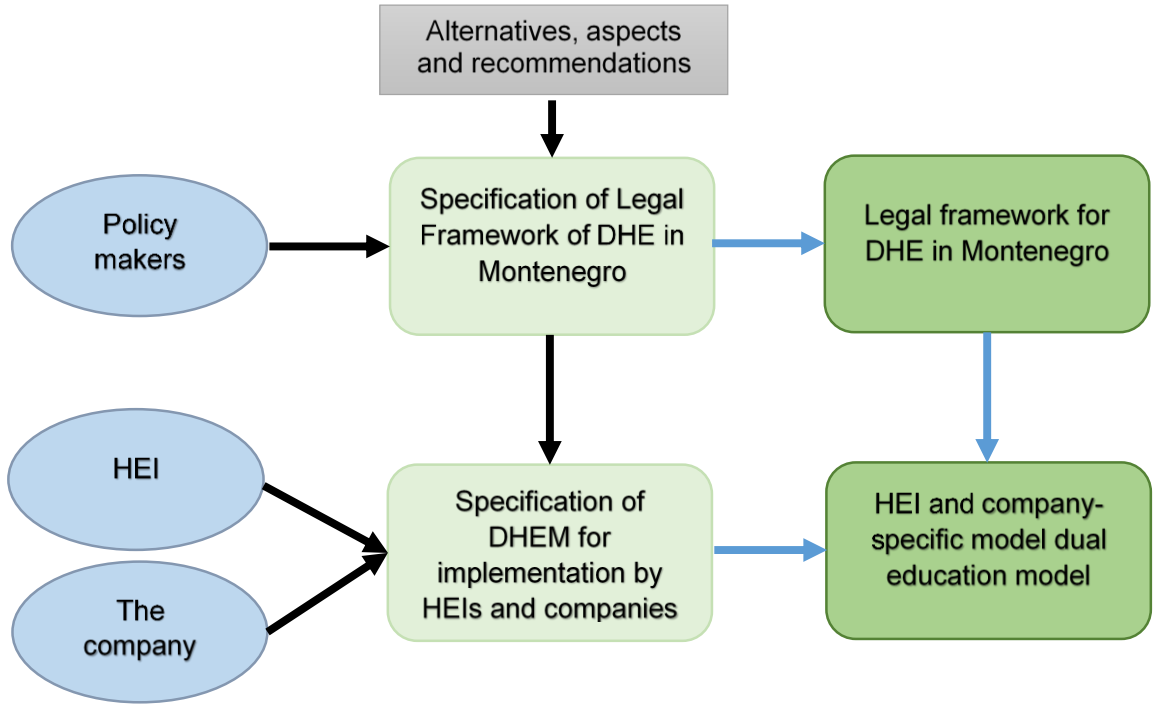


Figure 2.1. The proposed methodology for specification of the generic and flexible MDHE

According to the Work Plan of DUALMON project, the proposals for legislation of DHE in Montenegro will be done in *WP3 - Creation of Legal and Quality Assurance Conditions for Implementation of dual higher education.* The goal of the Phase 1: *Specification of the legal framework of DHE* is to provide a basis for further activities in WP3, as it will propose alternative and possible solutions and recommendations for DHE legislation. This provides a decision space for solutions to be specified in WP3.

Ones the **Legal Framework of DHE (LF-DHE)** is agreed by project partners and other stakeholders and specified in Phase 1, there will be enough preconditions for development of generic and flexible MDHE in Phase 2. The developed MDHE should be implemented by HEIs and companies.

3. Specification of the Legal Framework of DHE

The aim of the specification of the Legal Framework of Dual Higher Education in Montenegro (LF-DHE) is to specify a possible decision space for legislation of DHE in Montenegro. This specification will be used by official policy and decision makers in Montenegro. It should identify factors to be taken into account during specification of the legislation of DHE and represent the core of the LF-DHE to be proposed here.

Factors of the Legal Framework of DHE (LF-DHE) provides a basis for specification of the legal status of DHE at the national level. Selection of factors and their numbers may vary, depending of the level of legislation chosen by official authority. There are countries that have very liberal legislation, that leave to companies and HEIs a lot of freedom for DHE implementation. There are also countries that have a very detailed legislation of DHE, and companies and HEIs are very constrained when they specify their specific MDHE. Having this in mind, we propose 15 factors of the national DHE:

1. Status of the student
2. Legal relationship between the student and the companies
3. Legal relationship between the HEI and the company
4. Educational programs and specification of competences of dual students
5. Evaluation of acquired competences
6. The approach to DHE implementation
7. Roles and responsibilities for the implementation of MDHE
8. Accreditation of Dual programs
9. Supporting documents required by officials for accreditation/registration of dual programs.
10. National organizational structure to support DHE
11. Regulatory framework to support collaboration and partnerships between different universities for DHE
12. Financing of DHE
13. Tuition fees for Dual programs
14. Eligibility criteria for the company to hire dual students
15. Incentives for companies

For each factor it is necessary to specify possible alternative solutions, different aspects that may be included or recommendations to policy makers, and for each of specified alternative, aspect or recommendation, optionally, more specification may be provided (Figure 3.1).

Figure 3.1 Components of a Legal Framework of DHE

Based on analysis of legislation in countries of the project partners (Programme Countries) and some other EU countries, we specified other components of proposed LF-DHE in Montenegro, presented in Table 3.1.

Table 3.1 Components of proposed Legal Framework of Dual Higher Education in Montenegro

No.	Factors	Alternatives, aspects or recommendations	What should be specified
1.	Status of the student	Dual student has a special status	
		No special status	
2.	Legal relationship between the student and the companies	A legal relationship is required	The typology of students' tasks is specified The number of hours in the work environment, per subject/ term/year The need to comply with a learning schedule where presence at work does not prevail over the student's commitments at the university The type of remuneration students receive etc.
3.	Legal relationship between the HEI and the companies	A legal relationship is required	The skills and competences to be acquired by students should be known in advance The organizational and administrative aspects that will regulate the relationship between trainers and tutors of both institutions Models of financial relationships Series of minimum criteria for company tutors should be established to ensure the quality of learning in the work environment

No.	Factors	Alternatives, aspects or recommendations	What should be specified
4.	Educational programs and specification of learning outcomes and competences of dual students	National regulation should obliged universities and companies to specify MDHE in their agreements	Educational programs must be flexible enough so that each student can perform *different tasks* in the company and provide the opportunity to create *different itineraries* for collaboration between the educational institution and the company, provided that *the critical generic and specific competences of each field of study are reached*
			Higher education stands out because of its orientation towards problem solving and research, competences that the educational programs must assume, and *should facilitate their understanding both in the academic and in the work* environment
5.	Evaluation of acquired competences	National regulation should obliged HEIs and companies to specify in their agreements the following topics	The competences of higher education are more in line with problem solving and research capacities, and their evaluation is more complex because of the diversity of tasks and problems each student faces. That is why, given the flexibility of the educational programs mentioned above, *more flexibility in the evaluation systems should also be introduced*
		This regulation is not specified at the national level	This regulation should also cover *the financing system of educational institutions* offering and regulating different models to select and later manage when designing their organizational models
6.	The approach to DHE implementation	The PUSH approach, the university or educational institution offers qualified people to the market and the market itself integrates them, depending on needs and suitability	
		In the PULL approach, on the contrary, it is the labour market itself that pulls the university, forcing it to adapt to the specific needs of the labour market	

No.	Factors	Alternatives, aspects or recommendations	What should be specified
		Both approaches are supported. The university may choose the approach that is the most convenient in a concrete case.	
7.	Roles and responsibilities in the implementation of MDHE?	The leadership is assumed by the institution of higher education or university, if the PUSH approach is implemented	
		The national educational and local administrations, in collaboration with trade associations and trade unions, activate and lead the process in this first phase, by implementing the PUSH approach	
		The company leads the process, by implementing the POOL approach	
8.	Accreditation of Dual programs	They have to be accredited	When HEI does accreditation of a program, it has to specify that the program will be offered also for dual education, and satisfy related accreditation rules.
		No accreditation is needed if dual education is an option for student of an accredited program	The HEI and partner companies have to implement Dual education according to national regulation and register their dual programs.
9.	Supporting documents required by officials for registration of dual programs	HEI implementing dual programs on accredited programs needs to submit specified supporting documents to officials	The pedagogical program must be supported by economic sectors in response to the needs of local or national territories and to be complete
			The application form requires the names of the economic sectors and companies that support the program

No.	Factors	Alternatives, aspects or recommendations	What should be specified
		There is no registration of dual programs	
10.	National organizational structure to support DHE	Vocational Training Centers (like in France)	
		There is no any structure to support dual programs.	
11.	Regulatory framework to support collaboration and partnerships between different universities for dual education	A regulatory framework is homogeneous to allow collaboration and partnerships between different universities	
		The regulatory framework is non- homogeneous and lacking legislation obstructs the implementation and development of dual training education	
12.	Financing of dual education	*Dual system is self-financing.* The cost of the compensation of students and its tuition fees are financed completely by companies or by students	
		Lump sum for fixed amount. A lump sum per student and year comes from the government. No money transferred between companies and university	
		Dual education is financed by different sources. Dual training passes through a complex circuit which mobilizes several actors: the state, regions, companies as contributors and training institutes, dual students and employers as beneficiaries.	

No.	Factors	Alternatives, aspects or recommendations	What should be specified
13.	Tuition fees for Dual programs	There are no tuition fees for public HEI funded by the government.	
		Private HEI are funded using tuition fees	Tuition fees should be paid by partner companies or students
		Public HEI use tuition fees for funding their dual programs.	Tuition fees should be paid by partner companies or students
14.	Eligibility criteria of the company to hire dual students	The company has certified tutors (mentor)	A company tutor (mentor) gets a Certificate after successfully completes a course for company tutors and if he has appropriate technical/personal experience and qualifications. The Certificate may issue HEIs with accredited dual programs.
		A company must provide one tutor for maximum five dual students.	The tutor may be engaged by contract, if he/she is not employee of the company, but must have professional qualification and mast know work practice of the company.
		The work-related learning outcomes of the dual program of the student may be achieved in the company.	
15.	Incentives for companies	The company receives incentives for each dual student	The company receives *exceptions for social contributions* and social security for wages paid to dual students
			The company receives *a tax credit* for recruitment of dual students
			The company receives a *fixed compensation allowance* for recruitment of dual students
			Small and medium companies are eligible for special financial assistance for each dual student
		The company does not receive any incentive for dual students	

The Table 1 provides alternatives or aspects or recommendations specified for each of 15 factors of LF-DHE, as well as their additional specifications. This may be the basis for further specification of proposals for DHE legislation.

4. Specification of the Generic and Flexible Model of Dual Higher Education

The Generic and Flexible Model of Dual Higher Education (GF-MDHE) includes generic and flexible part. Generic part of the model provides the base of the model of dual higher education (MDHE) and this component should ensure that the most important characteristics and features of MDHE are the same and maintained in each HEIs. The flexible part of the MDHE represents an upgrade of generic model and its role is to enable adjustment of MDHE to the specific requirements of each HDI and company in which it will be applied.

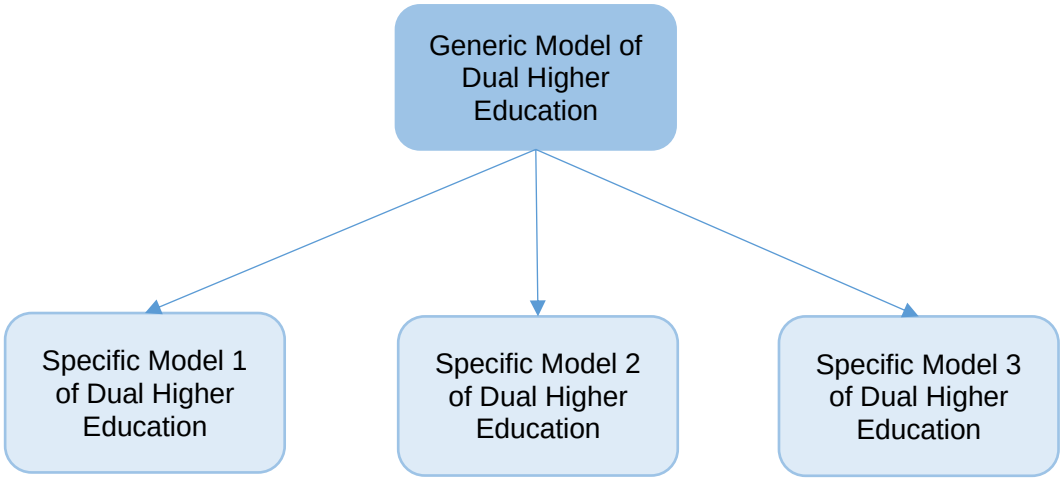


Figure 4.1 Specific MDHEs with its variants

These specific models represents an approximation of real implementation of DHE. Each specific MDHE arises from generic one and contains additional features required by context in which it is applied (specific requests of HEIs and companies). It is important to note that generic model cannot include all factors that describe all dimensions agreed between HEIs and companies, which creates the need for development of specific models. However, generic model can predict various factors which can be mandatory and/or elective. When creating specific model of DHE based on generic one, the mandatory factors should be included, as well as some of the elective dimensions that best fit into the context of arrangement between given HEI and a company. As generic model cannot predict all elective factors that should be included in specific models, those specific models should be created in a way to give possibility to the HEIs and their partners to add all necessary dimensions that are not predicted by generic model. At the same time, specific models should also be flexible in a way to allow partners to add factors that are not listed in GF-MDHE and in specific MDHE, if specific circumstances require it.

In order to minimize efforts of HEIs and companies in the process of specification of their specific MDHE, it is recommended that the generic and flexible MDHE include as many factors as it is feasible. Table 4.1 shows the proposed GF-MDHE with 38 factors. However, it should be noted that this is only the initial proposal of generic model, which will be later presented and discussed with project partners. Based on their suggestions and comments, the generic model will be changed in a way to best fit their needs, as well as the needs of the HEI and the students. Hence,

it is most likely that its final version, specified by the end of the DUALMON project will be different and better.

The specification of the generic and flexible MDHE (GF-MDHE) is constrained by the national legal framework of dual higher education (LF-DHE) specified in the previous section. As the generic and specific models of DHE should be in line with the legislation, it is expected that initially agreed models between HEIs and partners will have to be additionally modified and adjusted to the legislation, once it is officially specified within WP3. If during the implementation of specific MDHE the HEI and its partners need to specify further factors and aspects of the model, it must be previously checked whether proposed features violate the official legislation. If the inclusion of the factor is not violating any requirement specified by the national DHE legislation, they can be added in the model, as shown in the Table 4.1. The resulting GF-MDHE will be more comprehensive and more complex and more flexible than the initial version specified in Table 4.1, as it provides more factors (Figure 4.2).

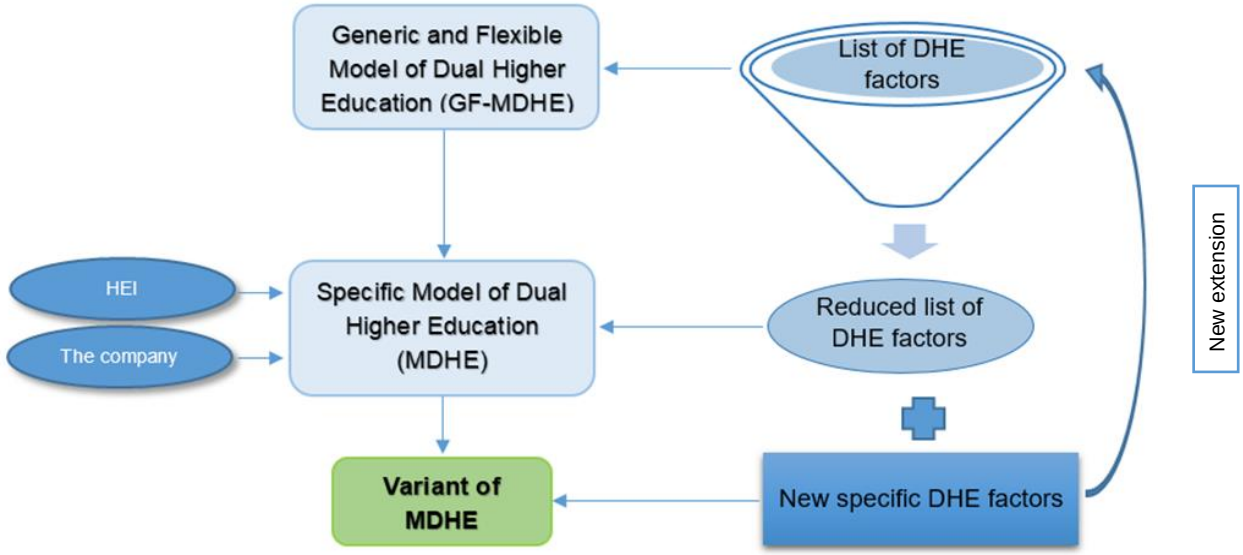


Figure 4.2 Creation of a variant of a specific MDHE and extension of DHE factors

Table 4.1.: The Generic and Flexible Dual Higher Education Model

No.	Feature	Alternatives, aspects or recommendations	What should be yet specified
Geographical and economic issues			
1.	Geographical restrictions	*Parallel model* of scheduling of working and teaching/learning times can be used if the company and the HEI are geographically close. A variant of suggested parallel models presented in Section 4.1 can be used or a new, specific parallel model specified.	Use 15 weeks semesters and parallel teaching of courses. Students work ***X*** hours and study ***Y*** hours per day and work 8

		Model should be created using Excel as shown in Section 4.1.	hours on Fridays Use a variant of the parallel model No. 1
			Use sequential block teaching of **X** courses per year. Use a variant of parallel models No.2 or No. 3
		Sequential model of scheduling of working and teaching/learning times should be chosen if the company and the HEI are not geographically close. A variant of suggested sequential models presented in Section 4.2 can be used, or a new, specific parallel model specified. Model should be created using Excel as shown in Section 4.2.	Use the sequential model No. 1 or its variant.
			Use the sequential model No. 2 or its variant.
			Use the sequential model No. 3 or its variant.
2.	Dual program is appropriate for local economic structure that requires qualified professionals.	Yes, the dual program educates the locally required professionals	List the target profiles and major local companies in this sector.
		No, the dual program educates professionals required both at local and national level.	Give explanation why your dual program is important from national point of view.
Study program			
3.	Academic level of dual education and program to be implemented	Bachelor	Specify the name of the program and the title it provides
		Other postgraduate courses	
		Master	
4.	Duration of the study	Standard duration (60 ECTS/year)	
5.	Teaching language	Montenegrin	
		English	
		Multilingual	Specify
		Other	Specify
6.	International mobility of the dual program	Collective mobility	Study up to one semester at a foreign university
		Individual mobility	Work in a foreign company

		Theoretical	Occurs in theoretical phase (eg. Erasmus)
		Practical	Occurs in practical phase (work in a company)
		Voluntary	
		Mandatory	
		No international mobility	
7.	Support of students' mobility	Administrative support	
		Legal supports	
		Financial	
		No support	
8.	The competences to be acquired and the contents	The university and company agree about the competences to be acquired in the HEI and the contents of the dual program (program curriculum).	Specify the competences to be acquired in the HEI
		The university and company agree about competences to be acquired in the workplace through specific practices	Specify the competences to be acquired in the workplace
		Types of projects and student's tasks in the workplace and in university	Initial it is planned, and later it is specified for each semester
		There is no agreement	Not recommended
Contracts			
9.	Contract between the HEI and the company	Specify dual program(s)	
		Specify planning, coordination and documentation of student's dual education	This part should be in line with the DHE model generated and agreed (this table) Specify the number of dual students to enrol each year
		Specify financial aspects	Payment of tuition fees
10.	Contract between the company and the dual student	Standard employment part-time working contract	May not specify the working time above the limit specified by DHE legislation

		Specific part-time working contract for dual students	Done according to special working status of dual students (if provided by DHE legislation) May not specify the working time above the limit specified by DHE legislation
		Contract to support dual education of the student	Specify paid tuition fee and the scholarship. Specify responsibilities of both parties May not specify the working time above the limit specified by DHE legislation
11.	Start of working of dual student	From the first year of study	
		From the second year of study	
		From the third year of study	
12.	Duration of the working contract	Four years for BSc	
		Three years for BSc	
		One year for BSc	
		Two years for MSc	
		One year for MSc	
13.	Paid work	Company pays student according to the working contract, gradually increasing 12 wages per year	
		Company pays the tuition fee and the (gradually increasing) scholarship	
14.	Company's Certificate	Yes, the company issues the certificate upon completion of the internship program.	Specifies starting date, duration of the internship, the job or jobs held, and the main tasks performed by dual student
		No, the company does not issue any certificate	Not recommended
Working time			
15.	The period of student time distribution or	Hour alternation	The student spend **X** hours in the company and **Y** hours at university

	rhythm	Daily alternation	The student works in the company on certain days of the week and attends university lectures on the other days (e.g. 3 days works, 2 days classes, or 2,5:2,5 days)
		Weekly alternation	The students is in the company (or at the university) every alternate week, or 2-3 weeks or more
		Monthly alternation	The students is in the company (or at the university) every alternate month or more.
		Quarterly alternation	The students is in the company (or at the university) every alternate quarter (3- months) or more
		Semester alternation	The students is in the company (or at the university) every alternate semester
		Combination	Time period alternations are mixed, depending of the period of the year and/or the year of study (specify it)
16.	Start of work in company	From 1st year	
		From 2nd year	
		From 3th year	
17.	Work distribution between the company and the university during a year	Fixed: 50% university, 50% company	Fixed for the whole year, but may vary during the year (more working time when there are no lectures)
		Fixed: 45% university, 55% company	
		Fixed: specific distribution of time allocation (X% university, Y% company)	
		Variable: 1st Year X1%:Y1%, 2nd Year: X2%:Y2%, 3rd Year: X3%:Y3%, and 4th Year X4%:Y4%	
18.	Change (rotation) of companies in each working period	No change	Dual student work at the same company from beginning to the end of the studies.

		Change is allowed	HEI may change the company Dual student may change the company if the contract between HEI and changed company exists
Selection of candidates			
19.	The admission criteria and the selection process	The company specifies the criteria and selects dual students using tests and interviews.	
		Joint interviews by professors and company tutors	
		The selection process in the hands of the university once the admission criteria have been agreed	Only those students who have already been previously selected by the companies can enrol
20.	Publishing of jobs for dual students by companies	The companies release a job posting for the current Dual positions at their company and interested candidate can apply.	
		The university publishes, students apply, and the university creates a short list and sends it to the company for selection of candidates (tests, interviews).	
		Firstly, student fills in an application form for the dual program they are interested in and goes for a job interview before a panel of stakeholders in training and has to pass technical tests. If more than one company offer jobs for the dual program, the student can select one of them.	
21.	Evaluation and selection of the candidates	The company tests the candidates, conduct interviews and select the candidates to hire.	
		The panel of stakeholders tests the candidates, conduct interviews and select the candidates for the job in one of interested companies.	
Tutorship			
22.	Tutorship realization	An official tutor from the university, and optionally, one or more operative tutors from the company	

		Or: Two tutors from the university and one from the company. One from the university is tutoring the academic filed and the second one liaises with the tutor of the company and keeps track of the student's work in the company.	
		Or: Two tutors - one from the university and one - from the company.	
		Or: Only one tutor from the company	
23.	The company tutor profile	The profile and functions of the company tutor are established and cover *both technical qualifications and the teaching capacities.*	
		The company tutor will have a brief training in following areas: the dual educational model, the teaching - learning process, the competences to be acquired by the student and the proposed evaluation system	
		The company has a "company tutor hosting guide", as an addition to F2F *(Face To Face)* training of tutors	
24.	Collaboration of company tutors with students	Biannual follow-up meetings with each student, as well as monthly class meetings with class delegates	
		Or: With tutoring in the company, each student meets with the company tutor at least monthly in order to evaluate the evolution and the degree of acquisition of the competences.	
		Or: 3 to 5 meetings are trilateral during academic year (student, university tutor and company tutor) in order to check their evolution and identify specific needs.	
		Or: The company tutor meets the dual student at least once a week.	
Teaching-learning process			
25.	Type of lecturers	Full-time lecturers,	
		Guest lecturers from other universities and colleges.	
26.	Evaluation of the company by the student	Every 6 months the student makes an assessment of his learning process in the company and reflects on the degree of acquisition of the competences expected for that semester.	
		The student evaluates the company according to established quality criteria.	

		Other forms of evaluation of the company	
		No evaluation of the company	
27.	The evaluation of the companies has two fundamental inputs.	The degree of acquisition of target competences in the workplace	
		The evaluation that the student himself makes of his/her stay in the workplace.	
28.	Assessment of ability of the company to match the acknowledged degree requirements		List relevant performances of the company
		Relies of company's performances	
		Actions to achieve the goal	List actions to achieve the goal
		Response to stressful situation and opportunities.	Specify how the company respond to stressful situation
29.	Assessment of ability of the university to implement active pedagogy	Implementation of problem/based learning	
		Reporting tools, including dual training booklet	
		Workshops on the standpoint and educational practices concerning the pedagogy of dual training and support	
		Reflections and dissemination of best practices concerning the pedagogy of dual training and support	
		Pedagogical innovations: active pedagogies, e-learning, virtual desk, seminaries abroad and invitation of foreign speakers	
30.	Assessment of ability of the university to implement didactic approach	The company implements a structured, phased learning process in the company (e.g., 1. student integration in the company and developing technical knowledge, 2. development of the scientific knowledge and autonomy or individual training, 3. industrial project)	
Active educational design			
31.	Implemented pedagogy	Deductive (first learn theory, then apply it)	Student first compete all academic courses and the have an (summer) internships.
		Inductive (start from a problem, and then build the theory and solutions)	"Real life problems" are linked to their theoretical background by problem based learning

			(recommended for dual education). For instance: 1. Industrial project in the company in 1st semester 2. Study project reflecting real life company problem, but realized at the university 3. Students have to select, deeply investigate and solve an applied (research) problem based on “real business priorities” at the latest in the last semester
32.	The E-portfolio (electronic formalization of experience)	It is a way to make students reflect about their personal and professional experience through a three-step process: 1. proofreading, 2. writing and valuation of experience leading to a life-wide curriculum	
33.	Students monthly meeting minutes	The meeting minutes manifests itself as an active tool to illustrate the relationship between the university based and work based elements of the programme	In the monthly meeting minutes, specific competences related to company and tasks/activities are transcribed. These notes need to be accessible at any time for the educational institution for review and signoff. The monthly meeting minutes diary remains in the portfolio until the last year of the degree, then the students assess the competences achieved so far and reflect upon which ones need to be developed
34.	Regular contacts	Onsite visits and/or email/telephone contact) between the workplace (usually with the mentor) and the university (academic tutor)	

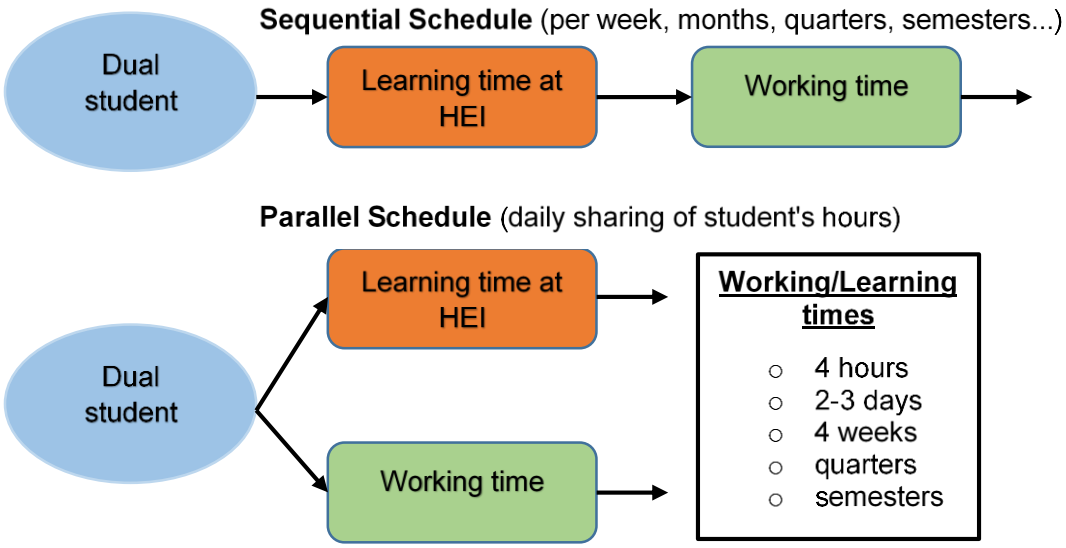
Assessment of dual students			
35.	Learning outcomes and success indicators	The correct definition of learning outcomes should be specifies	
		Success indicators should be specified	Take into account all the aspects of the activity, performances, action to achieve the goal, reaction with respect to stress situation and opportunities.
36.	Who performs the evaluation?	Assessment is done jointly with the student, the company mentor and the university tutor based on the existing requirements of the company and the university	Recommended
		No assessment. Only student's written report and oral presentation of student's evolution in each dual period.	
37.	What should be evaluated? (multiple answers are possible)	The knowledge and skills needed to perform their work, and achieved learning outcomes.	
		The theoretical knowledge acquired	
		The adaptation of the student to a real job	
		Something else	
38.	Kind of evaluation (multiple answers are allowed)	Written and oral exams	
		Individual assignments	
		Team work	
		Report on their performance in the company	
		Projects	
		Something else	Specify
39.	How many evaluation attempts are allowed?	There will be only one evaluation	The student must pass both the theoretical part (university) and the practical part (company). If either of the two are failed, the student will not obtain the final degree.
		There are two evaluations	
		Others	Specify

One of the most important factor of the specified Generic and Flexible MDHE is "Working time", as it requires that the HEI and the company to specify the schedule of work and study of their dual

student. This schedule may be (Figure 4.3):

- Sequential, when learning (study) time and working time are implemented sequential, one after the other,
- Parallel, when learning (study) time and working time are implemented simultaneously, i.e. in parallel.

Figure 4.3. Sequential and parallel schedule of work and study of dual students



If we want to be very precise, all time schedule are sequential, as it is not possible for a dual student to have classes in the same time when he works in a company. We consider schedule to be parallel if both learning and working time are perform daily. It is possible only if durations of learning (or teaching) and working time last only few hours. If their duration is few days and longer, then, they are implemented sequentially. Some of the most typical durations of learning and working times are also presented in Figure 4.3. We will present here few time schedules that might be the most interesting for HEIs and companies in Montenegro.

4.1 Parallel working, teaching and learning time schedules

Strictly speaking, it is not possible to work or to have classes simultaneously, in real time, but by parallel working and teaching and/or learning we mean that *both working time and teaching/learning time are implemented during each week.* There are many ways to implement a parallel working and teaching/learning cycles during a week, but we will present two most promising ones.

4.1.1. Parallel schedule No. 1:

Within the Parallel model No.1 implementation of dual education (working time) is planned to be implemented on 2nd and 3rd year of study. This means that students of the first year do not have working time. In other semesters (from 3 to 6) the parallel schedule No.1 involves both teaching and working within the same day during teaching periods of the winter and summer semesters of 2nd and 3rd year of study. The following tables describe in more details the way of implementation of dual higher education during one academic year and this way of implementation should be the same for both (2nd and 3rd) years. According to this model, students work 3 hours daily, from Monday to Thursday, and 8 hours on Fridays. Students have certain time for individual learning during each examination periods. More precisely, they have 6 weeks in January/February, 5 weeks in June and 2 weeks in September.

Figure 4.1.1.1. Parallel schedule No.1 assuming 5 teaching hours/day and 3 working hours/day (Monday-Thursday) and 8 work hours on Fridays

Parallel model: 5WH + 3TH per day, 8WH on Fridays					
Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Total**
5	**5**	**5**	**5**	**8**	**20**
3	**3**	**3**	**3**	**0**	**20**

Legend

	Teaching time
	Working time

a. **Teaching time** is 5 hours and **working time** is 3 hours per day, from Monday to Thursdays (Figure 4.1.1.1.).
b. **Working time** is 8 hours on Fridays during two semesters (30 weeks).
c. **Learning & examination time** (students learn at home) during three examination periods in January/February, June and August/September (3x4weeks).
d. **Working time** with 40 hours a week for 4 weeks in July
e. **Summer holidays** lasting 4 free weeks in August when students are free.

In total, in 12 months (in II and III academic years of study), according to this time schedule, students have approximately 620 hours for teaching, 520 hours for individual learning and 780 hours for work in a company. In aggregate, students have 1920 hours per year for teaching, learning and working activities. In other words it means that the total student workload within one academic year is distributed as follows: 32.29% for teaching, 27.08% for individual learning and 40.62% for working activities.

Table 4.1.1.1. Academic calendar for parallel model No. 1

	Working week												
Month	**M1**	**M2**	**T1**	**T2**	**W1**	**W2**	**Th1**	**Th2**	**F1**	**F2**	**Teaching time**	**Learning time**	**Working time**
IX	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20

Working week													
Month	**M1**	**M2**	**T1**	**T2**	**W1**	**W2**	**Th1**	**Th2**	**F1**	**F2**	**Teaching time**	**Learning time**	**Working time**
X	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
XI	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
XII	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
I	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
II	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
III	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
IV	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
V	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
	5	3	5	3	5	3	5	3	4	4	20		20
VI	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
VII	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
VIII													
											620	520	780
													Sum: 1920

4.1.2. Parallel schedule No. 2:

Within the Parallel model No.2 implementation of dual education (working time) is also planned to be implemented during 2nd and 3rd year of study. This means that students of the first year do not have working time. However, this model involves combination of working and teaching hours during the same day for dual students during second and third years of their study. The model is organized in a way that beginnings of both semester in academic year are reserved for teaching (6 hours per day for 7 weeks in both semesters) and individual learning (2 hours per day for 7 weeks in both semesters). However, the second parts of the semesters are organized in a way that students attend classes 4 hours per day and also have 4 working hours a day (approximately 8-9 weeks in each semester of second and third year). This model also involves learning time of dual students during each examination period (January and first two weeks of February, June and first two weeks of August). The following tables describe in more details the way of implementation of dual higher education during one academic year and this way of implementation should be the same for both (2nd and 3rd) years.

Figure 4.1.2.1. Parallel schedule No.2

h/day	6th + 2lh	4wh + 4th	8lh	6th + 2lh	4wh + 4th	8lh	8wh	8lh
	7 w	9 w	6 w	7w	8w	5w	4w	2w
h/week	30	20	20	30	20	20	20	20
h/week	10	20	20	10	20	20	20	20
Teaching (total): 760								
Learning (total): 660								
Working (total): 500								

Legend

	Teaching time
	Working time
	Individual learning

In total, in 12 months (in II and III academic years), according to this time schedule, students have approximately 760 hours for teaching, 660 hours for individual learning and 500 hours for work in a company. In aggregate, students have 1920 hours per year for teaching, learning and working activities. In other words it means that the total student workload within one academic year is distributed as follows: 39.58% for teaching, 34.38% for individual learning and 26.04% for working activities.

Table 4.1.2.1. Academic calendar for parallel model No. 2

Working week													
Month	M 1	M 2	T 1	T2	W1	W2	Th1	Th2	F1	F2	Teaching time	Learning time	Working time
IX													

Working week													
Month	M 1	M 2	T 1	T2	W1	W2	Th1	Th2	F1	F2	Teaching time	Learning time	Working time
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
X	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
XI	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
XII	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
I	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
II	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
III	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
IV	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
V	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
	4	4	4	4	4	4	4	4	4	4	20		20
VI	4	4	4	4	4	4	4	4	4	4		40	

Working week													
Month	**M 1**	**M 2**	**T 1**	**T2**	**W1**	**W2**	**Th1**	**Th2**	**F1**	**F2**	**Teaching time**	**Learning time**	**Working time**
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
VII	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
VIII	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
											760	660	500
Sum: 1920													

4.1.3. Advantages and disadvantages of parallel models of DHE

Parallel schedule requires short distance and good traffic communication between two locations (the company and the HEI). The ideal case is if they share the same building or location. It is not advised to implement this time schedules if transportation time between two locations takes more than one hour.

Starting from the specificities of the faculties and activities of the companies that are partners in the pilot project, the application of parallel models can be difficult, and therefore there are certain advantages and disadvantages of the previously presented models. The main aggravating circumstance refers to the distance between the faculties and the companies in which the student would do the internship, which means that the student would need some time to get from the faculty to the company, which would be to the detriment of working or teaching time. However, as the goal of the generic model is to present a general framework, based on which each faculty will form a specific model for itself, the possibility of applying parallel models should not be excluded, especially taking take into account the nature of activities and spatial distance between faculties and companies that could be involved in a dual education project in the future.

The major benefit of these parallel time schedule is that the student does not make any brake in his work assignments or in his project in the company, and can have classes every day at the university. But, the timetable of classes must take into account availability of dual student. Another advantage of this schedule is the fact that during the first academic year dual students gain necessary theoretical background which enables them to easier adopt to working environment in the partner institution (company).

4.2 Sequential working, teaching and learning time schedules

"Sequential" models are models that specify that working and teaching hours are not realized one after another. These models allows combination of teaching and individual learning hours or combination of working and individual learning hours. There are scheduling combinations that can be created when applying sequential models. Here will be presented two possible options. However, given schedules within sequential models can be changed in order to be adjusted to the needs of DHE partners.

The two sequential models of time schedules that we will present here are:

4.2.1. Sequential model No. 1:

The sequential model No. 1 does not include working hours during the first year of study, but only in second and third years. In another words, implementation of dual education (working time) is planned to be implemented on 2nd and 3rd year of study. The schedule of teaching, working and learning time within first sequential model is given as follows:

a. **Working time** – 5 hours per day for 11 eleven weeks during the examination period (January/February and June) and 8 hours per day in 4 weeks in July and first two weeks in August.

b. **Teaching time** - 5 hours per day for 31 weeks realized during the teaching part of the semester.

c. **Learning time –** 3 hours per day during each month of the year except July, August two weeks of September (which are planned as free weeks for dual students).

It should be noted that the following tables describe in more details the way of implementation of dual higher education during one academic year and this way of implementation should be the same for both (2nd and 3rd) years of study.

Figure 4.2.1. Sequential model No. 1 - weekly working, teaching and learning times

	16 W	6 W	15 W	5 W	6 W	4 W	Teaching	Learning	Working
H/week	25	25	25	25	20		775		395
H/week	15	15	15	15	20			630	120
Sum:							**775**	**630**	**515**

Legend

	Teaching time
	Working time
	Individual learning

The sequential model No.1 (Figure 4.2.1) is the easiest for the implementation, as it does not require that the HEI changes the organization of teaching process. Both semesters continue to operate, students have classes for 5 hours/day and individual learning time for 3 hours/day every day from Mondays to Fridays. Students have 5 hours/day for working during the examination part of the semester and 8 hours/day for 6 weeks (in July and first two weeks of August).

In total, during an academic year, according to this time schedule, students have 775 hours for teaching,

630 hours for individual learning and 515 hours for work in a company. In aggregate, students have 1920 hours per year for teaching, learning and working activities. In other words it means that the total student workload within one academic year is distributed as follows: 40.36% for teaching, 32.82% for individual learning and 26.82% for working activities.

Table 4.2.1. Academic calendar for sequential model No. 1

Working week													
Month	**M1**	**M2**	**T1**	**T2**	**W1**	**W2**	**Th1**	**Th2**	**F1**	**F2**	**Teaching time**	**Learning time**	**Working time**
IX	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
X	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
XI	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
XII	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
I	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3		15	25
II	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
III	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
IV	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
V	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	
	5	3	5	3	5	3	5	3	5	3	25	15	

Working week													
Month	**M1**	**M2**	**T1**	**T2**	**W1**	**W2**	**Th1**	**Th2**	**F1**	**F2**	**Teaching time**	**Learning time**	**Working time**
	5	3	5	3	5	3	5	3	5	3	25	15	
VI	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3		15	25
	5	3	5	3	5	3	5	3	5	3		15	25
VII	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
VIII	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
											775	630	515
													Sum: 1920

4.2.2. Sequential model No. 2:

The main characteristic of second sequential model is that certain amount of teaching classes is replaced with working hours of dual student. This model is designed in a way that the first academic year contains only teaching and does not include working hours. Implementation of dual education (working time) is planned to be applied on 2nd and 3rd year of study However, the beginning of each semester of second and third year is also reserved only for teaching, in order to students gain needed theoretical knowledge which will be required from them on the working position in a partner company. The second part of each semester during the 2nd and 3rd academic year is organized in a way that students have three days a week planned for teaching, and two days a week planned for working. This means that the implementation of sequential model No. 2 requires certain change of current teaching process in Montenegrin HEIs. The model also does not provide any special time for preparation of exams in September, so students have to learn continuously during teaching/learning cycles. The schedule of teaching, working and learning time within first sequential model is given as follows:

a. **Working time** – two days a week (Thursday and Friday) for 15 weeks during the academic year, and every day for 6 weeks during July and first two weeks of August (as this is the time when dual students do not have classes on HEI).

b. **Teaching time –** every day with 6h/day for 7 weeks at the beginning of the winter semester and 9 weeks at the beginning of the summer semester. Besides of that, teaching time is also planned for three days a week with 6h/day during 15 weeks (9 weeks of one semester and 6 weeks of second semester of academic year).

c. **Learning time –** each day for six weeks during the examination period in January and first two weeks of February, as well as each day for 5 weeks during the examination period in June. Learning hours are also planned during the teaching period with 2h/per day.

It should be noted that the following tables describe in more details the way of implementation of dual higher education during one academic year, and this way of implementation should be the same for both

(2nd and 3rd) years of study.

Figure 4.2.2. Sequential No. 2

	7 W	9 W	6 W	9 W	6 W	5 W	6 W	4 W	Teaching	Learning	Working
H/week	30	18	20	30	18	20	20		750	220	120
H/week	10	16	20	10	16	20	20			380	360
H/week		6			6					90	
Sum:									**750**	**690**	**480**

Legend

	Teaching time
	Working time
	Individual learning

In total, during an academic year, according to this time schedule, students have 750 hours for teaching, 690 hours for individual learning and 480 hours for work in a company. In aggregate, students have 1920 hours per year for teaching, learning and working activities. In other words it means that the total student workload within one academic year is distributed as follows: 39.06% for teaching, 35.94% for individual learning and 25% for working activities.

Table 4.2.2. Academic calendar for sequential model No. 2

Working week													
Month	**M1**	**M2**	**T1**	**T2**	**W1**	**W2**	**Th1**	**Th2**	**F1**	**F2**	**Teaching time**	**Learning time**	**Working time**
IX													
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
X	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
XI	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
XII	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
I	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	

Working week													
Month	M1	M2	T1	T2	W1	W2	Th1	Th2	F1	F2	Teaching time	Learning time	Working time
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
II	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
III	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
IV	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
V	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
	6	2	6	2	6	2	4	4	4	4	18	6	16
VI	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
VII	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
VIII	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
											750	690	480
													Sum: 1920

4.2.3. Sequential model No. 3:

The third sequential model schedules working hours of dual student after gaining the theoretical knowledge planned by all courses within study programme. That means that dual student has only teaching and individual learning during the first two years of a study, while practice in a company is planned at the end of the third year of study. More precisely, the first semester and a half of the second semester of 3rd year is intended for learning at HEI, while the second part of the second semester is

intended for working in a company. This model also includes certain amount of time for individual learning of dual student, which is scheduled during the examination periods in January/February and June.

The main benefit of this model is the fact that it provides dual students with practical skills and knowledge after acquiring the theoretical knowledge at HEI. This enables them to apply the theoretical knowledge to solving real practical problems during their working hours in a company. This way both, better understanding of theoretical knowledge and gaining practical skills, is more efficiently achieved. On the other hand, this model is also suitable for academic (not applied) studies at HEIs, where gaining theoretical knowledge, followed by numerical and laboratory exercises, cannot be replaced by a practice at the first two years of studies. On the other hand, practical implementation of gained knowledge and skills will be added value for these students, and will make them more attractive for industry.

Schedule of time intended for working, teaching and individual learning for this sequential model is as follows:

a. **Working time** – every day with 8h/day for 8 weeks during the April and May in the second semester of the 3rd year of a study, and every day with 4h/day for 4 weeks in June.

b. **Teaching time –** every day with 6h/day during the first semester and during the first half of the second semester of the 3rd year (i.e. in February and March)

c. **Learning time –** during the teaching period (first semester and first half of the second semester) each day with 2h/day; also each day with 8h/day for 6 weeks during the examination period in January and first two weeks of February, as well as each day with 4h/day during the examination period in June.

Figure 4.2.3. Sequential No. 3

	18 W	6 W	7 W	8 W	5 W	Teaching	Learning	Working
H/week	30	20	30	20	20	750	120	260
H/week	10	20	10	20	20		470	160
Sum:						**750**	**590**	**420**

Legend

	Teaching time
	Working time
	Individual learning

In total, during an academic year, according to this time schedule, students have 750 hours for teaching, 590 hours for individual learning and 420 hours for work in a company. In aggregate, students have 1760 hours per year for teaching, learning and working activities. In other words it means that the total student workload within one academic year is distributed as follows: 42.62% for teaching, 33.52% for individual learning and 23.86% for working activities.

Table 4.2.3. Academic calendar for sequential model No. 3

Working week													
Month	**M1**	**M2**	**T1**	**T2**	**W1**	**W2**	**Th1**	**Th2**	**F1**	**F2**	**Teaching time**	**Learning time**	**Working time**
IX	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	

Working week													
Month	M1	M2	T1	T2	W1	W2	Th1	Th2	F1	F2	Teaching time	Learning time	Working time
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
X	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
XI	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
XII	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
I	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
II	4	4	4	4	4	4	4	4	4	4		40	
	4	4	4	4	4	4	4	4	4	4		40	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
III	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
	6	2	6	2	6	2	6	2	6	2	30	10	
IV	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
V	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
	4	4	4	4	4	4	4	4	4	4			40
VI	4	4	4	4	4	4	4	4	4	4		20	20
	4	4	4	4	4	4	4	4	4	4		20	20
	4	4	4	4	4	4	4	4	4	4		20	20
	4	4	4	4	4	4	4	4	4	4		20	20
	4	4	4	4	4	4	4	4	4	4		20	20

Working week													
Month	**M1**	**M2**	**T1**	**T2**	**W1**	**W2**	**Th1**	**Th2**	**F1**	**F2**	**Teaching time**	**Learning time**	**Working time**
VII													
VIII													
											750	590	420
Sum: 1760													

4.2.4. Advantages and disadvantages of sequential models of DHE

The main characteristic of sequential models is reflected in the fact that it is necessary to adjust the teaching processes at HEI, so that one part of the semester is planned for the practical training of students through work in the company. Although this is to the certain extent aggravating circumstance for HEI, the main advantage of sequential models stems from the fact that they allow the student to practically, through work in the company apply the acquired theoretical knowledge and skills. This provides positive effects by strengthening students' practical competencies and readiness for the labour market on the one hand, as well as by harmonizing students' knowledge with existing company requirements on the other hand.

An additional advantage of sequential models is that they allow a significant degree of flexibility in terms of scheduling of teaching and working time, which enables the full alignment of these models with the requirements of companies. This is especially important considering that different activities of companies require different dynamics of student presence in the workplace. In other words, the specifics of work processes, that vary from company to company, define the need for continuity of student work, which dictates whether the shift between working and teaching hours will be made on a daily, weekly or monthly basis.

5. Conclusions

This document specifies the generic and specific model of dual higher education (GF-MDHE) that could be implemented in Montenegro. The Generic model of Dual Higher Education (GF-MDHE) includes generic and flexible part. Generic part of the model provides the base of the model of dual higher education (MDHE) and this component should ensure that the most important characteristics and features of MDHE are the same and maintained in each HEIs. The flexible part of the MDHE represents an upgrade of generic model and its role is to enable adjustment of MDHE to the specific requirements of each HDI and company in which it will be applied.

The GF-MDHE is specified as a table with 38 rows representing its attributes, and three columns specifying possible values of attributes. DHE partners choose one or more offered values for each of attributes. The given generic model serves as a basis for HEIs and companies in a way that allows them to create specific models based on defined attributes. The flexibility of this model is reflected in the fact that for each defined attribute several possible variants are provided, that companies and HEIs can choose. Besides of that, the generic model presented in this way enables the specification of new attributes, as well as the omission of those that are not relevant, starting from the specific needs of the partners.

The document offers two parallel models of work and teaching/learning schedules, as well as three sequential models. They help DHE partners to choose one that suits them the most, but DHE partners may also modify them or even they can create new scheduling models.

The document, in Section 3, defines the model of the legal framework of dual higher education in Montenegro (LF-DHE), with 15 attributes that specify major features of the legal framework. This section aims to point out the basic aspects of the legal framework that need to be modified and harmonized with the needs of the implementation of dual education programs. Through emphasizing the most important legislative prerequisites for the establishment of dual education, this section gives inputs to decision makers by defining the key attributes of the legal framework relevant to dual education, and by analysing several different ways in which these attributes can be realized.

In order to demonstrate the use of both models of the legal framework (LF-MDHE) and of the generic and flexible model of dual higher education (GF-MDHE), two specific MDHEs were created. The proposed general and specific models in this document are created with the aim to encourage the discussion of all partners included in the project. The final versions of these models will be specified based of the feedbacks received from the organized discussion forums and written suggestions from individuals and/or organizations.

APPENDIX - Examples of a Specific Model of DHE

In order to demonstrate how a DHE partners can create their specific model of dual higher education (MDHE), we will use the General and Flexible Model of Higher Dual Education (GF-MDHE), and specify options that define this specific MDHE. The specific model for Faculty of Economics University of Montenegro is presented below in the Table A1, within which the pink colour indicates the chosen options. The specific model for Faculty of Electrical Engineering University of Montenegro is given in the Table A2, within which the grey colour indicates the chosen options.

The specific model for Faculty of Economics University of Montenegro is presented below in the Table A1. This specific model is part of pilot project that would be explaned in more detail in WP4. The basic idea of the specific model for Faculty of Economics is that dual education could be applied in academic studies, in the module Microeconomics (third year, VI semester). Courses presented in this module offer excelent theoretical basis which students can apply in the company.

The specific model relies on the Sequential model No 3. which is presented in chapter 4.2 Sequential working, teaching and learning time schedules. Each professor who teaches courses in the module Microeconomics, will choose several students (for example 5 students) to pilot dual higher education for the time of duration of the project.

During the first part of VI semester (in February and March) dual students will atend only the lectures, while in the second part of the same semestar (in April and May) students will work in the company, 8 hours per day. With this scedule dual students will have enough time to acquire basic theorethical knowledge from professors, and to implement that knowledge in the company. Each dual student will have mentor in the company, who will be obliged to write a report on students's achived results. Professors will use this report to make a final grade for a student.

It should be pointed out that after the completion of the project, it will be assessed in which direction the model of dual higher education, which will be applied at the Faculty of Economics, should be additionally developed, with the aim to ensure its further improvement.

Table A1: A specific model of dual higher education (MDHE) for University of Montenegro – Faculty of Economics

	Feature	Alternatives , aspects or recommendations	What should be yet specified
Geographical and economic issues			
1	Geographical restrictions	You may choose *a parallel model* of scheduling of working and teaching/learning times, if the company and the HEI are geographically close. You may use a variant of suggested parallel models presented in Section 4.1 or specify a new, specific parallel model. In any case, create the model using Excel as shown in Section 4.1.	Use 15 weeks semesters and parallel teaching of courses. Students work **3** hours and study **5** hours per day, and work 8 hours on Fridays. Use a variant of the parallel model No. 1
			Use sequential block teaching of **X** courses per year. Use a variant of parallel models No.2 or No. 3
		You may choose *a sequential model* of scheduling of working and teaching/learning times, if the company and the HEI are not geographically close. You may use a variant of suggested sequential models presented in Section 4.2 or specify a new, specific parallel model. In any case, create the model using Excel as shown in Section 4.2.	Use the sequential model No. 1 or its variant.
			Use the sequential model No. 2 or its variant.
			Use the sequential model No. 3 or its variant.
			Use the sequential model No. 4 or its variant.
			Use a new specific sequential model.
2	Dual program is appropriate for local economic structure	Yes, the dual program educates the locally required professionals	Graduate Software Engineer, companies: IST, PowMio

	that requires qualified professionals.	No, the dual program educates professionals required both at local and the national level.	Graduate economists
Study program			
3	Academic level of dual education and program to be implemented	Bachelor	BSc Economics
		Other postgraduate courses	
		Master	
		Doctorate	
4	Duration of the study	Standard duration (60 ECTS/year)	3 years, 180 ECTS
		Prolonged duration (30 ECTS/year)	
5	Teaching language	Montenegrin	Yes
		English	
		Multilingual	Specify
		Other	Specify
6	International mobility of the dual program	Collective mobility	Study up to one semester at a foreign university
		Individual mobility	Work in a foreign company
		Theoretical	Occurs in theoretical phase (e.g. Erasmus)
		Practical	Occurs in practical phase (work in a company)
		Voluntary	Yes
		Mandatory	
		No international mobility	
7	Financial support of students' mobility	Administrative support	
		Legal supports	
		Financial	
		No support	
8	The competences to be acquired and the contents	The university and company agree about the competences to be acquired in the university and the contents of the dual program (program curriculum).	Use of the competences specifies for BSc economics program.
		The university and company agree about competences to be acquired in the workplace through specific practices	Specify the competences to be acquired in the workplace
		Types of projects and student's tasks in the workplace and in university	Initial it is planned, and later it is specified for each semester

		There is no agreement	Not recommended
Contracts			
9	Contract between the university and the company	Specify dual program(s)	BSc Economics
		Specify planning, coordination and documentation of student's dual education	5 Year 1 students each year, starting from 2022/23 1 Year 3 student in 2022/23 and 2023/24
		Specify financial aspects	The scholarships for students from year 3 - amounts specify the company based on performances
10	Contract between the company and the dual student	Standard employment part-time working contract	May not specify the working time above the limit specified by DE legislation
		Specific part-time working contract for dual students	Done according to special working status of dual students (if provided by DHE legislation) May not specify the working time above the limit specified by DHE legislation
		Contract to support dual education of the student	The company pays the scholarship 100 EUR/month starting from Year 3, and may be changed based on student/s performances. Students have to work 8h/day each day during the April and May, as well as 4h/day during the examination period in June, according to sequential model No. 3

11	Start of working of dual student	From the first year of study	From 21st week of 2019/20
		From the second year of study	From 1st week of 2020/21
		From the third year of study	From 28th week of 2022/23
12	Duration of the working contract	Four years for BSc	Yes
		Three years for BSc	
		Two years for MSc	
		One year for MSc	
13	Paid work	Company pays student according to the working contract, gradually increasing 12 wages per year	
		Company pays the tuition fee and the (gradually increasing) scholarship	From year 3 scholarship 100 EUR per month
14	Company's Certificate	Yes, the company issues the certificate upon completion of the internship program.	Specifies starting date, duration of the internship, the job or jobs held, and the main tasks performed by dual student
		No, the company does not issue any certificate	Not recommended
Working time			
15	The period of student time distribution or rhythm	Hour alternation	The student spend **3** hours in the company and **5** hours at university from Monday to Thursday and 8 hours of Fridays and according to parallel model No. 1
		Daily alternation	The student works in the company on certain days of the week and attends university lectures on the other days (e.g. 3 days works, 2 days classes, or 2,5:2,5 days)

		Weekly alternation	The students is in the company (or at the university) every alternate week, or 2-3 weeks or more
		Monthly alternation	The students is in the company (or at the university) every alternate month, or more
		Quarterly alternation	The students is in the company (or at the university) every alternate quarter (3- months) or more
		Semester alternation	The students is in the company (or at the university) every alternate semester
		Combination	The students spend 420 hours in the company in April, May and June, while they spend 1000 hours at the university during the 3rd academic year.
16	Start of work in company	From 2nd year	Yes, from 21st week
		From 3th year	Yes, from 28th week
17	Work distribution between the company and the university during a year	Fixed: 50% university, 50% company	Fixed for the whole year, but may vary during the year (more working time when there are no lectures)
		Fixed: 45% university, 55% company	
		Fixed: specific distribution of time allocation (65% university, 35% company)	
		Variable: 1st Year X1%:Y1%, 2nd Year: X2%:Y2%, 3rd Year: X3%:Y3%, and 4th Year X4%:Y4%	1st Year, 1st semester no work, 2nd semester 8 hours of Fridays and 8 hours daily 5 weeks Year 2-4: 3 hours from Monday to Thursday and 8 hours on Fridays (30 weeks) + 8 hours daily during 5 weeks
18	Change (rotation) of companies in each working period	No change	Dual student work at the same company from beginning to the end of the studies.

		Change is allowed	Dual student may change the company
Selection of candidates			
19	The admission criteria and the selection process	The company specifies the criteria and selects dual students using tests and interviews.	The company has to specify selection criteria by May 1, 2019.
		Join interviews by professors and company tutors	
		The selection process in the hands of the university once the admission criteria have been agreed	Only those students who have been selected by the university can enrol
20	Publishing of jobs for dual students by companies	The companies release a job posting for the current Dual positions at their company and interested candidate can apply.	
		The university publishes, students apply and the university creates a short list and sends it to the company for selection of candidates (tests, interviews).	Yes. The HEI publishes the call for candidates.
		First students fill in an application form for the dual program they are interested in and goes for a job interview before a panel of stakeholders in training and has to pass technical tests. If more than one company offer jobs for the dual program, the student can select one of them.	
21	Evaluation and selection of the candidates	The company tests the candidates, conduct interviews and select the candidates to hire.	Yes
		The panel of stakeholders tests the candidates, conduct interviews and select the candidates for the job in one of interested companies.	
Tutorship			
22	Tutorship realization	An official tutor from the university, and optionally, one or more operative tutors from the university	

		Or: Two tutors from the university and one from the company. One from the university is tutoring the academic filed and the second one liaises with the tutor of the company and keeps track of the student's work in the company.	
		Or: Two tutors - one from the university and one - from the company.	Yes
		Or: Only one tutor from the company	
	The company tutor	The profile and functions of the company tutor are established and cover *both technical qualifications and the teaching capacities.*	Yes
		The company tutor will have a brief training in the dual educational model, the teaching - learning process, the competences to be acquired by the student and the proposed evaluation system	Yes
		The company has a "company tutor hosting guide", as an addition to F2F training of tutors	
23	Collaboration of tutors	Biannual follow-up meetings with each student, as well as monthly class meetings with class delegates	Yes
		Or: With tutoring in the company, each student meets with the company tutor at least monthly in order to evaluate the evolution and the degree of acquisition of the competences.	
		Or: 3 to 5 meetings are trilateral (student, university tutor and company tutor) in order to check their evolution and identify specific needs.	
		Or: The company tutor meets the dual student at least once a week.	Yes
Teaching-learning process			
24	Type of lecturers	full-time lecturers,	Yes
		guest lecturers from other universities and colleges,	Yes
		as well as consultants and executives	Yes

25	Evaluation of the company by the student	Every 6 months the student makes an assessment of his learning process in the company and reflects on the degree of acquisition of the competences expected for that semester.	
		The student evaluates the company according to established quality criteria.	Yes. Student sends its assessment to both
		Other forms of evaluation of the company	
		No evaluation of the company	
26	The evaluation of the companies has two fundamental inputs.	The degree of acquisition of target competences in the workplace	Yes
		The evaluation that the student himself makes of his stay in the work centre.	Yes
27	Assessment of ability in the company to match the acknowledged degree requirements	Relies of company's performances	The company develops software products or components for its clients.
		Actions to achieve the goal	List actions to achieve the goal
		Response to stressful situation and opportunities	Specify how the company respond to stressful situation
28	Assessment of ability of the university to implement active pedagogy	Implementation of problem/based learning	
		Reporting tools, including dual training booklet	Yes
		Workshops on the standpoint and educational practices in connection with experts of dual training	Yes
		Reflections and dissemination of best practices concerning the pedagogy of dual training and support	Yes
		Pedagogical innovations: active pedagogies, e-learning, virtual desk, seminaries abroad and invitation of foreign speakers	Yes
		Specific application situations must be used at the university, such as case studies or condensed real business problems; regular visits to companies and exchange times are also a necessity, case studies must be prepared by both together (academic/ business)	Yes

29	Assessment of ability of the university to implement didactic approach	The company implements a structured, phased learning process in the company (e.g., 1. student integration in the company and developing technical knowledge, 2. development of the scientific knowledge and autonomy or individual training, 3. industrial project)	Yes. The company will specify the phased learning process of students at the company.
Active educational design			
30	Implemented pedagogy	Deductive (first learn theory, then apply it)	Student first compete all academic courses and they have an (summer) internships
		Inductive (start from a problem, and then build the theory and solutions)	"Real life problems" are linked to their theoretical background by problem based learning (recommended for dual education). For example, students have to select, deeply investigate and solve an applied (research) problem based on "real business priorities" at the latest before finishing VI semester.
31	The E-portfolio (electronic formalization of experience)	It is a way to make students reflect about their personal and professional experience through a three-step process: 1. proofreading, 2. writing and 3. valuation of experience leading to a life-wide curriculum	Yes

32	Students monthly meeting minutes	The meeting minutes manifests itself as an active tool to illustrate the relationship between the university based and work based elements of the programme	In the monthly meeting minutes, specific competences related to company and tasks/activities are transcribed. These notes need to be accessible at any time for the educational institution for review and signoff. The monthly meeting minutes diary remains in the portfolio until the last year of the degree, then the students assess the competences achieved so far and reflect upon which ones need to be developed
33	Regular contacts	Onsite visits and/or email/telephone contact) between the workplace (usually with the mentor) and the university (academic tutor)	At least once a year, the HEI tutor visits students in the company.
Assessment of dual students			
34	Pedagogical goals and success indicators	The correct definition of pedagogical goals should be specifies	
		Success indicators should be specified	Take into account all the aspects of the activity, performances, action to achieve the goal, reaction with respect to stress situation and opportunities.
35	Who performs the evaluation?	Assessment is done jointly with the *student,* the *company mentor* and the *academic tutor* based on the existing requirements of the company and the university	Yes
		Done jointly by school and company tutors.	
		Done by company tutor	

		Done by school tutor	
		No assessment. Only student's written report and oral presentation of student's evolution in each dual period.	
36	What should be evaluated? (multiple answers are possible)	The knowledge and skills needed to perform their work, and achieved pedagogical goals.	Yes
		The theoretical knowledge acquired	Yes
		The adaptation of the student to a real job	
		The evolution held since the beginning of the process	
		Something else	
37	Kind of evaluation (multiple answers are allowed)	Written and oral exams	Yes
		Individual assignments	
		Team work	
		Report on their performance in the company	Yes
		Public presentations	Yes
		Projects	Yes
		Something else	Specify
38	How many evaluation attempts are allowed?	There will be only one evaluation	The student must pass both the theoretical part (university) and the practical part (company). If either of the two are failed, the student will not obtain the final degree.
		There are two evaluations	
		Others	Specify

Pilot dual model presented in the following table (table A2) will be implemented at the Faculty of Electrical Engineering, University of Montenegro, at the sixth semester of academic studies, study program Electronics, Telecommunications and Computer Engineering, module Computer Engineering.

During the accreditation in 2016. study model of 3+2+2 is adopted at the University of Montenegro. The main idea of this accreditation was to change the high education system in Montenegro in order to make it complemental with the European educational space, as well as to produce students that are ready to start their professional careers after third year of a faculty.

The Faculty of Electrical Engineering, at the time, made crucial changes of curricula of all its academic programs, so that majority of subject with high practical importance are now held in the sixth semester. Having high level of cooperation with partners from industry, and having in mind needs of partners at the Project, as well as the availability of partners willing to offer mentorship, we made decision to pilot dual education in the sixth semester of academic study program, module Computer Engineering. Although, dual programs are usually offered at applied study programs, we share opinion with our industry partners, that students at academic studies should also gain practical experience during their studies. On the other side, the field of Electrical Engineering demands of students high level of theoretical knowledge in order to understand the core of the wide range of physical processes of interest, and to be able to develop and implement modern technologies. This is the main reason to offer dual education at the sixth semester, not earlier, and to plan to cover in the first part of this semester theoretical knowledge, and afterwards to provide practice to our student an make them a part of teams that work on concrete problems and implementations.

This practice will be valorised as final exams, graded with at least 30 points out of 100. The grading will be done with mentors from industry, based on their reports, and diaries of students' activities during internship. Having feedback from the student will be also important factor to measure success of piloting program.

Hopefully, after piloting this program, we will have clear picture of its worth and justification to provide legal framework to implement dual education not only at applied study programs, but also at academic study programs. Both, students and industry partners will have clear picture of benefits of dual program.

Table A2: A specific model (MDHE) for University of Montenegro - Faculty of Electrical Engineering

No.	Feature	Alternatives, aspects or recommendations	What should be yet specified
Geographical and economic issues			
1.	Geographical restrictions	*Parallel model* of scheduling of working and teaching/learning times can be used if the company and the HEI are geographically close. A variant of suggested parallel models presented in Section 4.1 can be used or a new, specific parallel model specified. Model should be created using Excel as shown in Section 4.1.	Use 15 weeks semesters and parallel teaching of courses. Students work ***X*** hours and study ***Y*** hours per day and work 8 hours on Fridays Use a variant of the parallel model No. 1
			Use sequential block teaching of **X** courses per year. Use a variant of parallel models No.2 or No. 3
		Sequential model of scheduling of working and teaching/learning times should be chosen if the company and the HEI are not geographically close. A variant of suggested sequential models presented in Section 4.2 can be used, or a new, specific parallel model specified. Model should be created using Excel as shown in Section 4.2.	Use the sequential model No. 1 or its variant.
			Use the sequential model No. 2 or its variant.
			Use the sequential model No. 3 or its variant.
2.	Dual program is appropriate for local economic structure that requires qualified professionals.	Yes, the dual program educates the locally required professionals	List the target profiles and major local companies in this sector.
		No, the dual program educates professionals required both at local and national level.	Graduate students od Electrical Engineering cover wide variety of positions at national and private enterprises.

Study program			
3.	Academic level of dual education and program to be implemented	Bachelor	Graduate studies of Electrical Engineering, module Computer Science. Almost each company in the Montenegro needs this qualification.
		Other postgraduate courses	
		Master	
4.	Duration of the study	Standard duration (60 ECTS/year)	
5.	Teaching language	Montenegrin	
		English	
		Multilingual	Specify
		Other	Specify
6.	International mobility of the dual program	Collective mobility	Study up to one semester at a foreign university
		Individual mobility	Work in a foreign company
		Theoretical	Occurs in theoretical phase (e.g. Erasmus)
		Practical	Occurs in practical phase (work in a company)
		Voluntary	Yes
		Mandatory	
		No international mobility	
7.	Support of students' mobility	Administrative support	Yes
		Legal supports	
		Financial	
		No support	
8.	The competences to be acquired and the contents	The university and company agree about the competences to be acquired in the HEI and the contents of the dual program (program curriculum).	Specify the competences to be acquired in the HEI
		The university and company agree about competences to be acquired in the workplace through specific practices	Use of the competences specifies for BSc of electrical Engineering, module Computer Engineering.

		Types of projects and student's tasks in the workplace and in university	Initial it is planned, and later it is specified for each semester
		There is no agreement	Not recommended
Contracts			
9.	Contract between the HEI and the company	Specify dual program(s)	Graduate studies of Electrical Engineering, module Computer Engineering
		Specify planning, coordination and documentation of student's dual education	Three to five students with the highest scores after mid-term will be candidates for dual education.
		Specify financial aspects	No tuition fees will be required.
10.	Contract between the company and the dual student	Standard employment part-time working contract	May not specify the working time above the limit specified by DHE legislation
		Specific part-time working contract for dual students	Done according to special working status of dual students (if provided by DHE legislation) May not specify the working time above the limit specified by DHE legislation
		Contract to support dual education of the student	Students will work 4 hours per day from Monday to Thursday and 6 hours on Fridays, according to modified sequential model No. 3
11.	Start of working of dual student	From the first year of study	
		From the second year of study	
		From the third year of study	Yes
12.	Duration of the working contract	Four years for BSc	
		Three years for BSc	
		One year for BSc	Yes
		Two years for MSc	
		One year for MSc	
13.	Paid work	Company pays student according to the working contract, gradually increasing 12	
		Company pays the tuition fee and the (gradually increasing) scholarship	

14.	Company's Certificate	Yes, the company issues the certificate upon completion of the internship program.	Specifies starting date, duration of the internship, the job or jobs held, and the main tasks performed by dual student
		No, the company does not issue any	Not recommended
Working time			
15.	The period of student time distribution or rhythm	Hour alternation	The student spend **X** hours in the company and **Y** hours at university
		Daily alternation	The student works in the company on certain days of the week and attends university lectures on the other days (e.g. 3 days works, 2 days classes, or 2,5:2,5 days)
		Weekly alternation	The students is in the company (or at the university) every alternate week, or 2-3 weeks or more
		Monthly alternation	The students is in the company (or at the university) every alternate month, or
		Quarterly alternation	The students is in the company (or at the university) every alternate quarter (3- months) or more
		Semester alternation	The students is in the company (or at the university) every alternate semester
		Combination	The student is in a company for the two last months of the sixth semester of his graduate studies.
16.	Start of work in company	From 1st year	
		From 2nd year	
		From 3th year	Yes
17.	Work distribution between the company and the university during a year	Fixed: 50% university, 50% company	Fixed for the whole year, but may vary during the year (more working time when there are no lectures)
		Fixed: 45% university, 55% company	

		Fixed: specific distribution of time allocation (X% university, Y% company)	1st and 2nd Years no work, 3rd Year 1st semester no work, 2nd semester, 4 hours from Monday to Thursday and 6 hours on Fridays, according (8-9 weeks).
		Variable: 1st Year X1%:Y1%, 2nd Year: X2%:Y2%, 3rd Year: X3%:Y3%, and 4th Year X4%:Y4%	
18.	Change (rotation) of companies in each working period	No change	Dual student work at the same company from beginning to the end of the studies.
		Change is allowed	HEI may change the company Dual student may change the company if the contract between HEI and changed company exists
Selection of candidates			
19.	The admission criteria and the selection process	The company specifies the criteria and selects dual students using tests and interviews.	
		Joint interviews by professors and company tutors	
		The selection process in the hands of the university once the admission criteria have been agreed	Only those students who have already been previously selected by the companies can enrol
20.	Publishing of jobs for dual students by companies	The companies release a job posting for the current Dual positions at their company and interested candidate can apply.	
		The university publishes, students apply, and the university creates a short list and sends it to the company for selection of candidates (tests, interviews).	Yes. The HEI publishes the call for candidates
		Firstly, student fills in an application form for the dual program they are interested in and goes for a job interview before a panel of stakeholders in training and has to pass technical tests. If more than one company offer jobs for the dual program, the student can select one of them.	
21.	Evaluation and selection of the candidates	The company tests the candidates, conduct interviews and select the candidates to hire.	

		The panel of stakeholders tests the candidates, conduct interviews and select the candidates for the job in one of interested companies.	
Tutorship			
22.	Tutorship realization	An official tutor from the university, and optionally, one or more operative tutors from the company	
		Or: Two tutors from the university and one from the company. One from the university is tutoring the academic filed and the second one liaises with the tutor of the company and keeps track of the student's work in the company.	
		Or: Two tutors - one from the university and one - from the company.	Yes
		Or: Only one tutor from the company	
23.	The company tutor profile	The profile and functions of the company tutor are established and cover *both technical qualifications and the teaching capacities.*	Yes
		The company tutor will have a brief training in following areas: the dual educational model, the teaching - learning process, the competences to be acquired by the student and the proposed evaluation system	
		The company has a "company tutor hosting guide", as an addition to F2F *(Face To Face)* training of tutors	
24.	Collaboration of company tutors with students	Biannual follow-up meetings with each student, as well as monthly class meetings with class delegates	
		Or: With tutoring in the company, each student meets with the company tutor at least monthly in order to evaluate the evolution and the degree of acquisition of the competences.	
		Or: 3 to 5 meetings are trilateral during academic year (student, university tutor and company tutor) in order to check their evolution and identify specific needs.	
		Or: The company tutor meets the dual student at least once a week.	Yes
Teaching-learning process			
25.	Type of lecturers	Full-time lecturers.	Yes
		Guest lecturers from other universities and colleges.	

26.	Evaluation of the company by the student	Every 6 months the student makes an assessment of his learning process in the company and reflects on the degree of acquisition of the competences expected for that semester.	
		The student evaluates the company according to established quality criteria.	Yes
		Other forms of evaluation of the company	
		No evaluation of the company	
27.	The evaluation of the companies has two fundamental inputs.	The degree of acquisition of target competences in the workplace	Yes
		The evaluation that the student himself makes of his/her stay in the workplace.	
28.	Assessment of ability of the company to match the acknowledged degree requirements		List relevant performances of the company
		Relies of company's performances	
		Actions to achieve the goal	List actions to achieve the goal
		Response to stressful situation and opportunities.	Specify how the company respond to stressful situation
29.	Assessment of ability of the university to implement active pedagogy	Implementation of problem/based learning	Yes
		Reporting tools, including dual training booklet	
		Workshops on the standpoint and educational practices concerning the pedagogy of dual training and support	
		Reflections and dissemination of best practices concerning the pedagogy of dual training and support	
		Pedagogical innovations: active pedagogies, e-learning, virtual desk, seminaries abroad and invitation of foreign speakers	
30.	Assessment of ability of the university to implement didactic approach	The company implements a structured, phased learning process in the company (e.g., 1. student integration in the company and developing technical knowledge, 2. development of the scientific knowledge and autonomy or individual training, 3. industrial project)	Yes. The company will specify the phased learning process of students at the company

Active educational design			
31.	Implemented pedagogy	Deductive (first learn theory, then apply it)	Student first compete all academic courses and the have an (summer) internships.
		Inductive (start from a problem, and then build the theory and solutions)	"Real life problems" are linked to their theoretical background by problem based learning. Industrial project in the company in the latest in the last semester
32.	The E-portfolio (electronic formalization of experience)	It is a way to make students reflect about their personal and professional experience through a three-step process: 3. proofreading, 4. writing and valuation of experience leading to a life-wide curriculum	
33.	Students monthly meeting minutes	The meeting minutes manifests itself as an active tool to illustrate the relationship between the university based and work based elements of the programme	In the monthly meeting minutes, specific competences related to company and tasks/activities are transcribed. These notes need to be accessible at any time for the educational institution for review and signoff. The monthly meeting minutes diary remains in the portfolio until the last year of the degree, then the students assess the competences achieved so far and reflect upon which ones need to be developed
34.	Regular contacts	Onsite visits and/or email/telephone contact) between the workplace (usually with the mentor) and the university (academic tutor)	At least once a month, the HEI tutor visits students in the company.
Assessment of dual students			
35.	Learning outcomes and success	The correct definition of learning outcomes should be specifies	

	indicators	Success indicators should be specified	Take into account all the aspects of the activity, performances, action to achieve the goal, reaction with respect to stress situation and opportunities.
36.	Who performs the evaluation?	Assessment is done jointly with the student, the company mentor and the university tutor based on the existing requirements of the company and the university	Yes
		No assessment. Only student's written report and oral presentation of student's evolution in each dual period.	
37.	What should be evaluated? (multiple answers are possible)	The knowledge and skills needed to perform their work, and achieved learning outcomes.	Yes
		The theoretical knowledge acquired	
		The adaptation of the student to a real job	Yes
		Something else	
38.	Kind of evaluation (multiple answers are allowed)	Written and oral exams	
		Individual assignments	
		Team work	
		Report on their performance in the company	Yes
		Projects	Yes
		Something else	Specify
39.	How many evaluation attempts are allowed?	There will be only one evaluation	The student must pass both the theoretical part (university) and the practical part (company). If either of the two are failed, the student will not obtain the final degree.
		There are two evaluations	
		Others	Specify

Based on two specific MDHE defined by the Table A1, and Table A2, the HEI and company make their contract, the company makes contracts with its dual students.