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Strengthening capacities for the implementation of dual education in BH higher education
(DUALSCI)

Description and Concept of Specific Dual Higher Education Model at the Faculty of Dentistry with Clinics of the University of Sarajevo

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1. Introduction

The Faculty of Dentistry with Clinics of the University of Sarajevo was founded in 1960 as a department at the Faculty of Medicine, and since 1974 it has existed as an independent organizational unit that occupies an important position in national higher education and international education.

The integrated study at the Faculty of Dentistry of the University of Sarajevo lasts six years, XII semesters, after which the title of dentist is acquired, and from 2019 it is also conducted in English. The study is designed so that in the first two years exams in general and preclinical subjects are listened to and taken, and in this way students are prepared to work with patients. After the second year, students are in direct contact with the patient under the expert supervision of teachers and assistants, and the faculty in the provides the necessary equipment and materials for work.

The professional study of dental hygiene at the Faculty of Dentistry, University of Sarajevo lasts three years, VI semesters, after which the title of university bachelor of dental hygiene is acquired. The study is designed to listen to theoretical classes in parallel and perform the practical part (work with the patient) under the expert supervision of teachers and assistants, and the faculty provides the necessary equipment and materials for work.

The Faculty is equipped with 125 new Sirona dental chairs, on which the teaching process and clinical work take place, new IT equipment was procured, the amphitheater was renovated and redesigned, and new 4K technology was introduced into the teaching process. The teaching process has been further improved with state-of-the-art equipment: two 3D CBCT diagnostic devices, Dentply Sirona CAD & CAM technology and dental 3D printers with which students are educated with modern achievements in the profession. We are continuously working on improving and perfecting the curricula, and they are harmonized with the curricula of study programs at recognized European faculties.

2. Implementation of the Dual Higher Education Model

Article 90 of the proposal Law on Higher Education (hereinafter referred to as: Law) defines that DHEM may be accredited as a separate study programme or as one of the modules within a study programme. As current draft proposes:

- (1) A higher education institution / member may organize a dual study in which through active teaching at a higher education institution and practical training and

work in a company, knowledge, skills and competencies are acquired, improved or built in accordance with the study program and qualification standard.

(2) The dual study referred to in paragraph (1) of this Article may be an independent study program in the second cycle or as a single study module within the study program in the final years of the first or second cycle of studies, which is integrated into the study program structure with practical learning blocks. work in companies.

(3) It is realized, through theoretical teaching at a higher education institution and practical training and work in companies, and in that way competencies are acquired in accordance with the study program and qualifications.

(4) A higher education institution that wishes to implement study programs according to the dual model of studies shall form a network of companies and other organizations that have the need to employ persons with qualifications acquired at that institution. The mutual relationship between a higher education institution, companies and other organizations and students in study programs, ie modules according to the dual model, is regulated by a contract.

In the proposed law, the stage was set for the introduction of DHEM. It was thereby planned that students, over the course of their three-year studies, should go through practical forms of learning by engagement within independent practice during studies, as well as in dental practice cabinets (company). It is envisioned that first generation of students will be composed of already hired dental nurses/dental assistants in dental practices. Practical work will be organised through clinical practice and apprenticeship in this study programme is realised in the following:

1. **Independent Clinical Practice** in the first year of studies, 200 hours (10 ECTS),
2. **Independent Clinical Practice** in the second year of studies, 200 hours (10 ECTS),
3. **Independent Clinical Practice** in the third year of studies, 200 hours (10 ECTS),
4. **Apprenticeship in Dental Practice** during studies, second and third year with 240 hours yearly (480 hours during entire programme).

In this way, over the course of their studies, students obtain 180 ECTS, 30 ECTS of which are obtained in the process of work-based learning at faculty clinics with addition of 480 hours of apprenticeship in dental practices, resulting in total of 1080 hours of practical work during entire three-year study programme.

During the development of the study program of Dental Hygienists, the European Qualifications Framework (EQF) was respected, in accordance with which the Basics of the Qualifications Framework in Bosnia and Herzegovina were adopted. The European

Qualifications Framework (EQF) is a system of connecting and harmonizing the education systems of European countries and aims to encourage mobility and regulate the area of lifelong learning.

Also, the study program complied with Directive 2005/36 / EC of the European Commission, which is the basic document on the regulation of mutual recognition of qualifications and diplomas among EU member states for certain regulated professions in the field of medicine and veterinary medicine. The introduction of vocational studies is in line with the FBiH Action Plan and Roadmap. Therefore, competencies, teaching load, level of education and learning outcomes are defined, which is necessary for the comparability and compatibility of qualifications in the education system.

The main goal of the study program is to educate highly professional staff in the field of dental medicine and train students to apply acquired knowledge and skills in preventing oral diseases, preparing patients for dental procedures, applying the latest diagnostic and therapeutic methods, in accordance with the principles of good clinical practice. The goals and learning outcomes of the study program reflect the mission and vision of the Faculty of Dentistry and are in line with its strategy.

Studies will be adapted to work-related obligations of students. In this way, students have the conditions of organise practical forms of work-based learning.

Graduated students would be provided with further education in Specialist Vocational Studies, which would include 60 ECTS, and upon completion of which they would receive the title of Professional Master of Dental Hygiene.

Dental hygienists have a higher degree of education and autonomy than a dental assistant. Upon completion of the professional study, the dental hygienist will be able to work independently in the health care system where he has a significant role in the oral health of society as a whole, which is reflected in education, prevention and health promotion performed by dental hygienists within the dental team.

Tables 1, 2 and 3 show the list of courses within Dental Hygiene Programme, the number of lectures and practical classes, as well as the corresponding number of ECTS for each of them.

Table 1. Course structure in the first year of studies
(subject to possible revision and update depending on labour market response)

CODE	COURSE	TOTAL HOURS	ECTS
SFDH011	FUNDAMENTALS OF DENTAL PRACTICE	120	5
SFDH012	DENTAL MATERIALS	150	6
SFDH013	HEAD ANATOMY WITH TEETH MORPHOLOGY	150	6
SFDH014	ORAL PHYSIOLOGY AND BIOCHEMISTRY	90	4
SFDH021	ORAL HYGIENE WITH PROPHYLAXIS	180	8
SFDH022	ORAL HEALTH CARE AND TEAMWORK	105	5
SFDH023	PUBLIC ORAL HEALTH	150	6
SFDH024	ETHICS AND DEONTOLOGY IN DENTAL MEDICINE	90	4
SFDHI15	CELL BIOLOGY AND ORAL HISTOLOGY	75	3
SFDHI25	ENGLISH	75	3
SFDHI26	IMAGING IN DENTAL MEDICINE	75	3
<i>Independent Clinical Practice</i>		200	10
			60

Table 2. Course structure in the second year of studies
(subject to possible revision and update depending on labour market response)

CODE	COURSE	TOTAL HOURS	ECTS
SFDH031	PREVENTIVE DENTISTRY	210	9
SFDH032	INTERNAL MEDICINE	180	7
SFDH033	MICROBIOLOGY WITH INFECTION CONTROL	90	5
SFDH034	STOM. PHARMACOLOGY WITH PAIN CONTROL	60	4
SFDH041	ORAL MEDICINE WITH BASICS OF PATHOLOGY	120	7
SFDH042	DENTAL RADIOLOGY	90	4

CODE	COURSE	TOTAL HOURS	ECTS
SFDH043	ASEPSY AND ANTISEPSY	75	3
SFDH044	SAFETY AT WORK	75	3
SFDHI35	NUTRITION AND ORAL HEALTH	75	4
SFDHI45	MANAGEMENT IN DENTISTRY	75	4
SFDHI46	COMPUTER SCIENCE	75	4
Independent Clinical Practice		200	10
			60

Table 3. Course structure in the third year of studies
(subject to possible revision and update depending on labour market response)

CODE	COURSE	TOTAL HOURS	ECTS
SFDH051	CHILDREN'S DENTISTRY	165	7
SFDH052	ORAL SURGERY	75	4
SFDH053	RESTORATIVE DENTISTRY AND ENDODONTICS	165	7
SFDH054	PATIENTS WITH SPECIAL NEEDS	75	5
SFDH061	DENTAL PROSTHETICS	165	7
SFDH062	JAW ORTHOPEDICS - ORTHODONTICS	75	4
SFDH063	PERIODONTOLOGY	150	6
SFDH064	EMERGENCY CONDITIONS IN DENTISTRY	90	4
SFDHI55	DENTAL PLANNING. DENT TREATMENTS. HYGIENICIANS	60	3
SFDHI65	FUNDAMENTALS OF COMMUNICATION SKILLS	60	3
SFDHI66	GERONTOSTOMATOLOGY	90	6
Independent Clinical Practice		200	10

The structure of students' work with the employers is planned to be based on proposed generic model 1, variant 3, with combination of online based learning and practical work in dental practice during second and third year of studies:

III variant of Model 1			
	Classes	Dental Practice	Learning
MON	5		3
TUE	5		3
WED	5		3
THU	5		3
FRI		8	
ukupno	20	8	12
15 weeks			
	Classes	Dental Practice	Learning
	300	120	180
7.5 weeks			
Independent learning, exams			
	300		
	Classes	Dental Practice	Learning
	300	120	480

Structure of Independent Clinical Practice

First year (200 hours)

Goals of Independent Clinical Practice I	Practical work and application of skills acquired during theoretical and practical classes, seminars and colloquia that they attended during the previous year of study.
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Purpose	Training students with basic knowledge and skills in the field of dental practice and dental materials, oral health, oral hygiene and ethics.
Learning outcomes	<p>After completing the independent professional practice, the student will, by additional performance of the acquired knowledge and skills, be able to:</p> <ul style="list-style-type: none"> -defines the importance of oral hygiene in maintaining oral health -educates the patient about the importance of oral hygiene from the aspect of prevention of oral diseases and preservation of good oral health -recommend to the patient different techniques and means for brushing teeth -apply different methods for identification and removal of soft and hard dental plaque -organizes the care of the patient in primary care -cooperates within the dental team -defines public health risk factors for general and oral health, - implement public health measures for the prevention of oral diseases, non-communicable and contagious diseases, -apply in teamwork health education programs in order to prevent oral diseases.

Second year (200 hours)

Goals of Independent Clinical Practice I	Practical work and application of skills acquired during theoretical and practical classes, seminars and colloquia that they attended during the previous year of study.
Purpose	Training students with basic knowledge and skills in the fields of internal medicine and microbiology, dental pharmacology and radiology, preventive dentistry and oral medicine, and occupational safety.

<p>Learning outcomes</p>	<p>After completing the summer internship, the student will, by additional performance of acquired knowledge and skills, be able to:</p> <ul style="list-style-type: none"> -knows the etiology of oral diseases and risk factors for their occurrence -knows and applies preventive and prophylactic measures in oral diseases -monitors epidemiological indicators of oral diseases -organizes and keeps health documentation and records -use an electronic card of dental services -create the conditions of aseptic work in the dental office, surgery room, dental laboratory -perform the chain of infection in clinical conditions -prepare the workplace and work field -takes anamnesis -performs a physical examination of the oral cavity -indicates to the dentist in case of suspicion of any disease of oral tissues or systemic disease that has a manifestation in the oral cavity -assists during medical and dental procedures -take a swab from the oral mucosa and prepares it for observation under a microscope -receives, arranges and sows material samples -preparation of medicines and materials for use in dental procedures -assess which patients require caution and urgent pharmacotherapy - independently performs intraoral radiography methods -examines the diet and nutritional status of their patients -develop recommendations for proper nutrition and diet therapy of patients
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Third year (200 hours)

Goals of Independent Clinical Practice I	Practical work and application of skills acquired during theoretical and practical classes, seminars and colloquia that they attended during the previous year of study.
Purpose	Enabling students with basic knowledge and skills in the field of pediatric dentistry, oral surgery and periodontology, restorative dentistry and endodontics, orthodontics and prosthetics, working with patients with special needs, and dealing with emergencies in dentistry.
Learning outcomes	<p>After completing the professional internship, the student will, by additional performance of the acquired knowledge and skills, be able to:</p> <ul style="list-style-type: none"> -distinguishes between milk and permanent dentition -recognizes psychological types of children -cooperates effectively within the dental team for the care of children and adolescents - independently prepare the working field and instruments -assists when performing surgical interventions -teaches patients to maintain oral hygiene after surgery -assists and prepares medicines and materials during the restorative intervention -assists and prepares medications and materials during endodontic intervention -prepares the workplace and the patient for dental prosthetic interventions <p>During the internship student:</p> <ul style="list-style-type: none"> -prepares the workplace, manages the administration, card and other documentation. -receives children, prepares, establishes a relationship with the child and parents, scheduling appointments -prepares instruments for sterilization, controls sterilization, preparation of surgical space and operating field -assists during simple and complicated tooth extraction -prepares, takes, marks and sends material for laboratory analysis

	<ul style="list-style-type: none"> - gives postoperative instructions to the patient and trains him to maintain hygiene after surgical interventions -performs postoperative control, wound dressing, intramuscular application of drugs to control swelling -removes floss, performs toilet dressing, examines tooth vitality, schedules check-ups -preparation of material for temporary closure of the cavity, preparation of medications or substrates -preparation of medications for endodontic therapy (anesthetics, channel antiseptics, pastes for channel medication) -prepares the workplace, communicates with the dental laboratory, organizes work in the dental prosthetic practice
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The Independent Clinical Practice takes place at the Clinics of the Faculty of Dentistry according to the plan and under the control of the responsible teacher, mentor, commentator or expert (the report on the completed internship is filled in by the mentor, commentator or expert, and the number of ECTS credits is entered in the index). The teacher, responsible for the internship, makes a plan of the student's summer internship and checks the records of regular attendance and student activities, and the student keeps a diary of the internship in which he records the activities he has performed. to perform it in order to achieve the anticipated number of ECTS credits.

The Apprenticeship in dental practice takes place at the respective dental practice according to the plan and under the control of the mentor in dental practice, (the report on the completed apprenticeship is filled in by the mentor dental practice). The teacher, responsible for the apprenticeship, makes a plan of the student's apprenticeship and checks the records of regular attendance and student activities, and the student keeps a diary of the internship in which he records the activities he has performed.

3. Legal Conditions for the Realisation of DHEM

Work-based learning is realised in its entirety with existing employer of dental assistant that have been enrolled for obtaining dental hygienist degree in compliance with the study programme and a plan for the realisation of work-based learning.

The rights and obligations of Faculty of Dentistry with Clinics of University of Sarajevo and dental practices, are regulated by agreements.

Students rights and obligations are regulated by Law on Higher Education, Statute of the University and Study rules for the I and II cycle, integrated, vocational and specialist studies at University of Sarajevo:

- 1) The student 's right and duty is to study in pursuance with the adopted and approved study rules and curriculum, be examined and evaluated in accordance with rules that are transparent, fair and accessible to each student.
- 2) The rights and duties prescribed by the student standard are personal and non-transferable.
- 3) The student is entitled to:
 - a. attend all forms of teaching,
 - b. quality teaching process in accordance with the adopted and approved curriculum,
 - c. receive timely and accurate information on all study issues,
 - d. be transparently informed about the schedule of classes and exam terms at the level of the academic year within the first two weeks,
 - e. equality with regard to the study conditions and treatment at the University as well as to the student status benefits conferred,
 - f. diversity and protection against discrimination,
 - g. health care in accordance with the Law,
 - h. use the library and other services provided to students at the University, in accordance with the University acts,
 - i. consultation with and assistance of academic staff in mastering the teaching content, especially during the final paper preparation,
 - j. freedom of thought and expression of personal views regarding teaching content during the teaching process,
 - k. evaluation of the academic personnel work,
 - l. ECTS recognition and transfer between higher education institutions for the mobility ensuring purpose,
 - m. participation in the election process for the student representative and other bodies established by the Statute,
 - n. participation in the student organizations work,
 - o. participation in the University or Faculty/Academy/Center/Institute decision-making bodies, in compliance with the Statute,
 - p. be protected in the manner established by law and statute in the event of a violation of any of his in the manner established by law and statute,

- q. complete the study program which he enrolled in the Faculty/Academy/Center/Institute at the University within the duration of one study cycle plus two academic years,
 - r. the student who is repeating the academic year is obliged to attend the study according to the changed curriculum in accordance with the Law,
 - s. other rights established by the Statute and other University general acts.
- 4) The University/Faculty/Academy/Center/Institute is bound to publish on its web site information package or student guide containing information on the student rights enjoyed during their studies, such as the way of obtaining students health care, on sections that are available to students and mobility programs, as well as other relevant information.
- 5) The student meets the following duties:
- a. abiding the University rules,
 - b. fulfilling teaching and other obligations,
 - c. fully respect the rights of teaching, professional and administrative staff, as well as the rights of other students at the University,
 - d. duly fulfilling study obligations and participate in academic activities,
 - e. other obligations prescribed by Law and Statute.

3.1. Defining relations between employers and students

Relations between Faculty of Dentistry with Clinics of University of Sarajevo and dental practices will be regulated by agreements.

Relations between Relations between Faculty of Dentistry with Clinics of University of Sarajevo and dental practices on DHEM, while relations between dental practices and students are regulated by an agreement on work-based learning.

3.1.1. Agreement on DHEM

The form, content, signing, publishing, termination and the consequences of terminating an Agreement on Dual Higher Education Model will be defined in Statute of the University of Sarajevo that will be passed after passing of the new Law on Higher Education.

3.1.2. Agreement on work-based learning

The form, content, signing, termination and the consequences of terminating an Agreement on Work-Based Learning will be defined in Statute of the University of

Sarajevo and the Study rules for the I and II cycle, integrated, vocational and specialist studies at University of Sarajevo that will be passed after passing of the new Law on Higher Education in Assembly of Sarajevo Canton.

3.3. Mentorship at the employer's

Mentor at the employer's must have the competence to realise work-based learning defined in the Statute of the University of Sarajevo and the Study rules for the I and II cycle, integrated, vocational and specialist studies at University of Sarajevo.

The manner of evaluating mentor's competence is determined in the Statute of the University of Sarajevo and the Study rules for the I and II cycle, integrated, vocational and specialist studies at University of Sarajevo

3.4. Grading and exams in DHEM

Grading students in DHEM is defined in the Statute of the University of Sarajevo and the Study rules for the I and II cycle, integrated, vocational and specialist studies at University of Sarajevo.

3.5. Material and financial compensation for students

Since the students of pilot study programme of Dental Hygiene are envisioned to be already employed dental assistants in dental practices the compensation is already defined as stipulated by labour contract between dental practice and dental assistant.