EACEA 586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP



University of Belgrade



Implementation of Dual Education in Higher Education of Serbia

Kraljice Marije 16, 11120 Belgrade 35, Republic of Serbia

email: nzrnic@mas.bg.ac.rs



Faculty of Mechanical Engineering







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



Report 2.1

Development of the Generic and Flexible Model of Dual Higher Education in Serbia

contacts: Prof. Dr.-Ing. Nenad Zrnić, tel: +381-63-287-193
Dr.-Ing. Žarko Mišković, +381-64-18-32-989

Project acronym:	DUALEDU
Project full title:	Implementation of Dual Education in Higher Education of Serbia
Project No:	586029-EPP-1-2017-1-RS-EPPKA2-CBHE-SP (2017-2962/001-001)
Funding scheme:	ERASMUS+
Project start date:	October 15, 2017
Project duration:	36 months

Abstract	The document specifies two models: 1. The model of the legal framework of dual higher education in Serbia (LF-MDHE) and 2. The generic and flexible model of dual higher education in Serbia (GF-MDHE). The first model specifies 15 attributes, and the second one 38 attributes of these models. Attributes are important features or specifications of a model. Their possible values specify concrete features of LF-MDHE and GF-MDHE, respectively. The models are represented with tables offering possible values of these attributes, but users may also add new attributes and values. Use of these models serve as guidelines for creation of the legislation of dual higher education of Serbia, 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. The document also specifies seven parallel or sequential scheduling models that determine working and teaching/learning time intervals during an academic year. These models can be also extended and modified according to specific implementation contexts.

Title of document:	Development of a flexible and generic Dual Higher Education Model for Serbia
Work package:	WP2: DEVELOPMENT - Flexible and Generic Dual Higher Education Model (MDHE) for Serbia
Activity:	2.1 Development of the Generic and Flexible Dual Higher Education Model for Serbia
Last version date:	06/12/2018
File name:	DualEdu_R2_1_final
Number of pages:	62
Dissemination level:	Consortium

VERSIONING AND CONTRIBUTION HISTORY

Version	Date	Revision description	Partner responsible
v.1.0	14/11/2018	First draft of the document is completed and it is ready for discussions	BMU (Dragan Domazet)
v.2.0	21/11/2018	Comments on proposed v.1.0 for chapters 1, 2 and 3	UKG (Nenad Stanisic, Vesna Mandic)
v.3.0	28/11/2018	Comments on proposed v.1.0 for chapters 3 and 4	UKG (Nenad Stanisic, Vesna Mandic)
V4.0	04/12/2018	Comments on proposed v1.0 for chapter 4	UKG (Nenad Stanisic, Vesna Mandic)
V5.0	06/12/2018	Comments on proposed v1.0 for chapters 4, 5 and 6	UKG (Nenad Stanisic, Vesna Mandic)
Final	10/01/2019	Creating the final version	BMU (Dragan Domazet)

DISCLAIMER

The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

TABLE OF CONTENT

1 INTRODUCTION 5

2 THE METHODOLOGY 7

3 SPECIFICATION OF THE LEGAL FRAMEWORK OF DHE 8

4 SPECIFICATION OF THE GENERIC AND FLEXIBLE MODEL OF DUAL HIGHER EDUCATION 22

4.1 PARALLEL WORKING, TEACHING AND LEARNING TIME SCHEDULES 34

4.1.1 Parallel Model No. 1 37

4.1.2 Parallel Model No. 2 37

4.1.3 Parallel Model No. 3 37

4.1.4 Comparison of parallel models No. 1, 2 and 3 38

4.2 SEQUENTIAL WORKING, TEACHING AND LEARNING TIME SCHEDULES 42

4.2.1 Sequential Model No.1 44

4.2.2 Sequential Model No. 2 44

4.2.3 Sequential Model No. 3 45

4.2.4 Sequential activity No. 4 45

4.2.5 Comparison of sequential models No. 1, 2, 3 and 4 45

5 AN EXAMPLE OF A SPECIFIC MODEL OF DHE 51

6 CONCLUSIONS 62

1 Introduction

As specified in the project proposal, within WP2 the flexible and generic *Model of* Dual *Higher Education* (MDHE) for Serbia has been developed and described in this document. This model represents a synthesis of the needs of different stakeholders (companies, HEIs, students) identified in WP1.

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 – work centers for dual students during their studies.

The developed flexible and generic MDHE represents the basis for development of specific MDHEs. Few specific MDHEs are planned to be initially specified and tested by project partners within their piloting in WP4.

Besides definition of the generic and flexible model of dual higher education (GF-MDHE), the document also specifies the model of the legal framework of dual higher education in Serbia (LF-MDHE). It can help policy makers and legislators to easier and faster prepare the legal framework and the legislation of dual higher education in Serbia.

Section 2 describe the methodology suggested for creation of the legal framework of dual higher education in Serbia 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 Serbia that may help policy makers and legislators when they create the legislation of dual higher education in Serbia.

Section 4 specifies the generic and flexible model of dual higher education that may be used by a HEI and its company-partners, when they have to specify their model of dual higher education. The section also provides seven parallel and sequential scheduling models, that can be used for specification of working and teaching/learning time intervals during an academic year.

Section 5 demonstrate 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. Concluding Section 6 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 Serbia.

2 The methodology

Dual Higher Education (DHE) needs to be specified at the national level, for legislation and at the implementation level, when a Higher Education Institution (HEI), such as a university, faculty and professional school of higher education, and a company specify the **Model of Dual Higher Education (MDHE**), specific to their needs and implementation possibilities. Having this in mind, our methodology for specification of a flexible and generic MDHE for Serbia has two phases (Figure 2.1):

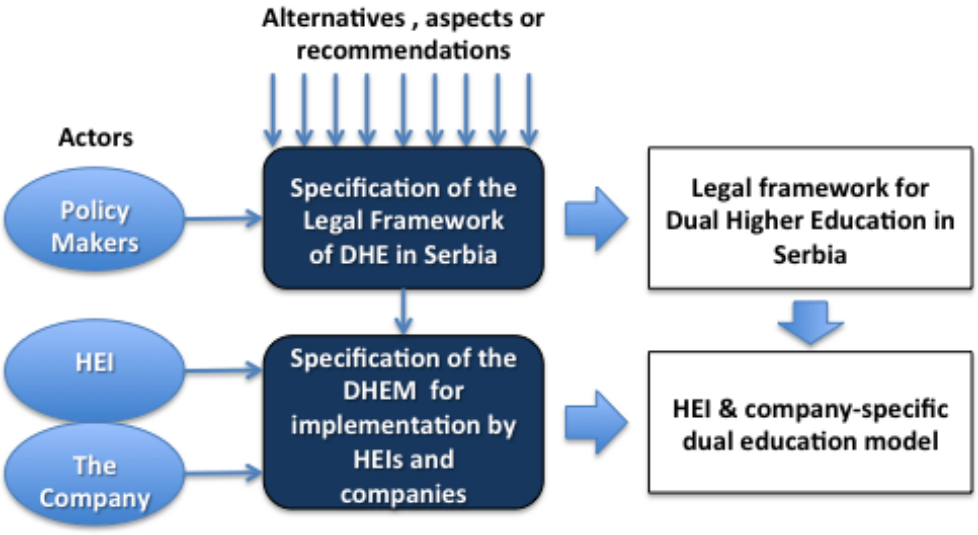
1. Phase: Speciation of the legal framework of DHE
2. Phase: Specification of the flexible and generic MDHE for implementation by HEIs and companies
3. 

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

According to the Work Plan of DualEdu project, the proposals for legislation of DHE in Serbia will be done in *WP3 - Creation of Legal and Other Conditions for Implementation of DHE in Serbia.* 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.

The generic and flexible MDHE for implementation by HEIs and companies is to be developed in Phase 2, according to the **Legal Framework of DHE (LF-DHE)** previously agreed by project partners and other stakeholders, and specified in Phase 1. Specification of LF-DHE is necessary for specification of MDHE , as it provides a possible solution space for MDHE.

3 Specification of the Legal Framework of DHE

The specification of the Legal Framework of Dual Higher Education in Serbia (LF-DHE) has to specify a possible decision space for legislation of DHE in Serbia, to be prepared and proposed to official policy and decision makers in Serbia. The decision space identify factors (or space dimensions) to be taken into account when the legislation of DHE has to be specifies. This decision space practically is the core of the LF-DHE to be proposed here.

Factors of the Legal Framework of DHE (LF-DHE) are dimensions of a multidimensional space that defines a solution space for values of factors that specify DHE legislation in Serbia. 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 the specify their specific MDHE. Having this in mind, we propose 15 factors, i.e. dimensions 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 project partners (Programme Countries) and some other EU countries, we specified other components of proposed a LF-DHE in Serbia, presented in Table 3.1.

Table 3.1 The Components of proposed Legal Framework of Dual Higher Education in Serbia

	Factors	Alternatives, aspects or recommendations	What should be specified
1	Status of the student	Dual student has a special status	
		We think that dual student has to have special status defined in enrolment stage	
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.
		Legal document(s) defining relationship between student and company(ies) are necessary	
3	Legal relationship between the HEI and the companies	A legal relationship is required	Learning outcomes are defined for each subject in accreditation

	Factors	Alternatives, aspects or recommendations	What should be specified
			documentation and it should be incorporated in legal document.
			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
		There is no legal relationship required	
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*

	Factors	Alternatives, aspects or recommendations	What should be specified
		National regulation does not oblige HEIs and companies to specify competences of dual students.	
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 should also cover *the financing system of educational institutions* offering and regulating different models to select and later manage when designing their organizational models
		This regulation is not specified at the national level	
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	
		Both approaches are supported. The university may choose the approach	

	Factors	Alternatives, aspects or recommendations	What should be specified
		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
			The application form requires the names of the economic sectors and companies that support the program
			Optional: A decision of the board composed of companies, unions and HEIs for settlement of a

	Factors	Alternatives, aspects or recommendations	What should be specified
			regional institution to support implementation of Dual education.
		There is no registration of dual programs	
10	National organizational structure to support DHE	Vocational Training Centers (like in France) and similar	
		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.	
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	The company has certified tutors (mentor)	A company tutor (mentor) gets a Certificate after

	Factors	Alternatives, aspects or recommendations	What should be specified
	hire dual students		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
			Companies with more then 250 employees pays a penalty if recruit less than 4% of dual students.

	Factors	Alternatives, aspects or recommendations	What should be specified
		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.

To illustrate how LF-DHE can help the specification of DHE legislation and regulation at the national level, we give Table 3.2 with marked alternatives, some of aspects included and some of recommendations accepted, all related to 15 factors of LF-DHE. This can be a good tool for discussion and final proposal for legislation of DHE.

Table 3.2: An example of the LF-DHE with 15 specified factors

	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 maximum time of presence in the work environment
			The need to comply with a training schedule where presence at work does not prevail over the student's commitments at the university
			The type of remuneration students receive etc.
		There is no legal relationship required	
3	Legal relationship between the HEI and the company	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
		There is no legal relationship required	
4	Educational programs and specification of competences of dual students	National regulation should obliged universities and companies to specify 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
		National regulation does not oblige HEIs and companies to specify competences of dual students.	
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 should also cover *the financing system of educational institutions* offering and regulating different models to select and later manage when designing their organizational models
		This regulation is not specified at the national level	
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	
		Both approaches are supported. The university may choose the approach that is the most convenient in a concrete case.	
7	Who should lead 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
			Optional: A decision of the board composed of companies, unions and HEIs for settlement of a regional institution to support implementation of Dual education.
		There is no registration of dual programs	
10	Is there any national organizational structure to support DHE?	Vocational Training Centers (like in France) and similar	
		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	
		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.	
13	Tuition fees for Dual programs	There are no tuition fees for public HEI funded by the government.	
		Private HEI are funded using tuition	Tuition fees should be

		fees	paid by partner companies
		Public HEI use tuition fees for funding their dual programs.	Tuition fees should be paid by partner companies
14	Eligibility 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
			Companies with more then 250 employees pays a penalty if recruit less than 4% of dual students.
		The company does not receive any incentive for dual students	

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

The Generic and Flexible Model of Dual Higher Education (GF-MDHE) aims to help HEIs and companies to specify their specific models of dual higher education (MDHE). The model of dual higher education should be ***generic*****,** providing that all specific models based of the generic one, satisfy some basic and important features of dual higher education. The model of dual higher education should be also ***flexible****,* to allow implementation of very different variants of specific MDHEs (Figure 4.1).

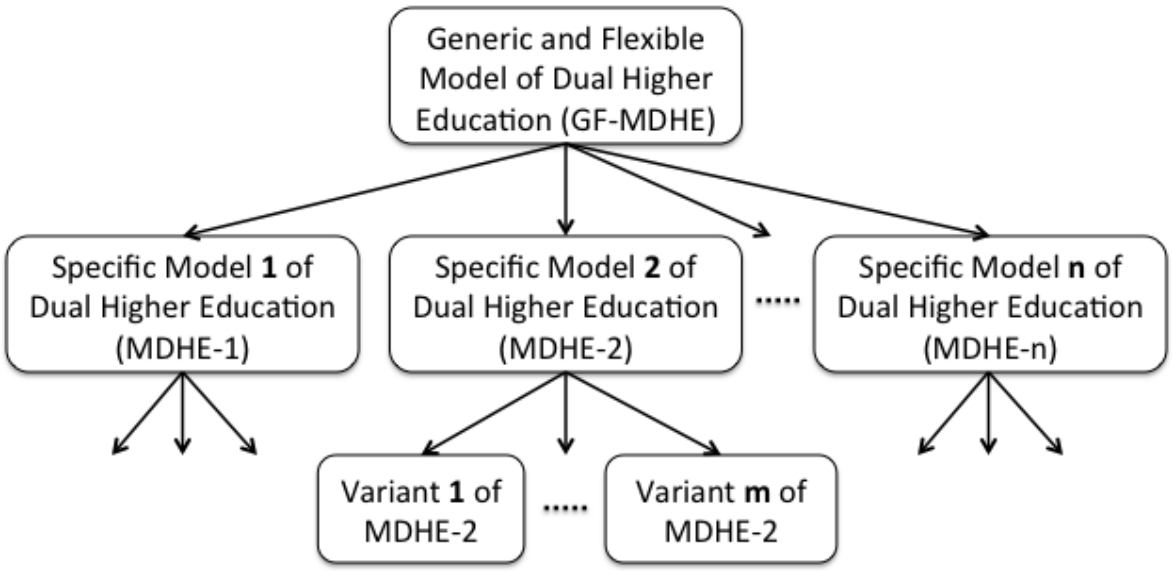


Figure 4.1 Specific MDHEs with its variants

Every specific MDHE describes an implementation dual higher education (DHE) in a specific context, as an approximation of a real implementation of DHE. The model usually cannot include all possible factors (dimensions) of a practical implementation of DHE agreed between a company and a HEI. The GF-MDHE should include the most relevant and important factors, providing guidance for a HEI and a company how to specify their specific implementation of DHE. A specific MDHE is a category of GF-DHE that contains a subset of factors specified by the GFDHE. So, many specific MDHEs may be specified from the GF-MDHE by selecting some of its factors. When a HEI and a company agree to implement a specific MDHE, they usually find that they need one or more factors that are not included in the specific MDHE and GF-MDHE and *need to add* them in their implementation of their specific MDHE. So, a specific MDHE *has to be flexible* and to allow partners to add factors that are not listed in GF-MDHE and in specific MDHE.

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 includes as many factors as it is feasible. Table 4.1 shows the proposed GF-MDHE with 38 factors (or

dimensions). This model will be tested (in WP4) of DualEdu project in order to refine and improve it according the experience gained during its pilot implementations by HEIs - project partners from Serbia. This initial proposal of the GF-MDHE will be further improved in this period according to proposals of different stakeholders expressed on forums and conferences planned to be organized by DualEdu project team, where the model will be presented and discussed. So, the GF-MDHE presented here, is just the first, initial version of the GF-MDHE, and it is most likely that its final version, specified by the end of the DualEdu 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. Ones the legislation of DHE is officially specified, as planned in WP3, the presented FD-MDHE will be modified in order to be in line with the DHE legislation. When a HEI and a company want to specify the specific MDHE the most convenient for them, they can choose alternative specifications, specific implementation aspects and recommendations given in Table 4.1. If DHE partners find that a factor in not provided by Table 4.1, and if the inclusion of the factor is not violating any requirement specified by the national DHE legislation, they can add the factor in Table 4.1 and extend the GF-MDHE. In this way, it is expected that the 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).

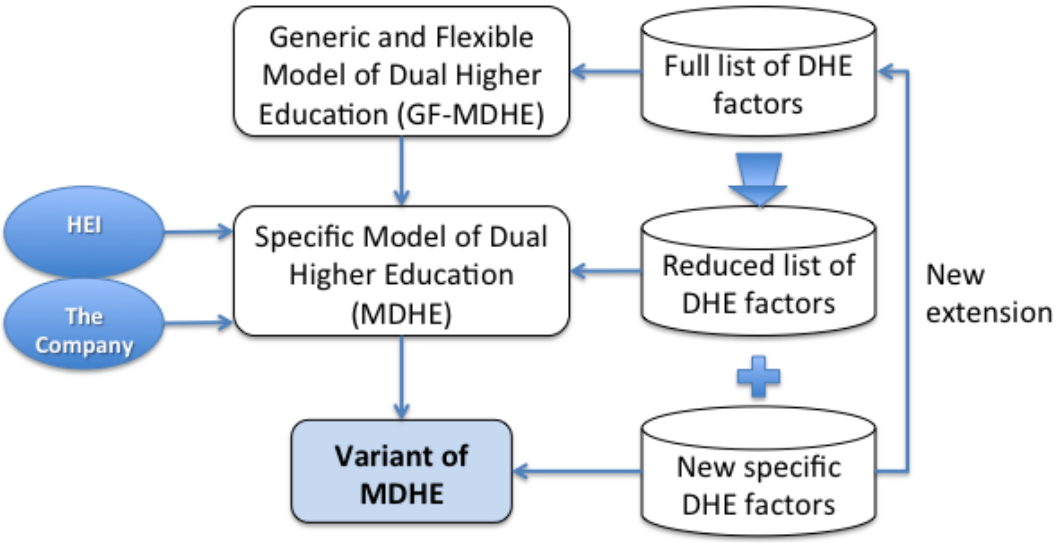


Figure 4.2 Creation of a variant of a specific MDHE and extension of DHE factors

Table 4.1: The Generic and Flexible Dual Higher Education Model

	Feature	Alternatives , aspects or recommendations	What should be yet specified
Geographical and economical 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 **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
		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 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 at the national level, but not locally.	Give explanation why your dual program is important from national point of vew.
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	
		Doctorate	
4	Start of working of dual student	From the first year of study	
		From the second year of study	
5	Duration of the study	Standard duration (60 ECTS/year)	
		Prolonged duration (30 ECTS/year), as part time studies? Or…	
6	Teaching language	Serbian	
		English	
		Multilingual	Specify
		Other	Specify
7	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	
8	Support of students' mobility	Administrative support	
		Legal supports	
		Financial	
		No support	
9	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			
10	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 enroll each year
		Specify financial aspects	Payment of tuition fees
11	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
12	Duration of the working contract	Four years for BSc	
		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	

Working time			
14	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 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)
15	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%	
16	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			
17	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 enroll
18	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.	
19	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			
20	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	
21	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	
22	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			
23	Type of lecturers	full-time lecturers,	
		guest lecturers from other universities and colleges,	
		as well as consultants and executives	
24	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	
25	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.	
26	Assessment of ability in of the company to match the acknowledged degree requirements	Relies of company's performances	List relevant performances of the company
		Actions to achieve the goal	List actions to achieve th goal
		Response to stressful situation and opportunities	Specify how the company respond to stressful situation
27	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 in connection with experts of dual training	
		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	

		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)	
28	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			
29	Implemented pedagogy	Deductive (first learn theory, then apply it)	Student first compete all academic courses and the have an (summer) internships (not recommended for dual education)
		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

30	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	
31	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
32	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			
33	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.

34	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
		Done jointly by school and company tutors.	
		Done by company tutor	
		Done by university tutor	
		No assessment. Only student's written report and oral presentation of student's evolution in each dual period.	
35	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	
		The evolution held since the beginning of the process	
		Something else	
36	Kind of evaluation (multiple answers are allowed)	Written and oral exams	
		Individual assignments	
		Team work	
		Report on their performance in the company	
		Public presentations	
		Projects	
		Something else	Specify
37	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.

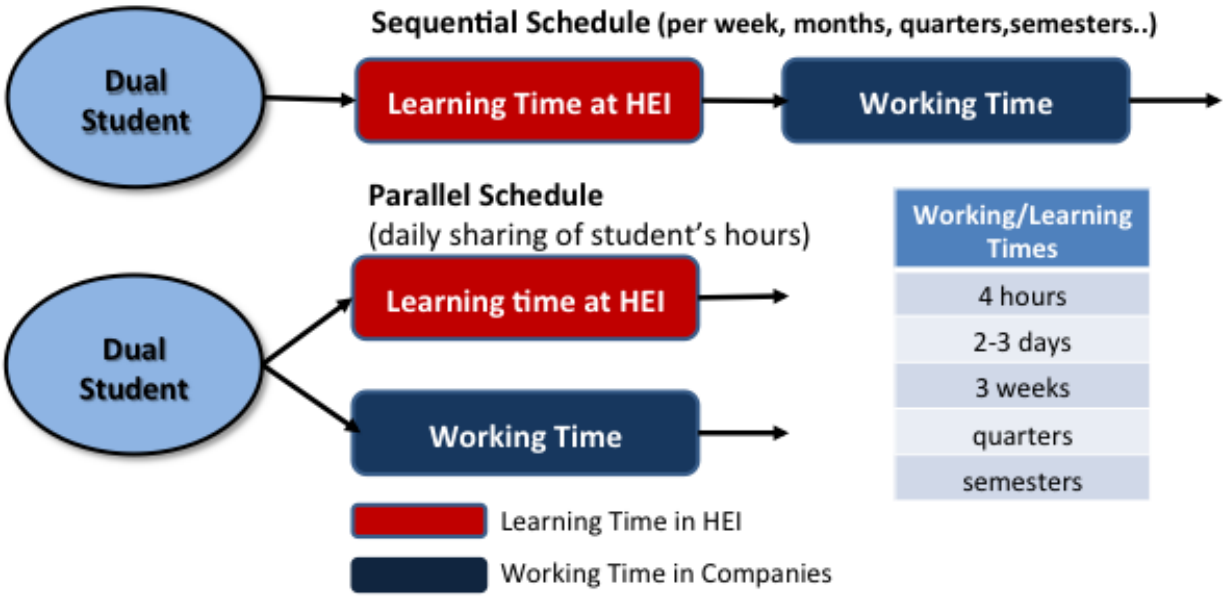


Figure 4.3 Sequential and parallel schedule of work and study of dual students

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 3. We will present here few time schedules that might be the most interesting for HEIs and companies in Serbia.

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 three most promising ones:

1. **Parallel schedule No. 1:**

   a. **Teaching time** is 5 hours and **working time** is 3 hours per day, from Monday to Thursdays (Figure 4.4).

   b. **Working time** is 8 hours on Fridays during two semesters (30 weeks).

PARALLEL MODEL: 3WH+ 5LH per day, 8 WH on Fridays

Monday	Tuesday	Wednesday	Thursday	Friday	Total
3	3	3	3	8	20
5	5	5	5		20

Figure 4.4 Parallel schedule No.1 with 5 teaching hours/day and 3 working hours/day (Monday-Thursday) and 8 work hours on Fridays

   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 5 weeks in August and September

   e. **Summer holidays** lasting 3 free weeks in July when students are free.

2. **Parallel Schedule No. 2:** The academic year has 8 courses realized in blocks, one after another, 6 courses with 8 ECTS (lasting 6 weeks) and 2 courses with 6 ECTS, lasting 5 weeks. Each course in implementing the following parallel teaching/learning and working time cycles (Figure 4.5):

PARALLEL MODEL NO. 2: Teaching courses in 6 or 5 weeks blocks (for 8 or 6 ECTS)

Cycles	1. week	2. week	3. week	4. week	5. week	6. week	
Monday 1	4	4	4	4	4	4	
Monday 2	4	4	4	4	4	4	
Tuesday 1	4	4	4	4	4	4	
Tuesday 2	4	4	4	4	4	4	
Wednesday 1	4	4	4	4	4	4	
Wednesday 2	4	4	4	4	4	4	
Thursday 1	4	4	4	4	4	4	
Thursday 2	4	4	4	4	4	4	
Friday 1	4	4	4	4	4	4	
Friday 2	4	4	4	4	4	4	TOTAL
Teaching time	16	16	16	16	16	0	80
Learning time	4	4	4	4	4	20	40
Working time	20	20	20	20	20	20	120
						Total Hours	240

Figure 4.5 Parallel model No. 2 for a block course with 8 ECTS, lasting 6 weeks

   a. **Teaching time** with 4 teaching hours from Monday to Thursday during all weeks (for courses with 8 ECTS or 6 ECTS).

b. **Learning time** with 4 learning hours each Friday during 5weeks (for courses with 8 ECTS or 6 ECTS) and 4 learning time from Monday to Friday in the last week of the course.

c. **Working time** with 4 working hours from Monday to Friday during all 6 weeks (for courses with 8 ECTS or 6 ECTS).

d. **Free time** in weeks 13, 31, 32 (depending annual calendar and public holidays), 45-46 (for summer holiday).

3. **Parallel Schedule No. 3:** The academic year has 8 courses realized in blocks, one after another, 6 courses with 8 ECTS (lasting 6 weeks) and 2 courses with 6 ECTS, lasting 5 weeks. Each course in implementing the following parallel teaching/learning and working time cycles (Figure 4.6):

   a. **Teaching time** with 8 teaching hours from Monday to Friday during the first week of a course, and 8 teaching hours only on Friday in next 4 or 3 weeks (for 8 or 6 ECTS courses)

   b. **Working time** with 8 hours a day, from Mondays to Thursdays, in 4 or 3 weeks (for 8 or 6 ECTS courses), and 8 hours only on Monday and Tuesday in the last week of the course.

   c. **Learning time** with 24 hours for learning at home (from Wednesday until Friday) in the last week of the course (Figure 4.6).

   d. **The structure** of learning, teaching and working time cycles is: 72 Teaching Hours/Course, **144** Working Hours/course and 24 hours Hours/Course.

PARALLEL MODEL NO. 3: Teaching courses in 6 or 5 weeks blocks (for 8 or 6 ECTS)

Cycles	1. week	2. week	3. week	4. week	5. week	6. week	
Monday	8	8	8	8	8	8	
Tuesday	8	8	8	8	8	8	
Wednesday	8	8	8	8	8	8	
Thursday	8	8	8	8	8	8	
Friday	8	8	8	8	8	8	TOTAL
Teaching time	40	8	8	8	8	0	72
Learning time	0	0	0	0	0	**24**	**24**
Work time	**0**	32	32	32	32	16	144
						Total Hours	**240**

Figure 4.6 Parallel schedule No.3 in case of a course with 8 ECTS

Parallel schedules No.1 (Figure 4.4) and No.2 (Figure 4.5) require 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 then one hour.

The major benefit of this 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. It is advisable to give dual students more time to study in HEI in Year 1 of their study, especially during the Semester 1.

Figures 4.7, 4.8 and 4.9 shows three parallel models for parallel models No.1, No. 2 and No.3. described above.

4.1.1 Parallel Model No. 1

This model is shown in Figure 4.7. There is no working time in Semester 1. In Semester 2, students work 8 hours only on Fridays. In other semesters (6 or 8) the parallel schedule No.1 is implemented during teaching periods of the fall and spring semesters (30 weeks). Students work 3 hours daily, from Monday to Thursday, and 8 hours on Fridays.

Students have 4 weeks for individual learning during each of the examination periods (3x4 weeks). They have 5 weeks with 40 work hours each in August and September. They also have 5 free weeks during a year.

In total, in 12 months (in II, III and IV academic years), according to this time schedule, students have 600 hours for teaching, 480 hours for individual learning and 800 hours for work in a company. In aggregate, students have 1.880 hours per year for teaching, learning and working activities.

4.1.2 Parallel Model No. 2

Figure 4.8 shows the parallel model No. 2 for each of four years of study. This schedule assumes the sequential teaching, in blocks, eight courses - 6 with 8 ECTS and 2 with 6 ECTS. Students spend 4 hours daily at HEI (teaching period) and 4 hours in the company during a week. Instead of having a teaching period on Fridays, they have 4 hours each Friday for their individual learning activities. During the last week of each course, student alternatively work 4 hours and have 4 hours for individual learning, from Monday to Friday.

This parallel model expect from the HEI to organize exams after completion of each course (on Saturdays), and therefore, the annual schedule does not provides, as in the previous case (parallel model No. 1), separate weeks for individual learning and preparation of exams. Block teaching of courses require from students to work hard during 6 or 5 weeks provided for each course, an to be ready for the final exam, at the end of last course week. It is assumed that students also need to use parts of their free time of individual learning (evening hours, and weekends).

In total, in 12 months (an academic year), according to this time schedule, students have 608 hours for teaching, 321 hours for individual learning and 920 hours for work in a company. In aggregate, students have 1.849 hours per year for teaching, learning and working activities.

4.1.3 Parallel Model No. 3

Figure 4.9 shows the parallel model No. 3 for each of four years of study. It is similar to the parallel model No. 2, as it assumes the sequential block teaching of 8 courses. But, it uses a different week schedule. In the first week student have intensive teaching activities from

Monday until Friday, and on Fridays during 3 or four next weeks in block. From the second week they have full-time daily work from Mondays until Thursdays. They have three days in last week of each course for individual learning.

In total, in 12 months (an academic year), according to this time schedule, students have 560 hours for teaching, 192 hours for individual learning and 1088 hours for work in a company. In aggregate, students have 1.840 hours per year for teaching, learning and working activities.

4.1.4 Comparison of parallel models No. 1, 2 and 3

Table 4.2 present features of three parallel time schedules presented.

Table 4.2 Comparison of parallel models No. 1, 2 and 3

Features	No. 1 (Year 1)	No.1 (Year 2-4)	No. 2	No. 3
Number of teaching hours	600	600	608	560
Number of individual learning hours	960	480	321	192
Number of work hours in the company	320	800	920	1088
Number of weeks for exams	12	12	0	0
Number of free weeks	5	5	5	5
Total number of teaching, learning and work hours	1880	1880	1849	1840

In case of three analyzed parallel models, we can note the following:

- The parallel model No. 1 is the most convenient for students, as they have more time for individual learning. It is also the most convenient for the HEI, as it does not change a normal organization of teaching and other activities. But, it provides less work hours of students, and students do not work 17 weeks during a year. Probably, some companies might not like it.
- The parallel model No. 2 provides more work hours (good for companies), and no 12 weeks for examinations (bad for students). The model assumes the sequential block teaching of eight courses and this is a challenge for HEIs, as they usually do not work like that.
- The parallel model No. 3 is similar to the model No. 2, but it provides less teaching and individual learning hours, and more work hours in companies. So, it requires that students use more their free time for individual learning.

Dual higher education (DHE) partners (the company and HEI) may choose other parallel schedules that are more appropriate in their context. These three models are presented here with intention to present the methodology for specification of the schedule, and not to prescribe only these three models of parallel schedules. DHE partners need also to think

about dual students and their interests and needs. The major potential problem is overloading of students, as they might need more time for individual learning than a scheduling model provides.

We propose to DHE partners to use Excel to describe and analyze the model of time schedules in a similar way as we did.

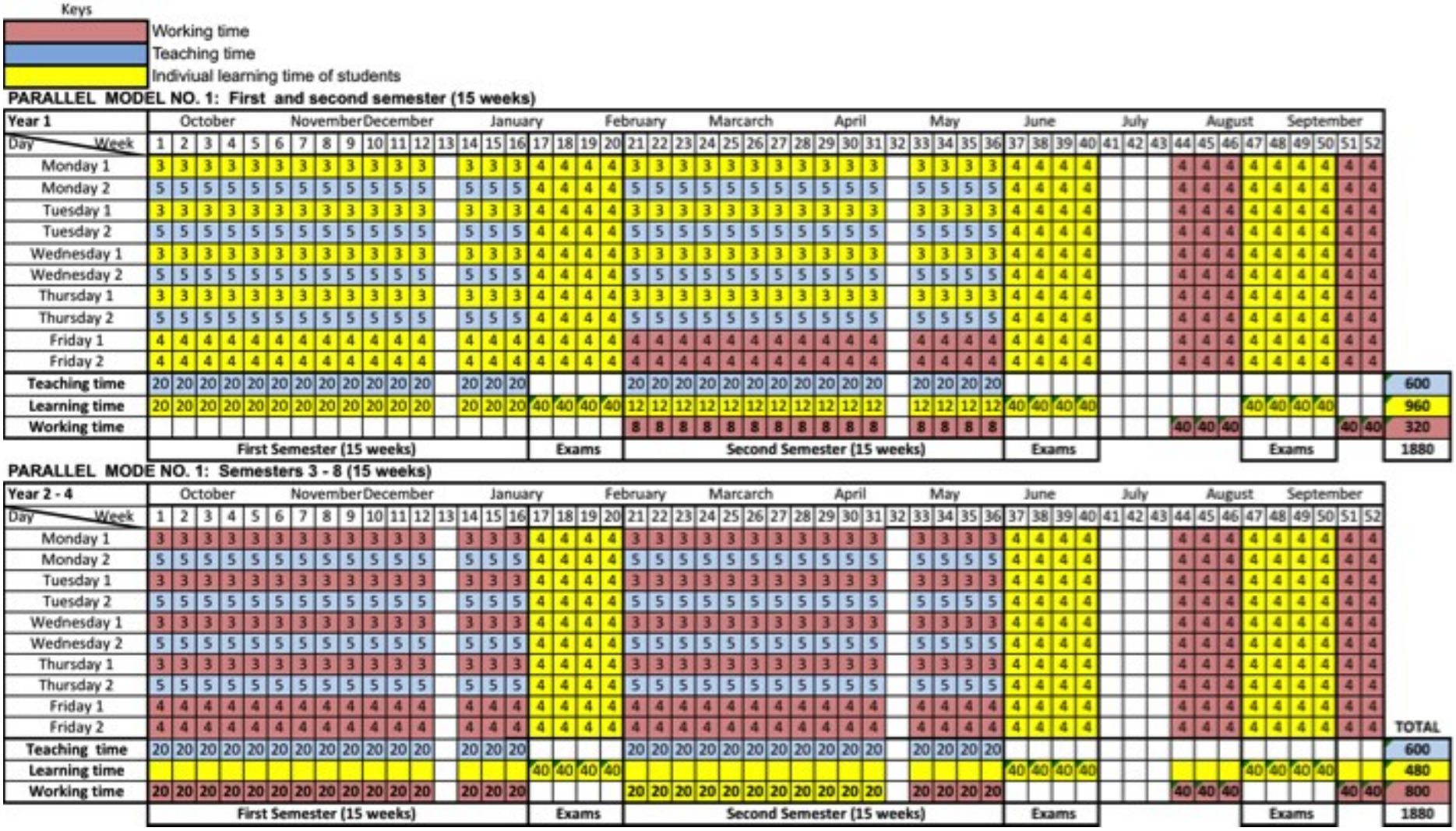


Figure 4.7 Parallel model No. 1

PARALLEL MODEL NO. 2: Teaching courses in 6 or 5 weeks blocks (for 8 or 6 ECTS)

| | October | | | | | | November | | | | | | December | January | | | | | | February | | | | | | Marcarch | | | | | | April | | May | | | | | | June | | | | | | July | | | | | | August | | | September | | | | | | |
|---|---|---

4.2 Sequential working, teaching and learning time schedules

We call a schedule “sequential” if time cycles, specifying working, teaching or learning times, are realized one after another, not sharing daily time. It means that students do not work and have classes (teaching time) the same days. Work cycles can last 2 to 3 days every week, or few weeks or months. When student works, he/she works 8 hours a day. The only exception is when work cycles last 2,5 days, and student work 4 hours one day, and 8 hours the other two working days.

There are many scheduling combinations that one can create. We will present here four time schedules in order to demonstrate the sequential scheduling methodology. These four models of work/teaching time schedules are just some of options. DHE partners can create a specific one that is the most convenient in their context.

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

1. **Sequential model No. 1:**

    a. **Working time** - 8 hours a day, during 12 weeks student realize in July, August and September each year, from Year 1 to Year 4.

    b. **Working/learning time** - 5 hours of training and 3 hours of learning, during with 30 weeks, students realize in fall and spring semesters.

    c. **Learning time -** 8 hours a day during 8 weeks students have in two examination periods (January/February and June).

SEQUENTIAL MODEL NO. 1 - F2F teaching 2 semesters with 12 weeks working summer cycles

	12 weeks	1 week	3 weeks	4 weeks	11 weeks	1 week	4 weeks	4 weeks	12 weeks	Teaching	Learning	Working	
Hours/week	20		20	40	20		20	40	40	**600**	320	480	
Hours/week	20		20		20		20				600		
	First Semester			Exams	Second Semester			Exams	**Total:**	**600**	**920**	480	**2000**

Figure 4.10 Sequential model No. 1 – weekly working, teaching and learning times

2. **Sequential model No. 2:**

    a. Working time - 2,5 work days (20 hours) each week, excluding 6 free weeks during II, III and IV years. In Semester 1 - there is no working time. In Semester 2 - student has 8 hours work each Friday.

    b. Teaching time from 3rd to 8th semester- 2,5 teaching days (20 teaching hours per week) - 8 hours on Mondays and Tuesdays, and 4 hours on Wednesdays,

    c. Learning time – 2,5 full days for individual learning per week (20 hours/week) during 16 weeks in semesters 3 – 8. In semesters 1 and 2, 3 hours/day from Monday to Thursaday, and 8 hours/day on Fridays, during 30 weeks, 40 hours/week during 8 weeks, and 20 hours/week during 8 weeks.

SEQUENTIAL MODEL NO. 2 - 2,5 days time cycles in semesters 1 &

Monday	Tuesday	Vednesda	Thursday	Friday	Total	
5	5	5	5	4	20	4
3	3	3	3	4	0	16
				Total:	**20**	**20**

SEQUENTIAL MODEL NO. 2 - 2,5 days time cycles in semesters 3-8

Monday	Tuesday	Vednesda	Thursday	Friday	Total	
4	4	4	4	4	12	8
4	4	4	4	4	8	12
				Total:	**20**	**20**

Figure 4.11 Weekly time periods during 30 weeks of teaching in semesters 1 and 2

3. **Sequential model No. 3:**

   a. **Working time –** twice a year students have 12 weeks of full-time work **(**40 work hours a week), or 960 work hours/year

   b. **Teaching time** – twice a year students have 12 weeks of teaching time, with 5 hours each week day, or 600 teaching hours/year

   c. **Learning time** – twice a year students have 12 weeks of learning time, with 3 hours per day, each week day, or 360 learning hours/year; As it can be seen in Figure 4.12, teaching and learning hours are realized in parallel (sharing 8 hours/day.

SEQUENTIAL MODEL NO.3 - F2F teaching with12 weeks cycles during all four years

	12 weeks	1 week	12 weeks	6 weeks	1 week	6 weeks	2 weeks	12 weeks	Teaching	Learning	Working	
Hours/week	25		40	25		25		40	600		960	
Hours/week	15			15		15				360		
	T&L		Working	Teaching&Learning				Working	**600**	**360**	**960**	**1920**

Figure 4.12 Sequential model No. 3 with alternate 12 weeks teaching/learning and working cycles, sequentially realized

4. **Sequential model No. 4:** The academic year has 8 courses realized in blocks, one after another - 6 courses with 8 ECTS (lasting 6 weeks) and 2 courses with 6 ECTS, lasting 5 weeks. Each course is implementing the following sequential 2,5 days of teaching/learning and working time cycles (Figure 4.13):

   a. **Working time** – 2,5 full-work days (Wednesdays to Fridays) with 20 hours per week – whole year (46 weeks), except 6 weeks of free time per year, or 920 work hours/year

   b. **Teaching time** – 16 hours of teaching time in two days per week, 5 or 4 weeks per course (for courses with 8 ECTS or 6 ECTS), or 8 courses, or 608 teaching hours/year

c. **Learning time** – 4 hours every Wednesday, and 8 hours on Mondays and Tuesdays of the last course week, providing 40 learning hours per course, or

Year 1 - 4	Course 6 8 ECTS						Course 76 ECTS				
Day \ Week	33	34	35	36	37	38	39	40	41	42	43
Monday	8	8	8	8	8	8	8	8	8	8	8
Tuesday	8	8	8	8	8	8	8	8	8	8	8
Wednesday	4	4	4	4	4	4	4	4	4	4	4
Wednesday	4	4	4	4	4	4	4	4	4	4	4
Thursday	8	8	8	8	8	8	8	8	8	8	8
Friday	8	8	8	8	8	8	8	8	8	8	8
Teaching Hours	16	16	16	16	16		16	16	16	16	
Working Hours	20	20	20	20	20	20	20	20	20	20	20
Learning Hours	4	4	4	4	4	20	4	4	4	4	20

213 learning hours/year.

SEQUENTIAL MODEL NO. 4 - F2F teaching course blocks with 2,5 days cycles during all four years

	Course 1	Course 2	Course 3	Course 4	Course 5	Course 6	Course 7	Course 8	TOTAL
Teaching Hours	80	80	80	80	64	80	64	80	**608**
Working Hours	120	120	120	120	100	120	100	120	**920**
Learning Hours	40	40	40	40	36	40	36	40	**312**
									1840

Figure 4.13 Sequential model No. 4 with alternate 2,5 days teaching/learning and working cycles, within 8 courses tought in blocks

Detailed presentations of these four sequential models of time schedules are given in Figures 4.14 – 4.17

4.2.1 Sequential Model No.1

The sequential model No.1 (Figure 4.14) is the easiest for the implementation, as it does not require that the HEI changes the organization of teaching process. Both semesters with 15 weeks each continue to operate, an student have classes 5 hours/day days from Monday to Thursdays. Students learn at home on Fridays. Students have 8 hours daily work during last 12 weeks in each academic year (July, August and September).

In total, in 12 months (an academic year), according to this time schedule, students have 600 hours for teaching, 920 hours for individual learning and 480 hours for work in a company. In aggregate, students have 2.000 hours per year for teaching, learning and working activities.

4.2.2 Sequential Model No. 2

The sequential model No.2 (Figure 4.15) has alternate 2,5 days working and learning cycles during 30 weeks of teaching in both semesters in semester 3 – 8. There is no working time during the first semester. Instead, students have learning time. Students have 8 hours work each Friday during the second semester.

Students have 8 weeks alternate learning and working 2,5 days cycles in two examination periods in semesters 3 – 8. They have only learning hours in these period in Year 1 of their study. Finally, last 8 weeks of the academic year student have alternate learning and working 2,5 days cycles, provide 20 hours of learning and 20 hours of work each week.

In total, in Year 1 according to this time schedule, students have **600** hours/year for teaching, **960** hours/year for individual learning and **280** hours/year for work in a company. In Year 2 – 4, students have **600** teaching hour/year, **320** learning hours/year and **920** work hours/year. In aggregate, for all four years, students have **1.840 hours per year** for teaching, learning and working activities.

4.2.3 Sequential Model No. 3

The sequential model No. 3 (Figure 4.16) provides alternate 12 weeks teaching/learning and working cycles all four years. During 12-weeks work cycles, student work 8 hours a day. During their teaching/learning cycles, students have 5 teaching hours and 3 learning hours daily, from Monday to Friday. There are no special learning examination periods, so, students need to use their free evening or weekend hours for individual learning. There are four weeks for free students' activities each year.

In total, in 12 months (an academic year), according to this time schedule, students have **600** hours for teaching, **360** hours for individual learning and **960** hours for work in a company. In aggregate, students have **1.920** hours per year for teaching, learning and working activities.

4.2.4 Sequential activity No. 4

The sequential model No. 4 (Figure 4.17) provides sequential block teaching of 8 courses (6 with 8 ECTS and 2 with 6 ECTS). Each course has 2,5 working days (with 20 hours/week) and alternate 2,5 days of teaching and learning, with 16 teaching hours and 4 learning hours. Exceptionally, the last week of each course has only learning hours – 20 learning hours.

In total, in 12 months (an academic year), according to this time schedule, students have **600** hours for teaching, **312** hours for individual learning and **920** hours for work in a company. In aggregate, students have **1.840** hours per year for teaching, learning and working activities

4.2.5 Comparison of sequential models No. 1, 2, 3 and 4

Table 4.2 shows main features of presented four sequential models of work/teaching time schedules.

Table 4.3 Sequential models of time schedules

Features	No.1	No.2 Year 1	No. 2 Year 2-4	No.3	No. 4
Number of teaching hours	600	600	600	600	608
Number of individual learning hours	920	960	320	360	312
Number of work hours in the company	480	280	920	960	920
Number of weeks for exams	8	8	0	0	0
Number of free weeks	2	6	3	4	5
Total number of teaching, learning and work hours	2000	1840	1840	1920	1840

In case of four presented and analyzed sequential models of time scheduls, we can note the following:

- *The sequential model No. 1* is the easiest to implement as it does not change current teaching practice, as it only adds 12 working weeks at the of each academic year. But it provides relatively low workload of students in companies (480 work hours/year), and they might be not interested for this model.

- *The sequential model No. 2* is also easy to be implemented, as it does not change current teaching process. It allows Year 1 students to focus on learning, but students in the following years have to work 20 hours per week 46 weeks, or in total, 920 work hours/year. Companies could be satisfied with this model, but students will have to use their free time for individual learning, as planned 320 learning hours/year is not enough. Students have only half of learning weeks in examination periods in Year 2 – 4. So, students need to work very hard during teaching periods (30 weeks), using evening hours and weekends. But, good thing is that students have four weeks for summer holidays.

- *The sequential model No. 3* is a ”pure” sequential model as it provides alternate teaching/learning and working time cycles lasting 12 weeks each. So, the implementation of this model require a radical change of current teaching process in Serbian HEIs. The model also does not provide any special time for preparation of exams, so, students have to learn continuously during teaching/learning cycles. It is feasible, as students have 15 planned learning hours per week. Companies will like this model as it provides 960 work hours per year. This model is similar to the model implemented by FH Joanneum from Gratz, implement in case of *Production Technology and Organisation* bachelor degree program.

- *The sequential model No. 4* requires implementation of sequential block teaching of eight courses per year. It does not provide enough learning hours to students, and they will need to use their free time to compensate this shortage. It provides 920

work hours in companies, 20 hours per week continuously during the year, with exception of six free weeks. From this point of view, it is likely that many companies will like this model. Bit, it is hard to expect that many HEIs will implement it, as it requires a totally new organization of teaching process in HEIs. Instead of usual parallel teaching of 4-5 courses per semesters, HEIs must organize teaching courses one after another, lasting six or five weeks, depending of ECTS provided by courses.

As in case of parallel models, there are many other sequential models of working and teaching/learning time cycles. DHE partners may find a specific sequential model for their context for one bachelor degree program, and another one for another bachelor degree program. This program-dependency DHE exists at FH Joanneum when different models are implemented in *Production Technology and Organisation degree program,* and a new IT degree program.

Keys

	Working time
	Teaching time
	Indiviual learning time of students
	Free time

SEQUENTIAL MODEL - F2F teaching with 12 weeks woring summer cycles

Year 1 - 4	Oktober					November			December					January			February				March					April					May				June				July				August								septembar				
Day \ Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	
Monday 1	5	5	5	5	5	5	5	5	5	5	5	5		5	5	5	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5		5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Monday 2	3	3	3	3	3	3	3	3	3	3	3	3		3	3	3	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3		3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Tuesday 1	5	5	5	5	5	5	5	5	5	5	5	5		5	5	5	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5		5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Tuesday 2	3	3	3	3	3	3	3	3	3	3	3	3		3	3	3	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3		3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Wednesday 1	5	5	5	5	5	5	5	5	5	5	5	5		5	5	5	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5		5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Wednesday 2	3	3	3	3	3	3	3	3	3	3	3	3		3	3	3	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3		3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Thursday 1	5	5	5	5	5	5	5	5	5	5	5	5		5	5	5	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5		5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Thursday 2	3	3	3	3	3	3	3	3	3	3	3	3		3	3	3	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3		3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	
Friday	8	8	8	8	8	8	8	8	8	8	8	8		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
Teaching Hours	20	20	20	20	20	20	20	20	20	20	20	20		20	20	20					20	20	20	20	20	20	20	20	20	20	20		20	20	20	20																		600
Working Hours																																					0	0	0	0	40	40	40	40	40	40	40	40	40	40	40	40	480
Learning Hours	20	20	20	20	20	20	20	20	20	20	20	20		20	20	20	40	40	40	40	20	20	20	20	20	20	20	20	20	20	20		20	20	20	20	40	40	40	40														920
	First Semester (15 weeks)																Exams				Second Semester (15 weeks)																Exams				Working Time (12 weeks)																2000

Figure 4.14 Sequential model No. 1

Keys

Working time
Teaching time
Indiviual learning time of students
Free time

SEQUENTIAL MODEL NO. 2 - 2,5 days time cycles in semesters 1 & 2

| Year 1 | Oktober | | | | | | | | | | | | | November | | | | December | | | | January | | | | | | | | February | | | | March | | | | | | | | April | | | | | | | | May | | | | | | | | June | | | | July | | | | August | | | | | | | | septembar | | | | |
|---|---|---

SEQUENTIAL MODEL NO.3 - F2F teaching with 3 months cycles during all four years

Year 1 - 4	Oktober							November				December		January					February					March			April					May					June					July					August					septembar					
Day \ Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	
Monday 1	5	5	5	5	5	5	5	5	5	5	5	5		4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5		5	5	5	5	5	5			4	4	4	4	4	4	4	4	4	4	4	4		
Monday 2	3	3	3	3	3	3	3	3	3	3	3	3		4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3		3	3	3	3	3	3			4	4	4	4	4	4	4	4	4	4	4	4		
Tuesday 1	5	5	5	5	5	5	5	5	5	5	5	5		4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5		5	5	5	5	5	5			4	4	4	4	4	4	4	4	4	4	4	4		
Tuesday 2	3	3	3	3	3	3	3	3	3	3	3	3		4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3		3	3	3	3	3	3			4	4	4	4	4	4	4	4	4	4	4	4		
Wednesday 1	5	5	5	5	5	5	5	5	5	5	5	5		4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5		5	5	5	5	5	5			4	4	4	4	4	4	4	4	4	4	4	4		
Wednesday 2	3	3	3	3	3	3	3	3	3	3	3	3		4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3		3	3	3	3	3	3			4	4	4	4	4	4	4	4	4	4	4	4		
Thursday 1	5	5	5	5	5	5	5	5	5	5	5	5		4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5		5	5	5	5	5	5			4	4	4	4	4	4	4	4	4	4	4	4		
Thursday 2	3	3	3	3	3	3	3	3	3	3	3	3		4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3		3	3	3	3	3	3			4	4	4	4	4	4	4	4	4	4	4	4		
Friday 1	5	5	5	5	5	5	5	5	5	5	5	5		4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5		5	5	5	5	5	5			4	4	4	4	4	4	4	4	4	4	4	4		
Friday 2	3	3	3	3	3	3	3	3	3	3	3	3		4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3		3	3	3	3	3	3			4	4	4	4	4	4	4	4	4	4	4	4		
Teaching Hours	25	25	25	25	25	25	25	25	25	25	25	25														25	25	25	25	25	25		25	25	25	25	25	25																	600
Working Hours														40	40	40	40	40	40	40	40	40	40	40	40															40	40	40	40	40	40	40	40	40	40	40	40		960
Learning Hours	15	15	15	15	15	15	15	15	15	15	15	15														15	15	15	15	15	15		15	15	15	15	15	15																	360
	Teaching & Learning Cycle (12 weeks)													Working Cycle (12 weeks)												Teaching & Learning Cycle (12 weeks)													Working Cycle (12 weeks)													1920

Figure 4.16 Sequential model No. 3

SEQUENTIAL MODEL NO. 4 - F2F teaching course blocks with 2,5 days cycles during all four years

Year 1 - 4	Course 1 8 ECTS						Course 2 8 ECTS							Course 3 8 ECTS						Course 4 8 ECTS						Course 56 ECTS							Course 6 8 ECTS						Course 76 ECTS									Course 8 8 ECTS						
Day \ Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	
Monday	8	8	8	8	8	8	8	8	8	8	8	8		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8			8	8	8	8	8	8	8	8	8	8	8	8			8	8	8	8	8	8	
Tuesday	8	8	8	8	8	8	8	8	8	8	8	8		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8			8	8	8	8	8	8	8	8	8	8	8	8			8	8	8	8	8	8	
Wednesday	4	4	4	4	4	4	4	4	4	4	4	4		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4			4	4	4	4	4	4	4	4	4	4	4	4			4	4	4	4	4	4	
Wednesday	4	4	4	4	4	4	4	4	4	8	8	8		4	4	4	4	4	4	4	4	4	8	8	8	4	4	4	4	4			4	4	4	4	4	4	4	4	4	4	4	4			4	4	4	4	4	4	
Thursday	8	8	8	8	8	8	8	8	8	8	8	8		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8			8	8	8	8	8	8	8	8	8	8	8	8			8	8	8	8	8	8	
Friday	8	8	8	8	8	8	8	8	8	8	8	8		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8			8	8	8	8	8	8	8	8	8	8	8	8			8	8	8	8	8	8	
Teaching Hours	16	16	16	16	16		16	16	16	16	16			16	16	16	16	16		16	16	16	16	16		16	16	16	16				16	16	16	16	16		16	16	16	16						16	16	16	16	16		608
Working Hours	20	20	20	20	20	20	20	20	20	20	20	20		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20			20	20	20	20	20	20	20	20	20	20	20	20			20	20	20	20	20	20	920
Learning Hours	4	4	4	4	4	20	4	4	4	4	4	20		4	4	4	4	4	20	4	4	4	4	4	20	4	4	4	4	20			4	4	4	4	4	20	4	4	4	4	4	20			4	4	4	4	4	20	312
																																																						1840

Figure 4.17 Sequential model No. 4

5 An Example 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), i.e. Table 4.1, and specify options that define this specific MDHE (Table 5.1). With the green color we indicate chosen options.

Table 5.1 A specific model of dual higher education (MDHE)

	Feature	Alternatives , aspects or recommendations	What should be yet specified
Geographical and economical issues			
1	Geographical restrictions	You may choose *a parallel model* of scheduling of working and teaching/learning times, if the company and the HEI <u>are</u> 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 <u>are not</u> 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 at the national level, but not locally.	Give explanation why your dual program is important from national point of vew.
Study program			
3	Academic level of dual education and program to be implemented	Bachelor	BSc Software Engineering
		Other postgraduate courses	
		Master	
		Doctorate	
4	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
5	Duration of the study	Standard duration (60 ECTS/year)	4 years, 240 ECTS
		Prolonged duration (30 ECTS/year)	
6	Teaching language	Serbian	Yes
		English	
		Multilingual	Specify
		Other	Specify
7	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	Yes
		Mandatory	
		No international mobility	
8	Financial support of students' mobility	Administrative support	
		Legal supports	
		Financial	
		No support	
9	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 Software Engineering 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			
10	Contract between the university and the company	Specify dual program(s)	BSc Software Engineering
		Specify planning, coordination and documentation of student's dual education	5 Year 1 students each year, starting from 2019/20 1 Year 3 student in 2019/20 and 2010/21
		Specify financial aspects	Payment of the tuition fee 2.000 EUR/year The scholarships for students from year 2 - amounts specify the company based on performances
11	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 tuition fee 2.000 EUR/year and the scholarship 100 EUR/month starting from Year 2, and may be changed based on student/s performances. Students has to work 3 hours per day from Monday to Thursday and 8 hours on Fridays, according to parallel model No. 1
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 1 tuition fee 2.000 EUR/year From year 2 scholarship 100 EUR per month
Working time			
14	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	Time period alternations are mixed, depending of the period of the year and/or the year of study (specify it)
15	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%	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 houts daily during 5 weeks
16	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			
17	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 already been previously selected by the companies can enroll
18	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 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.	
19	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			
20	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	
21	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	
		The company has a "company tutor hosting guide", as an addition to F2F training of tutors	
22	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.	
Teaching-learning process			
23	Type of lecturers	full-time lecturers,	Yes
		guest lecturers from other universities and colleges,	Yes
		as well as consultants and executives	Yes
24	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.	Yes. Student sends its assessment to both mentors.
		The student evaluates the company according to established quality criteria.	
		Other forms of evaluation of the company	
		No evaluation of the company	

25	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 stay in the work centre.	Yes
26	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
27	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	
		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	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)	
28	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			

29	Implemented pedagogy	Deductive (first learn theory, then apply it)	Student first compete all academic courses and the have an (summer) internships (not recommended for dual education)
		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: 4. Industrial project in the company in 1st semester 5. Study project reflecting real life company problem, but realized at the university 6. Students have to select, deeply investigate and solve an applied (research) problem based on "real business priorities" at the latest in the last semester
30	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: 4. proofreading, 5. writing and 6. valuation of experience leading to a life-wide curriculum	Yes.

31	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
32	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			
33	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.
34	Who performs the evaluation?	Assessment is done jointly with the *student*, the *company mentor* and the *school tutor* based on the existing requirements of the company and the school	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.	
35	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	
		The adaptation of the student to a real job	
		The evolution held since the beginning of the process	
		Something else	
36	Kind of evaluation (multiple answers are allowed)	Written and oral exams	
		Individual assignments	
		Team work	
		Report on their performance in the company	Yes
		Public presentations	Yes
		Projects	Yes
		Something else	Specify
37	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 the specific MDHE defined by Table 5.1, the HEI and company make their contract, the company makes contracts with its dual students.

6 Conclusions

This document specifies the generic and flexible model of dual higher education (GF-MDHE) that could be implemented in Serbia. It specifies 38 attributes and offers different and optional values of these attributes. The model is “generic” as it provides common features and their optional values that needs to be chosen and specified when a specific model of dual higher education (MDHE) is generated according to the needs of DHE partners (the companies and the higher education institution). The model should also be “flexible” to allow specification of different variants of a specific MDHE. These variants may add new attributes or new optional values of already defined attributes.

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. They can also add new attributes and/or new values of the defined attribute, thus, creating a specific model of dual higher education (MDHE) that they agree to implement for one or more specified degree programs. The generated specific model of DHE is the basis for contracts (the company-HEI, the company-student) to be prepared and put into action.

The document offers three parallel models of work and teaching/learning schedules, as well as four 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 Serbia (LF-DHE) with 15 attributes that specify major features of the legal framework. It can help policy makers and legislators to specify easier the legislation of dual higher education in Serbia. They can choose one of offered values of each attribute, but also can add new values or new attributes with their values, in order to create the most convenient legislation of dual higher education (DHE) in Serbia.

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), a specific LF-MDHE was created, as well as a new specific MDHE.

The proposed models for the legal framework and for implementation of DHE by DHE partners, provides a basis for public discussion of all stakeholders (HEIs, companies, legislators etc.). The final versions of these models will be specified based of the feedbacks received from the organized discussion forums and written suggestions from individuals or from some organizations.