UNIVERSITY OF SARAJEVO – FACULTY OF DENTISTRY WITH DENTAL CLINICAL CENTER

DOCTORAL STUDY

(III cycle of studies at University of Sarajevo - Faculty of dentistry with dental clinical center)

Sarajevo, 2023.

CURRICULUM OF STUDY PROGRAM

1. GENERAL

Within the framework of the III cycle of studies - doctoral studies in Dentistry, at the University of Sarajevo - Faculty of Dentistry with a dental clinical center, candidates will acquire scientific knowledge and develop the ability to conduct independent scientific research, which will provide new scientific results and original contributions to the development of scientific thought in the field of healthcare.

The study program of the third cycle of the University of Sarajevo - Faculty of Dentistry with a dental clinical center consists of teaching, scientific research work, preparation and defense of a doctoral dissertation. Teaching is conducted through lectures, workshops, seminars, discussions and practical work, and can also be consultative/mentoring, depending on the number of participants. Scientific research work within the framework of the doctoral thesis is valorized through seminars, i.e. through the preparation and defense of the doctoral thesis.

Lectures in compulsory and optional subjects aim to expand the candidate's knowledge, primarily in the field from which the candidate is working on the thesis. Consultative work with candidates and block of classes are optional.
The basis of this study is scientific research work within the framework of doctoral studies that candidates will perform at the University of Sarajevo - Faculty of Dentistry with a dental clinical center and in teaching bases with multi-professional scientific research teams in various disciplines, if necessary in other institutions that have adequate equipment necessary for research.
The fundamental principles of doctoral study are scientific research and learning through scientific research, innovation, application of international academic and scientific standards and international quality standards, transparency and international competitiveness.

The functions of doctoral studies are:
a) creation of new knowledge and their application;
b) training doctoral students for independent, original and scientifically based research that expands the boundaries of knowledge as well as critically evaluating the work of others;
c) acquisition of experience, skills and knowledge based on research;
d) internationalization of scientific research work at the University;
e) compliance of practices within the third cycle of studies with the EU principles for the organization of doctoral studies, i.e. the Salzburg recommendations for the organization of

doctoral studies and the Principles of Innovative Doctoral Education. (Art. 3. Rules of the University).

Doctoral studies are organized in accordance with the Law on Higher Education of the Canton of Sarajevo, the Statute of the University of Sarajevo, the Study Rules for the third cycle of studies at the University of Sarajevo, i.e. the valid positive legal regulations.

Completion of the third cycle of studies acquires the competence of independent design, organization and implementation of demanding research programs and projects, as well as independent preparation and evaluation of reports and presentation of the results of programs and projects.

Title of study, scientific field, title

The title of the study program is the III cycle of studies - Doctoral study in dentistry.

Doctoral studies at the Faculty of Dentistry of the University of Sarajevo belong to the scientific field of biomedicine and healthcare.

Upon completion of the study program of the third cycle of studies, doctoral study in dentistry, the candidate acquires the title of ***Doctor of Dental Sciences***.

1.2. Holder of studies

The holder of the study is the University of Sarajevo. The University entrusts the organization and implementation of the program at the Faculty of Dentistry in Sarajevo. The study rules are determined by the study rules for the third study cycle of the University of Sarajevo, adopted by the Senate of the University of Sarajevo.

1.3. Conditions for enrolling in studies

Candidates from Bosnia and Herzegovina and abroad who, as a rule, have graduated from the Faculty of Dentistry, can enroll in the course under equal conditions:

- who obtained a diploma of integrated studies in dentistry,
- who obtained a diploma with the scientific title of Master of Dental Sciences, and before the introduction of the Bologna system studied at the Faculty of Dentistry with clinics or at another

higher education institution in Bosnia and Herzegovina or abroad. These candidates are granted 60 study points when enrolling in the third cycle of study, in a manner determined in more detail by the Study Council, and these candidates acquire the remaining volume of 120 study points in accordance with the Study Rules for the third study cycle at the University of Sarajevo. These candidates pay two thirds of the total tuition fee.

- foreign nationals who apply for the Competition on the condition that they submit a decision on the nostrification/academic recognition of the acquired diploma.

- For clinical areas, the candidate must have passed the specialist exam (In accordance with the decision of the Senate of the University of Sarajevo number: 01-260/20 of September 30, 2020, for faculties of the Council of the Group of Medical Sciences (with the exception of the Faculty of Veterinary Medicine), for clinical areas, the candidate cannot enroll in doctoral studies without passing the specialist exam.

Knowledge of the English language at a level that enables communication through speech and writing, following scientific and teaching literature, writing scientific papers and using computer programs is mandatory.

1.4. Criteria and procedures for selecting participants

Enrollment in doctoral studies is carried out on the basis of a public competition. The decision to announce a competition for admission to doctoral studies, on the proposal of the Council for Doctoral Studies, is made by the Teaching and Research Council of the Faculty, with the consent of the Senate of the University of Sarajevo.

Notice of the competition for student enrollment is published in at least one daily newspaper published in the territory of Bosnia and Herzegovina. The competition for the enrollment of students in the first year of study is published on the website of the University/organizational unit, as well as on the bulletin boards of the University/organizational unit.

More detailed provisions on the announcement of a public competition for study enrollment, the admission process and student enrollment are determined by the Study Rules for the third cycle of study at the University of Sarajevo.

Enrollment of students for doctoral studies will be done on the basis of the admission procedure, without the obligation to take an entrance exam.

Candidates for doctoral studies who meet the enrollment requirements, if the number of students to be admitted is defined, will be selected in the admissions procedure based on the following criteria:

- results achieved during previous education,
- scientific research work.

Success in previous studies and demonstrating the results of scientific and research work is proven by competitive documentation (copies of papers, books, etc.).

2. DESCRIPTION OF THE PROGRAM

2.1. Program structure and duration

Doctoral studies last for three (3) study years (6 semesters) and, with appropriate commitment and continuous work, enable students to have an even workload. Doctoral studies are evaluated with at least 180 ECTS points. Doctoral students can extend each study

year by one year, so they are obliged to complete their studies within a maximum of six years from the date of enrolment.

The term from the previous paragraph of six years can be extended for a maximum of one more year, counting from the date of expiry of the term established by the Law on Higher Education of the Canton of Sarajevo. (Art. 18 of the University Rules).

Students who enroll in the study program of the third cycle of studies with the title of Master of Science, based on the student's request and the Decision of the Doctoral Studies Council, are recognized with 60 study points, based on attending classes and taking exams (Article 22 of the University Rules)

In this way, the workload of these students in the doctoral studies is 120 study points, which the student needs to achieve through the realization of the obligations foreseen in the III, IV, V and VI semesters of the study. Upon completion of the study program, the academic title of Doctor of Dental Sciences is obtained.

Doctoral study consists of:

1. active participation in the teaching-scientific process and monitoring the evaluation of results through established knowledge tests,
2. application and presentation of the project, approach and scientific methods of the doctoral thesis,
3. selection of the scientific field in which the doctoral dissertation will be done and selection of a mentor,
4. scientific research, theoretical and practical work on the preparation of a doctoral dissertation,
5. publishing parts of the research in journals that follow relevant international databases from the register of relevant scientific databases prescribed by the competent authority,
6. defending the results of the work and the working version of the doctoral dissertation in front of the commission members,
7. public defense of the doctoral dissertation (Article 10 of the University Rules)

The study program is implemented through classes, scientific research work and the preparation and defense of a doctoral dissertation. The teaching process is carried out through lectures, seminars, consultations, guided practicals and other established forms of teaching.

The curriculum consists of: study areas, mandatory modules (required courses), optional courses, guided practicals, and research work.

2.2. Student obligations and movement/advancement through studies

I year of study

In the first semester of study, unique classes were organized for all students from the group of compulsory subjects that correspond to the home fields of the Faculty of Dentistry of the University of Sarajevo.

The Council of Studies determines the list of responsible teachers who participate in the teaching of the III cycle of studies. The Council of Studies assigns a supervisor to the doctoral student upon enrollment.

As a teacher, the supervisor participates in the conduct of studies and is a potential mentor, who directs and monitors the doctoral student and his work until the appointment of a mentor. (Art. 19 of the University Rules)

The doctoral student has the right to change the supervisor once with a written request to the study council. (Art. 18 of the University Rules).

In the second semester, the student chooses six elective courses, out of the ten offered, which correspond to the main fields of the Faculty of Dentistry, so that the total workload in the second semester amounts to a minimum of 30 ECTS.

Lectures for compulsory subjects are held regardless of the number of enrolled candidates, and for elective subjects if there are 3 (three) or more participants. For a smaller number of participants, the teaching is consultative (Article 12 of the University Rules). In order for the student to get a signature, it is necessary to fulfill all obligations from the subject (attended lectures, active participation in workshops, practical classes, seminars and consultations).

During the second semester of study, the doctoral student chooses the area of the research topic and, together with the supervisor, defines the narrower area and topic of the doctoral dissertation. The application form for the topic of the doctoral dissertation is an integral part of these Rules. (Form DS 1)

The topic of the doctoral dissertation is confirmed by the study council. (Art. 29 of the University Rules)

The supervisor is obliged to submit a report on the doctoral student's work on the prescribed form by the end of the second semester. (Form DS 5)

The report from the previous paragraph of this article is submitted to the study council for adoption. (Art. 19 of the University Rules).

II year of study

In the third semester, the student reports the Doctoral Dissertation Project to the Council of the Third Cycle of Studies, on a form that is an integral part of the Rules of the Third Cycle of Studies (Form DS 2), which must contain:

a) candidate's biography/CV,
b) working title of the thesis,
c) mentor's proposal
d) introductory notes and overview of previous research,
e) the subject and objectives of the research,
f) narrower research domain,
g) methodological approach,
h) expected results and scientific/artistic contribution i
i) used literature. (Art. 30 of the University Rules)

By the end of the first half of the 3rd semester of studies, the Council of the 3rd cycle of studies proposes to the Faculty Council, and the Faculty Council to the University Senate the composition of the Commission for the evaluation and defense of the project, working version and doctoral dissertation (hereinafter: the University Commission). One of the members of the Commission is proposed as a mentor.

By the end of the 3rd semester, the Senate of the University, with the prior opinion of the group council, appoints the University Commission. The commission has three or five members. The commission has five members when it comes to a commission that has two mentors for the reasons prescribed in article 20, paragraph 4 of this Ordinance. The commission must also have one substitute member. All members of the Commission are chosen from the ranks of teachers who have the scientific degree of Doctor of Science, most of whom are from the field from which the topic is applied.

A person entrusted with the role of mentor cannot be appointed as the President of the Commission.

The commission carries out the complete process of evaluation and defense of the doctoral dissertation project, the working version of the doctoral dissertation and the final version of the doctoral dissertation.

Exceptionally, in the event that members of the Commission are appointed from university teachers from other countries, a commission for the defense of the doctoral dissertation project and the working version of the doctoral dissertation and a commission for the evaluation and defense of the final version of the doctoral dissertation may be appointed separately. It is also possible in such a situation that a substitute member participates in the

earlier stages of the evaluation and defense of the doctoral dissertation. (Art. 31 of the University Rules).

In the fourth semester, the student is required to defend the doctoral dissertation project. The defense of the doctoral dissertation project is public and is defended before the University Commission.

The University Commission prepares a report on the doctoral dissertation project, in which it is obligatory to state the suitability assessment of the candidate and the topic of the doctoral thesis, and submits it to the University Senate through the Council of the Third Cycle of Studies and the Faculty Council, and on the form that is an integral part of the Rules of the Third Cycle of Studies (Form DS 6). After the Council of the 3rd cycle of studies, the Faculty Council and the University Senate have made a decision to accept the report of the University Commission, the doctoral student can begin the realization of the doctoral dissertation project. (Art. 32 of the University Rules).

If the University Committee has objections to the submitted doctoral dissertation project, it returns the doctoral student for revision, who is obliged to submit the corrected version of the doctoral dissertation project to the University Committee within no longer than 30 days from the day of the objections submitted by the University Committee.

After the submitted corrected version of the doctoral dissertation project, the University Commission prepares a report on the corrected doctoral dissertation project, in which it is obligatory to state the suitability assessment of the candidate and the topic of the doctoral thesis, and submits it to the University Senate via the Council of the III cycle of studies and the Faculty Council. (Art. 32. Rules of the University).

III year of year

In the fifth semester, the student does scientific research as part of his doctoral thesis. By the end of the 5th semester at the latest, the student reports the scientific research within the thesis, presents and defends part of the achieved research and results within the doctoral thesis.

The Doctoral Study Council forms a Commission before which the candidate defends the achieved research and results.

In the sixth semester, the student has the obligation to obtain a positive opinion from the mentor and report the working version of the doctoral dissertation to the study council by the end of the sixth semester.

The application for the working version of the doctoral dissertation is made using a form that is an integral part of the Rules (Form DS 7). (Art. 35 of the University Rules).

The working version of the doctoral dissertation should be correctly linguistically, stylistically and technically designed in accordance with contemporary procedures, techniques and technology for producing publications in the field of scientific, professional and artistic work. (Art. 36 of the University Rules).

The doctoral student is obliged to submit the working version of the doctoral dissertation to the study council. Submission of the working version of the doctoral dissertation is done through the Faculty's protocol. (Art. 37 of the University Rules)
The secretary of the study council, in agreement with the doctoral student and the president of the Commission, schedules the presentation of the working version of the doctoral dissertation. (Art. 38 of the University Rules).

The presentation procedure of the working version of the doctoral dissertation is performed before the University Commission, with the presence of the secretary of the study council, recorder, doctoral student, as well as teachers from the field in which the doctorate is being defended, as well as other interested persons, without the possibility to ask questions or interrupt the doctoral student. Members of the University Commission have the right to interrupt the PhD student and ask for explanations.

Presentation of the doctoral student, observations and remarks of members of the University Commission should be in the form of a dialogue.
The doctoral student is obliged to incorporate the remarks of the members of the University Commission into the corrected working version of the doctoral dissertation and submit it in printed and electronic form within 90 days from the day the presentation was made.
The record of the procedure performed is submitted to the study council, on the form that is an integral part of these Rules (Form DS 8). (Art. 39 of the University Rules).

After submitting the corrected working version, according to the Rulebook on how to use plagiarism detection software (similarity procedure), the organizational unit is obliged to submit a PDF document of the corrected doctoral dissertation to the Publishing Service of the University of Sarajevo. The written statement of the Doctoral Dissertation Evaluation Commission on the results of the Doctoral Dissertation check using software for the detection of potential plagiarism, determined by the Rulebook on how to use software for the detection of potential plagiarism, is an integral part of the report that the Commission submits to the Faculty Council, and which the Faculty submits to the University Senate. (Art. 40 of the University Rules).

After the procedure of presentation of the working version of the doctoral dissertation in accordance with Article 40 and submission of the corrected working version of the doctoral

dissertation, the University Commission draws up a Report on the evaluation of the doctoral dissertation, which contains an evaluation of the presentation of the results of the work presented in the doctoral dissertation, and within 30 days it is submitted to the doctoral studies council together with the corrected working version of the doctoral dissertation. The report is submitted on a form that is an integral part of these Rules (Form DS 9). (Art. 41 of the University Rules).

Within ten days, the Council of Studies makes a decision on accepting the report of the University Commission and submits it to the Faculty Council. (Art. 41. Rules of the University)

Upon receipt of the decision to accept the report of the University Commission, the organizational unit of the University announces on its bulletin board, website and in the media that the report of the University Commission and the corrected working version of the doctoral dissertation are made available to the public.

The notification contains:

a) name and surname of the doctoral student,

b) the institution where the doctoral student is employed,

c) title of doctoral dissertation,

d) composition of the University Commission for evaluation and defense of the project, working version and doctoral dissertation

e) place and time for reviewing the working version of the doctoral dissertation.

The corrected working version of the doctoral dissertation and the Report on the evaluation of the doctoral dissertation remain open to the public for 30 days in a designated room of the organizational unit. Possible comments and suggestions from the public are considered by the University Commission and submitted to the study council within 30 days. Within 15 days, the Council of Studies makes a decision on accepting the report of the University Commission on comments and suggestions from the public and submits it to the council of the organizational unit. (Art. 42 of the University Rules).

At the end of the deadline, the Faculty Council considers the report of the University Commission and submitted comments from the public and proposes to the University Senate that the doctoral dissertation proposal be accepted, rejected or returned for amendment or amendment. The Senate of the University verifies the report and proposal of the council of the organizational unit.

In the event that the council of the organizational unit accepts the working version of the doctoral dissertation, the doctoral student is obliged to prepare the final version of the doctoral dissertation within 60 days from the receipt of the decision of the council of the organizational unit, submit it in the required number of copies and submit at least one work

published in journals monitored by relevant international databases from the register of relevant scientific databases, prescribed by the competent authority. (Art. 43 of the University Rules).

If the council of the organizational unit returns the doctoral dissertation proposal for amendment or amendment, and the doctoral student does not act on the remarks and suggestions and does not submit an amended working version of the doctoral dissertation within six months from the date of receipt of the notification of such a decision, the study council informs the Faculty council, which makes the decision that the doctoral student has abandoned his studies. (Art. 43 of the University Rules).

In the event that the council of the organizational unit rejects the working version of the doctoral dissertation, the candidate loses the status of a doctoral student, and the working version of the doctoral dissertation is registered as rejected.

The rejected working version of the doctoral dissertation cannot be submitted again by the doctoral student.

After the Senate approves the Report, the Faculty determines the place, date and time of the defense of the doctoral dissertation.

The public defense of the doctoral dissertation is organized no later than 30 days after the decision of the University Senate. (Art. 45 of the University Rules)

Doctoral studies end with the defense of the doctoral dissertation before the University Commission. The doctoral dissertation must have a scientific contribution in the field of research, it must be proof that the student can be independent in scientific research work, it must show that the student has mastered the theoretical foundations and has a good knowledge of current scientific literature, also that the student can evaluate his scientific ideas through scientific research work.

The doctoral dissertation is submitted before the public defense in ten copies in hardcover and five copies of electronic versions, which meet the following requirements:

• on the cover of the doctoral dissertation, it is necessary to state the name and surname of the doctoral student, the title of the doctoral dissertation, the name and surname of the mentor, the name of the organizational unit and the year of the defense of the doctoral dissertation,

• on the title page of the doctoral dissertation, it is necessary to state the name and surname of the doctoral student, the title of the doctoral dissertation, the name and surname of all members of the committee for the defense of the doctoral dissertation, indicating the functions of the committee (president, mentor, member), the name of the organizational unit and the year of the defense of the doctoral dissertation,

• comparative English version of the title page (with all listed elements),

• summary (from 300 to 500 words) with up to 8 keywords/terms in Bosnian and English.

After the defense of the doctoral dissertation, the student is obliged to publish the doctoral dissertation in the Repository of doctoral dissertations within 30 days from the day of the successful defense of the doctoral dissertation.

The publication of the doctoral dissertation in the Repository of final theses and doctoral dissertations of the UNSA is realized through self-storage of doctoral dissertations by the author. (Article 72, paragraph 2 of the Sarajevo Canton Law on Higher Education).

Authors must store the entire text of the dissertation, as well as a summary of the dissertation in the language in which it was written and in English, up to 500 words.

Storing the doctoral dissertation in the Repository is a condition for issuing a diploma on the acquired academic title and the scientific/artistic title of Doctor of Science/Art.

The administrator in the organizational unit, within which the doctoral dissertation was defended, within 30 days from the day of the successful defense of the doctoral dissertation, enters the metadata for that dissertation on the form provided for it. During the studies, the student is obliged to carry out scientific research activities.

2.3. Model publication to dissertation

The Council of the 3rd cycle of studies can, on the reasoned proposal of the mentor, approve the preparation of a doctoral dissertation according to the publication to dissertation model for a doctoral student who meets the requirements.

The publication-to-dissertation model represents a set of published scientific works accompanied by a critical overview chapter, which consists of an introduction, discussion, conclusion and review of relevant literature. The model of work by publication up to the dissertation is possible only as part of the scientific research work on the doctoral studies, and the scientific papers must be published or accepted for publication after enrollment in the doctoral studies.

The combined scientific works proposed as a doctoral thesis must form a rounded whole of at least three works published/accepted for publication in journals covered by the Current Contents (Web of Science) database.

The doctoral student must be the first/main author in all three published papers. (Art. 34 of the University Rules).

2.4. Guidance through studies and mentorship

Advising and guiding students through their studies is done by a mentor or supervisor.

The mentor is determined in the third semester. A mentor can be a teacher who has been elected to the title of associate professor and full professor or to the title of professor emeritus or to the title of senior scientific associate and scientific advisor in the scientific/artistic field of the doctoral dissertation, who has at least five papers published in journals that monitor international databases prescribed by the competent authority, at least three of which in the last five years in the scientific field from which the candidate's doctoral dissertation is.

2.5. Teachers

The teachers who participate in the doctoral study have the teaching titles of assistant professor, associate and full professor, or professor emeritus (they cannot be the holder of the course).

3. DESCRIPTION OF THE STUDY PROGRAM

3.1. Study program structure and organization

The doctoral study program is aligned with the European credit transfer system (ECTS), i.e. the total point value of the study content is a mandatory 180 ECTS study points.

The third cycle of study, Doctoral study in dentistry, lasts 3 (three) years and takes place over 6 (six) semesters.

One ECTS point is calculated as a workload of 30 hours of the total workload of the doctoral student through all forms of his work, which at the semester level amounts to 750 hours. In accordance with the point system, the point value of the study content is determined (teaching subjects, seminar papers, scientific research papers, doctoral dissertation project, doctoral dissertation, etc.).

From organized classes, the doctoral candidate must acquire a total of at least 60 ECTS points to complete the studies. The doctoral candidate must acquire at least 30 ECTS from the first credit group (compulsory courses) and at least 30 ECTS from the second credit group (elective courses).

In agreement with the supervisor, the doctoral candidate can choose any course from the optional modules offered. The study program of the third cycle of studies, the doctoral study in dentistry, is fully profiled as a research-academic study and aims to provide the highest, third degree, university education, i.e. the title of Doctor of Science.

The program, through the inclusion of candidates in scientific research work, interactive methods of knowledge transfer and acquisition, and independent planning, realization and defense of a doctoral thesis, should train candidates for independent planning and realization of research in the field of study.

The study should enable:

- systemic understanding of the scientific field that is the subject of study,
- qualification for independent research work,

- the ability to synthesize, design, implement and accept processes based on scientific achievements,
- qualification for independent original research that expands the boundaries of knowledge through scientific work, and some parts of which deserve to be published in domestic and international reference publications,
- skills for critical analysis, evaluation and synthesis of new and complex ideas and
- building attitudes that ethically responsibly promote technological and social progress based on knowledge in an academic and professional context.

In addition to teachers, domestic and foreign experts from various fields of health sciences can participate in teaching, and the teaching thematic units are determined by the Council of Doctoral Studies, before the beginning of the teaching process. After listening to the subject, the student chooses one of the presented topics from which he writes a doctoral seminar paper and defends it publicly. The defense of this paper can be attended by all participants, the teacher who taught the thematic unit and the responsible teacher of the course.
Classes in one semester take place over the course of 15 weeks, and a block of classes is also possible, which is decided by the Council of Doctoral Studies.

During the studies, and at the latest before starting the public defense of the doctoral dissertation, the doctoral student must submit at least one paper published in journals that follow relevant international databases from the register of relevant scientific databases, which is prescribed by the competent authority (Article 43 of the University Rules).
Teaching in compulsory and optional subjects is carried out during the first and second semesters of study. In the remaining part of the studies, the doctoral student is trained for independent scientific research through research work.

Table 1. Criteria for realization of ECTS points

	Criteria	**ECTS**
Organized teaching	Compulsory teaching activity (methodological subjects) – I semester	30
	Elective teaching activity (branch subjects) – II semester	30
	TOTAL I YEAR:	**60**

Doctoral dissertation work	Doctoral thesis: - Submission of the doctoral dissertation project – Preparation, writing and submission of the project – III semester	15
	- Scientific research activities* - III semester (extracurricular scientific work)	15
	- Scientific-research works, presentations of scientific results at professional-scientific gatherings and which were published up to three years before enrollment in doctoral studies	15
	- Scientific research papers that were published up to three years after enrolling in doctoral studies	30
	- A scientific research paper in which the doctoral student is the first author or co-author in a journal that is cited in the Current Contents (CC) database or in the Science Citation Index (SCI) database in the area of the doctoral dissertation published after enrollment in the doctoral program	15
	- Study stays in a laboratory/institute/clinic abroad	15
	- Defense of the doctoral dissertation project - IV semester	10
	- Work on creating the working version of the doctoral dissertation - IV semester	20
	TOTAL II YEAR:	**60**
	- Practical work on the material of the doctoral dissertation – 5th semester (primary publications shown in table 3.)	15

Work on the preparation and defense of a doctoral dissertation	- Presentation of the working version of the doctoral dissertation – 5th semester - Public defense of the doctoral dissertation – 6th semester	15 30
	TOTAL III YEAR	**60**
	T o t a l - ECTS	**180**

*Scientific research activities offered in the 3rd semester, the doctoral student achieves a minimum of 15 ECTS, these activities are shown in table 4**.**

Table. 2. Model publication to dissertation

	Criteria	**ECTS**
1.	Attending classes and taking exams	60
	Doctoral thesis: - Submission of a doctoral dissertation project - Scientific research activities - Defense of the doctoral dissertation project - Work on creating a working version of the doctoral dissertation - Practical work on the material of the doctoral dissertation - Writing the final version of the doctoral dissertation - Public defense of doctoral dissertation	 15 15 10 20 15 15 30
	To t a l ECTS	**180**

Table 3. Scientific research activities

	Primary publications	**ECTS**
1.	a) Published scientific work in journals that follow the relevant international database **(CC) - first author**	20
	b) Published scientific work in journals that follow the relevant international database **(CC) - co-author**	15
2.	a) Published scientific work in journals that follow the relevant international database **(SCI) - first author**	15
	b) Published scientific work in journals that follow the relevant international database **(SCI) - co-author**	10
3.	a) Published scientific work in journals that follow the relevant database - **first author**	10
	b) Published scientific work in journals that follow the relevant database - **co-author**	5
Table 4.	**Other scientific research activities**	**ECTS**
1.	University textbook, chapter in the university textbook	10
2.	Reviewed book/monograph in the field of healthcare	5
3.	Publications in proceedings (scientific congresses, scientific symposia)	5
4.	a) Participation in the national scientific meeting with an oral presentation / poster presentation - first author	5
	b) Participation in the domestic scientific meeting - co-author of the paper / co-author of the poster presentation	3
5.	a) Participation in an international scientific meeting with an oral presentation / poster presentation - first author	8

	b) Participation in the international scientific meeting – co-author of the paper / co-author of the poster presentation	5
6.	Organization of domestic scientific congresses and scientific gatherings scientific committee / organizing committee	3
7.	Organization of international scientific congresses and scientific gatherings scientific committee / Organization Committee	4
8.	Participation in a domestic project in the field of healthcare	5
9.	Participation in an international health project	8
10.	Scientific training in the function of writing a thesis (up to 3 months)	10
11.	Scientific training in the function of writing a thesis (over 3 months)	15

3.2. Activities during study semesters and years

The study program of the third cycle consists of classes, scientific research work and preparation and defense of a doctoral dissertation. Teaching is conducted through lectures, workshops, discussions and seminars, and can also be consultative/mentoring, depending on the number of participants. Scientific research work within the framework of the doctoral thesis is valorized through doctoral seminars, application of the topic of the doctoral dissertation, application of the doctoral dissertation project, public presentation of the working dissertation project, publication of works, and preparation and defense of the doctoral dissertation.

I year of study

During the first and second semesters, students attend classes and take exams in compulsory and selected optional subjects, according to the program and propositions of each subject.

In the first semester, classes are held for all participants in four compulsory subjects: Methodology of scientific research, Epidemiological methods and biostatistics in dental science and practice, Biological basics of the orofacial system, Publishing in biomedical sciences. Assistant professors, part-time and full-time professors from the University of Sarajevo, as well as visiting professors from foreign universities participate in teaching with the consent of the Senate of the University of Sarajevo, and the coverage of methodological

units is determined by the Council of Doctoral Studies before the beginning of the teaching process.

In the first semester, the Council of Studies assigns a supervisor to the doctoral student upon enrollment.

As a teacher, the supervisor participates in the conduct of studies and is a potential mentor, who directs and monitors the doctoral student and his work until the appointment of a mentor. (Art. 19 of the University Rules).

In the II semester, the student chooses six optional subjects from the ten offered, while taking into account that the total workload at the semester level is at least 30 ECTS.

During the second semester of study, the doctoral student chooses the area of the research topic and, together with the supervisor, defines the narrower area and topic of the doctoral dissertation (Form DS 1). The topic of the doctoral dissertation is confirmed by the study council. (Art. 29 of the University Rules)

II year of study

During the **3rd semester**, a student can take exams from compulsory and optional subjects that he did not pass during the 1st and 2nd semesters.

The second year of study is intended for the student's research work, participation in scientific gatherings, congresses (preparation and publication, ie presentation of scientific papers, work on a doctoral dissertation).

During the third semester, the student submits a Doctoral Dissertation Project to the Council of the Third Cycle of Health Sciences Studies (Form DS 2), which must contain:

a) candidate's biography/CV,
b) working title of the thesis,
c) mentor's proposal
d) introductory notes and overview of previous research,
e) the subject and objectives of the research,
f) narrower research domain,
g) methodological approach,
h) expected results and scientific/artistic contribution
i) used literature. (Art. 30 of the University Rules)

The Council of the third cycle of studies considers the Project Application after the previously obtained consent of the Ethics Committee on the ethical aspect of research for the purpose of preparing a doctoral dissertation.

The application of the Doctoral Dissertation Project is a mandatory activity and carries 15 ECTS points.

By the end of the first half of the 3rd semester of study, the Council of the 3rd cycle of studies proposes to the Faculty Council, and the Faculty Council to the University Senate, the composition of the Commission for the evaluation and defense of the project, working version and doctoral dissertation. One of the members of the Commission is proposed as a mentor.

The rest of the minimum 15 ECTS in the III semester is achieved by the student by choosing one of the scientific research activities shown in table 4.

During the IV semester, the doctoral student is obliged to defend the project of the doctoral dissertation. The defense of the doctoral dissertation project is public and is defended before the University Commission.

The University Commission prepares a report on the project of the doctoral dissertation, in which it is obligatory to state the evaluation of the candidate's suitability and the topic of the doctoral thesis, and submits it to the University Senate via the Council of the Third Cycle of Studies and the Faculty Council (Form DS 6).

After the Council of the 3rd cycle of studies, the Faculty Council and the University Senate have made a decision to accept the report of the University Commission, the doctoral student can begin the realization of the doctoral dissertation project. (Art. 32. Rules of the University)

Project defense is a mandatory activity and carries 10 ECTS points.

The rest of the 20 ECTS credits the student earns by working on the working version of the doctoral dissertation, so that in the IV semester the student earns the necessary 30 ECTS credits.

III year of study

By continuing the research work in the third year of study, the student devotes himself to the greatest extent to the work on his doctoral dissertation and the presentation of scientific research papers. .

In the 5th semester, the student conducts scientific research as part of his doctoral thesis. By the end of the 5th semester at the latest, the student should achieve 30 ECTS points from the following activities:

- Practical work on the material of the doctoral dissertation - 15 ECTS
- Presentation of the working version of the doctoral dissertation - 15 ECTS.

The student has the obligation to obtain a positive opinion from the mentor and report the working version of the doctoral dissertation to the study council (Form DS 7).

The doctoral student is obliged to submit the working version of the doctoral dissertation to the study council through the Faculty's protocol.

Within a period of one month from the delivery of the working version, the secretary of the study council, in agreement with the doctoral student and the president of the Commission, schedules the presentation of the working version of the doctoral dissertation. (Art. 38 of the University Rules)

The minutes of the performed procedure are submitted to the study council (Form DS 8). (Art. 39 of the University Rules)

The doctoral student is obliged to incorporate the remarks of the members of the University Commission into the corrected working version of the doctoral dissertation and submit it in printed and electronic form within 90 days from the day the presentation was made.

After submitting the corrected working version, according to the Rulebook on how to use plagiarism detection software (similarity procedure), the organizational unit is obliged to submit a PDF document of the corrected doctoral dissertation to the Publishing Service of the University of Sarajevo. The written statement of the Doctoral Dissertation Evaluation Commission on the results of the Doctoral Dissertation check using software for detecting potential plagiarism is an integral part of the report that the Commission submits to the Faculty Council, and which the Faculty submits to the University Senate. (Art. 40 of the University Rules)

After the procedure of presentation of the working version of the doctoral dissertation and submission of the corrected working version of the doctoral dissertation, the University Commission prepares a Report on the Evaluation of the Doctoral Dissertation (Form DS 9) and within 30 days submits it to the Council of Doctoral Studies and the Council of the Faculty of Health Studies together with the corrected working version of the doctoral dissertation. (Art. 41. Rules of the University)

Upon receipt of the decision from the Faculty Council to accept the report of the University Commission, the Faculty announces on its bulletin board, website, as well as in the media that the report of the University Commission and the corrected working version of the doctoral dissertation are made available to the public for 30 days. Any comments and suggestions from the public are considered by the University Commission and, within 30 days, a report is submitted to the Council of Studies (Article 42 of the University Rules), then the report is sent to the Faculty Council and the Senate of the University of Sarajevo.

In the event that the council of the organizational unit accepts the working version of the doctoral dissertation, the doctoral student is obliged to prepare the final version of the doctoral dissertation within 60 days from the receipt of the decision of the council of the organizational unit, submit it in the required number of copies and submit at least one work published in journals monitored by relevant international databases from the register of relevant scientific databases, prescribed by the competent authority. (Art. 43. Rules of the University)

After the approval of the Report by the Senate, the Faculty determines the place, date and time of the defense of the doctoral dissertation.

Doctoral studies end with the defense of the doctoral dissertation before the University Commission.

The public defense of the doctoral dissertation is a mandatory activity and carries 30 ECTS points.

The candidate has successfully completed his doctoral studies if he has achieved 180 ECTS credits.

3.3. List of all subjects with number of ECTS credits

3.3.1. List of all subjects with number of ECTS credits

I year – I semester				
Code / Subject title	Teaching			ECTS
Obligatory subjects	Lectures	Exercises	Seminars	
SF DS MP 11E Methodology of scientific research	36	4	5	8
SF DS MP 12E Epidemiological methods and biostatistics in dental science and practice	30	25	5	11
SF DS MP 13E Biological characteristics of the orofacial system	20	20	5	6
SF DS MP 14E Publishing in biomedical sciences	25	0	5	5
I SEMESTER	**TOTAL ECTS**			**30**
	I godina – II semester			
Elective subjects				
SF DS GP 11E	20	20	5	5

Dental morphology with dental anthropology and forensics				
SF DS GP 12E Dental pathology with endodontics	20	20	5	5
SF DS GP 13E Dental prosthetics with dental implantology	20	20	5	5
SF DS GP 14E Oral medicine and periodontology	20	20	5	5
SF DS GP 15E Preventive dentistry and pedodontics	20	20	5	5
SF DS GP 16E Orthodontics	20	20	5	5
SF DS GP 17E Oral surgery with dental implantology	20	20	5	5
SF DS GP 18E Maxillofacial surgery				
SF DS GP 19E Dental implantology	20	20	5	5
SF DS GP 110E Dental radiology	20	20	5	5
II SEMESTER	**TOTAL ECTS**			**30**
I YEAR	**TOTAL ECTS**			**60**

II year – III semester		
Code		**ECTS**
SF DS NIR 211E	Submission of the doctoral dissertation project - preparation, writing and submission of the project	15

SF DS NIR 212E	Scientific research activities	15

II year – IV semester		
Code		ECTS
SF DS NIR 213E	Defense of the doctoral dissertation project	10
SF DS NIR 214E	Work on creating a working version of the doctoral dissertation	20
II YEAR	**TOTAL ECTS**	**60**

III year – V semester		
Code		**ECTS**
SF DS NIR 31E	Practical work on the material of the doctoral dissertation	15
SF DS NIR 32E	Presentation of the working version of the doctoral dissertation	15

III year - VI semester		
Code		ECTS
SF DS NIR 33E	Public defense of the doctoral dissertation	30
III YEAR	**TOTAL ECTS**	**60**

Code: SF DS MP 11E	**Course Title: METHODOLOGY OF SCIENTIFIC RESEARCH**		
Cycle: III study cycle	**Year: I**	**Semester: I**	**Number of ECTS credits:** 8
Status: obligatory		**Total number of hours: 45** Lectures 36 Practical courses 4 Seminars 5	
Teaching participants:	Teachers and associates selected in the field to which the course belongs / course		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	Enabe students to independently: - Adequately search the literature, scientific publications, data bases and critically to estimate the field of the investigation; - To choose adequate method of the investigation depending of the topic of the research; - To write correctly scientific – research papaer.		
Thematic units:	In accordance of the implementation plan of the course		
Learning outcomes:	Student will be trained to: - Adequately search the literature, data bases; - To make synthesis and analysis of previous research - To choose an adequate type of the research depending on the topic of scientific interest; - To write correctly scientific research paper.		
Teaching methods:	Lectures, seminars, practical classes- writting the project of scientific research		
Knowledge assessment methods with	Regular attendance and active participation at lectures constitutes 35% of the grade;		

assessment structure:	Regular attendance and active participation at practical classes constitutes 15% of the grade; - Seminars constitutes 10% of the grade; - Final exam constitutes 40% of the grade. At the end of module PhD student can have maximum of 100 points, and scale range is following: < 55 points - grade 5 55-64 points - grade 6 65 - 74 points - grade 7 75-84 points - grade 8 85-94 points - grade 9 95-100 points - grade 10

PRACTICAL CLASSES

SEQUENCE NUMBER	CONTENT OF EXERCICES	NUMER OF HOURS
1.	Identification of the research type by literature review	2
2.	Software plagiarism detection methods	3

Seminar 1	Preparation of scientific paper/ scientific communication and congress presentation or publishing in journal
Seminar 2	Preparation of scientific paper/ scientific communication and congress presentation or publishing in journal
Seminar 3	Preparation of scientific paper/ scientific communication and congress presentation or publishing in journal
Seminar 4	Preparation of scientific paper/ scientific communication and congress presentation or publishing in journal
Seminar 5	Preparation of scientific paper/ scientific communication and congress presentation or publishing in journal

Literature:	1. Phillips EM, Pugh D. How to get an PhD: a handbook for students and supervisors. 4th edt. Open Univeristy Press McGraw Hill, England 2006; 2. American Medical Association Manual of Style (10th Edition): A Guide for Authors and Editors. Oxford Universitz Press, 2007; 3. Goyal RC. Research Methodology for Health Professionals Including Proposal, Thesis and Article Writing, 1 st edt. Jaypee Brothers Medical Publishers (p) Ltd, New Delhi, India, 2013.

Code: SF DS MP 12E	**Course title: EPIDEMIOLOGICAL METHODS AND BIOSTATISTICS IN DENTAL SCIENCES AND PRACTICE**		
Cycle: III study cycle	**Year: I**	**Semester: I**	**Number of ECTS credits:** 11
Status: obligatory		**Total number of hours: 60** **Lectures** 30 **Exercises** 25 **Seminars** 5	
Teaching participants:	Teachers and associates selected in the field to which the subject belongs / subject		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	The goal of the course is to train candidates to independently design, create and analyze a study/project according to all standards of modern epidemiology and biostatistics, which will make their understanding of research results in the field of dentistry in relevant world publications much more successful.		
Thematic units:	1. Methods of data collection in dental research with basics of descriptive biostatistics 2. Establishing research aims and hypotheses in quantitative dental research, with types of data distribution 3. Measures of disease occurrence and association; Sampling errors in analytical studies (bias and confounding) 4. Univariant data analysis 5. Bivariant data analysis – design, analysis, and application of epidemiological methods in dental care; Design and analysis of screening in dentistry 6. Inferential biostatistics (statistical inference based on examples in dentistry), regression analysis		

Learning outcomes:	Upon completion of this course, students will improve their knowledge, understanding and attitudes towards: -collection and organization of data, design, and analysis of epidemiological studies in dentistry, and use of continuous, binary, polychotomic data with focus on examples in dental care and research, with different types of variables (continuous and categorical) -appropriate use of statistical software applications in building models and graphs, along with other types of statistical analyses -univariant and bivariant data analysis -specifics of application in methods of statistical reasoning
Teaching methods:	• all classes are conducted interactively • lectures are based on the "sandwich" method: theoretical basics with examples from practice • exercises are in small groups, with examples from practice and with appropriate epidemiological and statistical programs • the maximum group for the exercises is 8 students (if there are more, they will be divided into two groups)
Knowledge assessment methods with assessment structure:	• Final knowledge assessment is based on: • Active participation in the course (10%) • Independent seminar assignment in the form of a project with consultations with course professors and teaching assistants (50%) • Written final exam, designed with two thirds MCQ questions and one third essay questions (40%).
Literature:	**Obligatory** 1. S. Čavaljuga, M. Čavaljuga. Biostatistika: Osnovni principi i metode. Medicinski fakultet Univerziteta u Sarajevu, 2009. 2. S. Čavaljuga, E. Ademović, L. Džananović, A. Jamakosmanović, Dž. A. Jesenković. Biostatistics – Theoretical fundamentals and practical examples, Faculty of Medicine University of Sarajevo, 2022. 3. D. Essex-Sorlie: Medical Biostatistics and Epidemiology. Appleton & Lange 1995. **Additional** 1. L. Gordis. Epidemiology. Elsevier. (Any Edition after 2nd) 2. C. H. Hennekens, J. E. Burring, S. L. Mayrent (Ed). Epidemiology in Medicine. Little, Brown and Co Boston/Toronto. 1987. 3. H. Harris and G. Taylor. Medical Statistics Made Easy. Taylor & Francis 2004. 4. B.R. Kirkwood and J.A.C. Sterne. Essentials of Medical Statistics. Blackwell Science Ltd 2003. 5. B. Dawson and R.G. Trapp. Basic & Clinical Biostatistics. McGraw-Hill 2004.

COURSE EXECUTION PLAN:

Week		Number of hours (lectures, practical classes)
Week 1.	Lecture 1: Methods of data collection in dental research with basics of descriptive biostatistics Exercise 1: Methods of data collection in dental research with questionnaire design – practical applications based on examples from dental research Sampling methods (same-probability and non-probability samples), defining appropriate sample size in dental research Defining variables, grouping and sorting data with basic principles of constructing graphs and data visualization Calculating measures of central tendency and measures of variability from data collected in dental research Lecture 2: Establishing research objectives and hypotheses in quantitative dental research, with types of data distribution Exercise 2: Types of data distribution – examples of normal distribution and t-distribution in quantitative dental research Defining research objectives and hypotheses, one-sided and two-sided testing on practical examples based in dental research	4 5 2 2
Week 2.	Lecture 3: Measures of disease occurrence and association Exercise 3: Calculation of measures of disease occurrence along with measures of association in examples based in dental research through appropriate use of a statistical software Lecture 4: Univariant data analysis Exercise 4: Univariant analysis of collected data in dental research with application of statistical software Lecture 5: Bivariant data analysis – design, analysis, and application of epidemiological methods in dental care;	2 3 4 3 4
Week 3.	Exercise 5: Design and analysis of descriptive epidemiological studies – examples of case-studies/case-series and cross-sectional studies in dental research Design of analytical epidemiological studies (case-control and cohort studies), with calculation of appropriate measures of association. Lecture 6: Sampling errors in analytical studies (bias and confounding)	3 2 2

	Exercise 6: Bias and confounding with methods of stratification based on examples from dental research Lecture 7: Design and analysis of screening in dentistry Exercise 7: Practical applications of calculating measures of diagnostic accuracy in diagnostic screening tests, based on examples from dental research	3 2
Week 4.	Lecture 8: Inferential biostatistics (statistical inference based on examples in dentistry), Exercise 9: Basic concepts from probability theory with examples from dental research Setting statistical research hypotheses and defining level of significance and power based on examples from dental research Choosing appropriate statistical test and defining theoretical probability distributions based on data collected from dental practice. Examples of parametric and non-parametric statistical tests with practical examples from dental research – applications in statistical software Lecture 9: Regression analysis Exercise 9: Regression analysis in examples from dental research Seminar 1 How to choose the appropriate epidemiological method/study design? Seminar 2 Influence of bias, confounding, and relationships between variables in drawing conclusions on causality Seminar 3 From associations to causality: Inference in epidemiological studies Seminar 4 Contemporary means of presenting biomedical and dental research findings Seminar 5 When and why is logistic regression used in research?	4 3 3 2 1 1 1 1 1

Code: SF DS MP 13E	**Course Title: BIOLOGICAL CHARACTERISTICS OF OROFACIAL SYSTEM**		
Cycle: III study cycle	**Year: I**	**Semester: I**	**Number of ECTS credits:** 6
Status: obligatory		**Total number of hours: 45** **Lectures**: **20** **Exercises: 20** **Seminars: 5**	
Teaching participants:	**Teachers and associates selected in the field to which the subject belongs / subject**		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	Acquiring advanced knowledge in the field of biology of the orofacial system. Understanding the genetic basis, normal growth and development, and deviations in the stomatognathic system. A more complete understanding of the mechanisms of maintaining the integrity of orofacial tissues and the process of reparation and regeneration.		
Thematic units:	Contained in the execution plan		
Learning outcomes:	Training doctoral students to think independently and find sources for research in orofacial genetics, development, histology, anatomy, and physiology of stomatognathic system.		
Teaching methods:	• Lectures • Practical exercises • Seminars • Consultations		
Assessment methods with assessment structure:	Regular attendance and activities at lectures constitute 35% of the grade; Regular attendance and activities at practical classes constitute 15% of the grade; Seminars constitute 10% of the grade; The final exam constitutes 40% of the grade. After completing the module, the doctoral student can have a maximum of 100 points, and the grading scale is as follows: <55 points - mark 5 55-64 points - mark 6 65-74 points - mark 7 75-84 points - mark 8 85-94 points - mark 9 95-100 points – mark 10		
Literature:	**Obligatory:** 1. Vuković A i saradnici. Osnovi morfologije zuba I dentalne antropologije. Stomatološki fakultet, Sarajevo, 2013. 2. Nikolić I.R. i saradnici. Osnovna i oralna histologija I embriologija. DataStatus, Beograd, 2019. 3. Avery JK, Chiego DJ. Osnovi oralne histologije i embriologije, DataStatus, Beograd 2011.		

	4. Škrinjarić I. Orofacijalna genetika. Školska knjiga, Zagreb, 2006. **5.** Ajanović M. i saradnici. Osnovi gnatologije. Stomatološki fakultet, Sarajevo, 2015. 6. Greene CS, Laskin DM. Tretment of TMD- Bridging the gap between advances in research and clinical patient management.Quintessence Publishing Co,Inc, 2013. 7. Bumann A, Lotzmann U. TMJ Disorders and Orofacial pain. The role of Dentistry in a Multidisciplinary Diagnostic Approach. Thieme Stuttgart, New York, 2002. 8. Becker IM. Comprehensive Occlusal Concepts in Clinical Practice. Willey-BlackWell, 2011. 9. Original scientific papers from reference journals. **Additional:** 1. Berkovitz BKB, Holland GR, Moxham BJ. Oral anatomy, histology and embriology, Mosby, St Louis, 2002. 2. Garant PR. Oral Cells and Tissues. Qintessence Publishing, 2003. 3. Roberson TM, Heymann HO, Swift EJ, editors. Sturdevant's Art and Science of Operative Dentistry, Mosby, St. Louis, 2002. 4. Mjör I. Biologija pulpe i dentina u restaurativnoj stomatologiji, Data Status, Beograd, 2008 5. Mastham MKM. Textbook of Human Oral Embriology, Anatomy, Physiology, Histology and Tooth Morphology. JP Medical Ltd, 2010. 6. Scheid, Rickne C. Woelfel's dental anatomy, 8th edition. Lippincott Williams&Wilkins, a Wolters Kluwer business, Philadelphia, 2012.

COURSE EXECUTION PLAN: **BIOLOGICAL CHARACTERISTICS OF OROFACIAL SYSTEM**

Week		Number of hours (lectures, practical classes)
Week 1.	Lecture: Epithelial-ectomesenchymal morphogenetic regulation of odontogenesis. Practical excercise: Deviations in dental organ development.	1 1
Week 2.	Lecture: Origin, localization, function and potential role of undifferentiated mesenchymal cells of the dental organ in reparative dentistry. Practical excercises: Biomaterials and new therapeutic strategies in dental medicine	1 1
Week 3.	Lecture: Comparative biology and reparative potential of dental tissues. Practical excercises: Biological response of dental tissues to restorative procedures Seminar: Contemporary knowledge of orofacial biology in the context of scientific research	1 2

Week 4.	Lecture: Ultrastructural specificities and optical characteristics of healthy and pathologically changed dental tissues Practical excercise: Analysis of optical changes in hard dental tissues using DiagnoDENT	1 1
Week 5.	Lecture: Conservative and holistic concept of mineral imbalance of hard dental tissues. Practical excercise: Microscopic analysis of developmental changes in dental tissues Seminar: Searching and analyzing recent literature by key words	1 1
Week 6.	Lecture: Oral somatosensory systems.	1
Week 7.	Lecture: Biological aspects of oral and dental tissue aging. Practical excercise: Microscopic analysis of regressive changes in dental tissues	1 1
Week 8.	Lecture: Biomechanics of hard dental tissues Practical excercise: FEA in research on the biomechanics of dental tissues.	1 1
Week 9.	Lecture: Enamel mineral balance in the service of regeneration nanotechnology Practical excercise: Methods of detecting the enamel mineral balance in equilibrium	1 1
Week 10.	Lecture: Inflammatory-induced angiogenesis and lymphangiogenesis in dental pulp Practical excercise: Immunohistochemical detection of blood and lymphatic vessels of dental pulp	1 1
Week 11.	Lecture: The periodontium as a unique, dynamic and multifunctional oral tissue. Development, structure and physiology of the periodontium; Different types of oral mucous membranes and tissue specificities of the oral mucosal barrier Practical excercises: Microscopic analysis of developmental and regressive changes in periodontal tissues	1 1

Week 12.	Lecture: Specific and non-specific defense mechanisms in the oral cavity (molecular aspect). Practical excercises: Clinical and radiological evaluation of the stage of periodontal disease and the importance of defense factors Seminar: Influence of systemic diseases on biology of orofacial region	1 1
Week 13.	Lecture: Genetic risk factors in periodontology. Practical excercises: Methodological elements of examination of periodontal patients and critical evaluation of periodontitis risk factor assessment	1 1
Week 14.	Lecture: Biomechanics and mechanobiology of the temporomandibular joint Practical excercises: Collection, analysis, and evaluation of scientific data in retrospective studies in the rehabilitation of the orofacial system	1 1
Week 15.	Lecture: Functional and structural adaptation of the temporomandibular joint Practical excercises: Collection, analysis, and evaluation of scientific data in prospective research in the rehabilitation of the orofacial system	1 1
Week 16.	Lecture: Orthopedic considerations of temporomandibular joint function and parafunction Practical excercise: Research possibilities in the assessment of the function and parafunction of the orofacial system Seminar: Registration of movements of the mandible	1 1
Week 17.	Lecture: Genetic research in dentistry: - studies on twins - family studies Practical excercise: Genetic aspect of characteristics of orofacial system	1 1

	Seminar: Genetic research in dentistry - population studies	
Week 18.	Lecture: Characteristics of dento-oral tissues and specificities of the pulp-periodontal complex in children. Practical excercises: Modern methods of evaluation of changes in periodontal tissues in children's age	1 1
Week 19.	Lecture: Implications of a child's mental and physical development on oral health - current knowledge Practical excercise: Considerations on hormonal influence on growth and development of the orofacial system	1 1
Week 20.	Lecture: Cellular and molecular regulation of tooth eruption and exfoliation Practical excercise: Analysis of contemporary knowledge on cellular and molecular regulation of tooth eruption and ewxfoliation based on a search of recent literature by key words	1

Code: SF DS MP 14E	**Course title: PUBLISHING IN BIOMEDICAL SCIENCES**		
Cycle: III	**Year: I**	**Semester: I**	**Number of ECTS credits:** 5
Status: obligatory		**Total number of hours:** Lectures 25 Exercise 0 Seminars 5	
Teaching participants:	**Teachers and associates selected in the field to which the course belongs / course**		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	Acquaint the student with the basic principles of scientific communication and the need to publish the results of scientific research. Educate the student for independent publication of work results in various types of publications as well as at scientific meetings.		
Thematic units:	According to the execution plan		
Learning outcomes:	Knowledge: To enable the student to think critically and analysis of scientific research works. Skills: Familiarize students with principles publishing, reviewing and editing journals in dentistry, with special emphasis on the ethical principles of publication. Competences: The student will be able to independently prepare, write and critically reflect on scientific research work.		
Teaching methods:	Lectures, seminars		
Knowledge assessment methods with assessment structure:	Regular attendance and activities at lectures - 20 points Seminar papers – 30 points final exam – 50 points <55 points - grade 5 55-64 points - grade 6		

	65-74 points - grade 7 75-84 points - grade 8 85-94 boda - ocjena 9 95-100 bodova - ocjena 10
Literature:	**Mandatory:** 1. Jokić M. Bibliometrijski aspekti vrednovanja znanstvenog rada.Sveučilišna knjiţara, Zagreb 2005. 2. V Silobrčić. Kako sastaviti, ocijeniti i objaviti znanstveno djelo? 6 dopunjeno izdanje, 2003 3. J. Peat, E. Elliott, L. Baur, V. Keena. Scientific Writing. London: BMJ Books, 2002. **Additional:** 1.GM Hall. How to Write a Paper. London: BMJ Books, 1998. 6. GM Hall. How to Present at meetings. London: BMJ Books, 2001. 2. JĐ Savić. Kako napisati, objaviti i vrednovati naučno delo u biomedicini. Beograd: Kultura, 1996. 3. RA Day. How to Write and Publish a Scientific Papaer. Phoenix: Oryx, 1998. 4. JĐ Savić. Kako stvoriti naučno delo u biomedicini. Beograd: Kultura, 1999. 5. Todorović Lj. Vučković- Dekić Lj.(urednici). Komunikacija u biomedicinskim naukama. Medicinski fakultet Univerziteta u Kragujevcu, M-print Beograd, Kragujevac 2008.

Week	LECTURE CONTENT	Number of hours (lectures, practical classes)
1.	Shaping of scientific work. The structure of the scientific article, the importance of individual parts of the work.	2
2.	Citation of literature in scientific work. Quotes and quote analysis. Uniform requirements for manuscript submission to scientific journals (Vancouver Rules).	1
3.	Scientific institutions as creators of scientific publications	1
4.	Authors and authorship. Scientific cooperation (co-authorship). Copyright and their protection. Scientific truth and intellectual honesty in scientific research work. Professionalism. Responsibility of the researcher	2
5.	Public presentation and defense of scientific work. Oral presentation of work. Poster presentation	2
6.	Magazines. Physical form of the magazine - number of articles and number of pages. Magazine publishers. Language of journal articles. Types of articles. Importance of instructions for authors.	1
7.	Electronic magazines	1
8.	Bibliographic databases. ISI's bibliographic databases: Citations indexes SCI, SSCI, Current Contents and ISI Proceedings. Secondary sources of information.	1
9.	Quotes and quote analysis	1
10.	Publishing process. Ethics of publication.Magazine publishers. The role of the editor and editorial board of the journal.	1
11.	Case report - writing a presentation of a clinical case with relevant findings (microbiological, PH findings, laboratory diagnostics) from the domain of oral medicine and	1
12.	Case report - a form of scientific and professional work	2

13.	Writing and publishing work	1
14.	Preparation of a project of scientific work with the aim of obtaining approval for scientific work research	1
15.	Proper collection of scientific research data and writing of a scientific paper	1
16.	Publication of scientific work	1
17.	Review paper, systematic literature review and meta analysis	1
18.	Presentation at a scientific meeting, basic types of presentation, differences between individual types of presentation, characteristics of a successful presentation.	1
19.	Searching scientific literature, principles of evaluation of publications, selection of literature for citation, choice of journal for publication.	1
20.	The style of writing a scientific paper and the specificity of expression, the most common mistakes in writing a paper for publication.	1

Seminars:

1. Scientific bases
2. Multiple authorship and co-authorship
3. Proper collection of data for writing a scientific paper
4. Professional papers
5. Scientific project

Code: SF DS GP 11E	**Course Title: DENTAL MORPHOLOGY WITH DENTAL ANTHROPOLOGY AND FORENSICS**		
Cycle: III study cycle	**Year: I**	**Semester: II**	**Number of ECTS credits:** 5
Status: elective	**Total number of hours: 45** Lectures: 20 Exercises: 20 Seminars: 5		
Teaching participants:	Teachers and associates selected in the field to which the course belongs / course		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	Acquisition of advanced knowledge in the field of anatomy, histophysiology and development of the dental organ, human dental anthropology and forensic dentistry. Training of doctoral students for the application of acquired knowledge and skills in anthropological, bioarchaeological and forensic research.		
Thematic units:	According to execution plan		
Learning outcomes:	Knowledge: Advanced knowledge in the field of morphology, development, and histophysiology of the dental organ. Skills: training for the application of craniometry, odontometry, photogrammetry and 3D analysis in research in the field of dental anthropology and forensic dentistry. Competencies: mastering metric and non-metric analyzes in the field of dental anthropology and forensic dentistry		
Teaching methods:	• Lectures • Practical excercises (guided practices) • Seminars • Consultations		
Knowledge assessment methods with assessment structure:	Regular attendance and activities at lectures constitute 35% of the grade; Regular attendance and activities at practical classes constitute 15% of the grade; Seminars constitute 10% of the grade; The final exam constitutes 40% of the grade. After completing the module, the doctoral student can have a maximum of 100 points, and the grading scale is as follows: <55 points - mark 5 55-64 points - mark 6		

	65-74 points - mark 7 75-84 points - mark 8 85-94 points - mark 9 95-100 points – mark 10
Literature:	Obligatory: 10. Vuković A i saradnici. Osnovi morfologije zuba I dentalne antropologije. Stomatološki fakultet, Sarajevo, 2013. 11. Brkić H. i saradnici. Forenzična stomatologija. Školska knjiga, Zagreb, 2000. 12. Scott R.G, Turner C.G. The anthropology of modern human teeth. Cambridge University Press, 1997. Additional: 1. Hillson S. Dental anthropology. Cambridge University Press, 1996. 2. Chowdhry A. Handbook of forensic odontology. Century Publications, 2018. 3. Keiser J. A. Human adult odontometrics. Cambridge University Press, 2008.

COURSE EXECUTION PLAN: **DENTAL MORPHOLOGY WITH DENTAL ANTHROPOLOGY AND FORENSICS**

Week		Number of hours (lectures, practical classes)
Week 1.	Lecture: Challenges and opportunities of anthropological and forensic research in dentistry Practical excercises: Craniofacial anthropometry (anthropometric points, anthropometric indices)	1 1
Week 2.	Lecture: Relationship between form and function of orofacial structures Practical excercises: Subjective and objective criteria for aesthetic evaluation of the dentofacial complex (analysis of dentodental, dentogingival, dentolabial and dentofacial complex in the photos)	1 2
Week 3.	Lecture: Anthropological aspect of morphology, dimensions and variations of teeth Practical excercise: Odontometry (methods on natural teeth, plaster models, photographs, using a microscope and radiographically) Calibration of	1 1

	researcher and standardization of measurement criteria	
Week 4.	Lecture: Functional occlusal morphology (supporting cusps and guiding cusps, marginal ridges, fissure type V, U, I, IK, Y) Practical excercise: Work on reference ASUDAS tiles – ASU UM cusp 5, ASU LM deflecting wrinkle, ASU LM cusp 5, ASU LM cusp 6, ASU LM cusp 7, Fissure appearance pattern, Number of cusps, Distal trigonid ridge, Protostylid	1 1
Week 5.	Lecture: Topographical anatomy of the endodontic space Practical excercise: A new root canal anatomy classification system based on microCT and CBCT images - case reports	1 1
Week 6.	Lecture: Other aspects of the functional anatomy of teeth Practical excercise: Dental anomalies (etiology, classification and diagnosis) Seminar: Variations and anomalies of genetically labile permanent teeth	1 1
Week 7.	Lecture: Comparative microanatomy of dental tissues and molecular biology of dental hard tissues Practical excercise: Collection, interpretation and application of anthropometric measurements in population, clinical and forensic research) Seminar: The influence of dietary habits on hard tissues of the dental organ	1 2
Week 8.	Lecture: Facial reconstruction in forensic anthropology and forensic dentistry Practical excercise: Computer morphometric analyses in forensic odontology	2 1
Week 9.	Lecture: Regressive changes in dental tissues (clinical and forensic aspects)	2 2

	Practical excercise: Estimation of dental age based on regressive changes of hard dental tissues	
Week 10.	Lecture: Non-carious lesions of hard dental tissues. Modern concept and new technologies in diagnosis and therapy Practical excercise: Tribological factors of the formation of NCL Seminar: Pathohistological and pathophysiological aspects of dentine hypersensitivity	1 1
Week 11.	Lecture: Classification of morphological characteristics on permanent dentition teeth - ASUDAS standard Practical excercise: Analysis of morphological characteristics of teeth according to the ASUDAS standard	2 2
Week 12.	Lecture: Odontometry: Applicability of results obtained by odontometric methods Practical excercise: Anthropological analysis using radiography	1 1
Week 13.	Lecture: Classic morphometric methods and geometric morphometry in dentistry Practical excercise: Forensic analysis using radiography Seminar: Morphological and metric analyzes in forensic anthropology and forensic dentistry	1 1
Week 14.	Lecture: Three-dimensional photogrammetry in forensic dentistry Practical excercise: Photogrammetry in dentistry (techniques, standardization of photographs, types of photographs) Seminar: Artificial intelligence: opportunities and challenges in forensic dentistry	1 1
Week 15.	Lecture: Forensic and bioarchaeological characteristics of teeth and jaws (age, sex, race and individual characteristics) Practical excercise: Creating a dental profile	2 1

Week 16.	Lecture: Dental profiling and comparative odontography Practical excercise: Comparative odontography	1 1

Code: SF DS GP 22E	**Course title: DENTAL PATHOLOGY WITH ENDODONTICS**		
Cycle: III study cycle	**Year: I**	**Semester: II**	**Number of ECTS credits:** 5
Status: elective		**Total number of hours: 45** Lectures 20 Exercises 20 Seminars 5	
Teaching participants:	Teachers and associates selected in the field to which the course belongs / course		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	The aim of the course is to provide the student with the theoretical and practical basics of endodontic diagnostic protocol, etiology, pathogenesis and clinical classification of pulp and apical periodontium diseases, techniques of mechanical processing, medication and obturation of root canals, emergencies, local anesthesia and analgesia in endodontics, complications and failures of endodontics. therapy, and therapeutic challenges and techniques in restorative dentistry, as well as the latest technologies that are applied.		
Thematic units:	Therapy and treatment of non-carious hard dental tissues. Minimally invasive therapy and composite materials The possibility of teeth whitening and aesthetics in restorative dentistry. Modern methods of endodontic therapy		
Learning outcomes:	To prepare the student for the modern conservative therapy of hard dental tissues as well as the use of the most modern technologies during the establishment of diagnosis, therapy and evaluation of endodontic therapy.		
Teaching methods:	Lectures, guided practicals		
Knowledge assessment methods with assessment structure:	Regular attendance and activities at lectures - 20 points final exam – 80 points		
Literature:	1. Roberson TM, Heymann HO, Swift EJ. Sturdevant's Art and Science of Operative Dentistry, Mosby Inc, 2013.Mount GJ, Hume WR. Preservation and restoration of tooth structure. Mosby International Ltd. 1998 2. Summit JB, Robbins JW, Hilton TJ, Schwartz RS. Fundamentals of operative dentistry: a contemporary approach: Quintessence Publishing Co Inc, 2013.		

	3. Konjhodžić A i saradnici, Endodontska propedeutika; Stomatološki fakultet Sarajevo 2017 4.Torabinejad M, Walton RE. Endodoncija: načela i praksa. Naklada Slap, Zagreb 2010. **5.** Ingle JI, Bakland LK. Endodontics. People's Medical Publishing House-USA, 2016. Cohen S, Burns RC. Pathways of the pulp. Mosby Inc, St. Louis, 2015.

COURSE EXECUTION PLAN: **DENTAL PATHOLOGY WITH ENDODONTICS**

Week		Number of hours
Week 1.	Diagnostic Terminology in Endodontics	2
Week 2.	Application of composite fillings in the transcanine sector	2
Week 3.	Methods of color determination in aesthetic dentistry	2
Week 4.	Adhesion problem in restorative dentistry	2
Week 5.	Monoblock concept in endodontics	2
Week 6.	Importance of irrigation in endodontic therapy; concentration effect, advantages of the combination of irrigants	2
Week 7.	Compromising factors in endodontic therapy	2
Week 8.	Application of the operating microscope in restorative dentistry and endodontics	2
Week 9.	Research methodology in endodontics in vitro	2
Week 10.	The use of computer-supported systems in restorative dentistry and endodontics	2

PRACTICAL

Week		Number of hours
Week 1.	CBCT in the interpretation of endodontics	2
Week 2.	Application of ultrasound in revision of inadequate fillings of root canals	3
Week 3.	Obturation techniques	3
Week 4.	Calcifications of the endodontic space	2
Week 5.	Systemic medication in endodontics	2
Week 6.	Specificities of dental tissue sampling for experimental research	2
Week 7.	Databases relevant to research in restorative dentistry and endodontics	2
Week 8.	Localization of root canal entrances using an operating microscope	2
Week 9.	Minimally invasive procedures in restorative dentistry	2

Seminars:

1. Protocols of regenerative endodontics
2. Cryotherapy in orthodontics
3. Teeth whitening controversies
4. The role of mediators in pulp inflammatory processes
5. Viruses in endodontics

Code: SF DS GP 13E	**Course title: PROSTHODONTICS WITH DENTAL IMPLANTOLOGY**		
Cycle: III study cycle	**Year: I**	**Semester: II**	**Number of ECTS credits: 5**

Status: elective	**Total number of hours: 45** **Lectures 20** **Guided practice 20** **Seminars 5**
Teaching participants:	Teachers and associates selected in the field to which the subject belongs / subject - Department of Prosthodontics with Dental Implantology
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo
Aim (objectives) of the course:	Adoption of modern scientific knowledge and specific methodological procedures related to scientific research work in this area.
Thematic units:	Experimental laboratory research of various properties of dental materials according to standardized procedures. Possibilities of applying the finite element method in biomechanical research. Ceramic systems in dental prosthetics. Clinical evaluation of fixed-prosthetic restorations. The influence of fixed prosthetic restorations on periodontal health. Examination of periodontal indices and evaluation of bone density in fixed-prosthetic therapy. Systemic factors in the pathogenesis of TMD, occlusion as a factor in TMD, prevention of TMD. Diagnosis and differential diagnosis of TMD. Methods of assessing pathological changes of the temporomandibular joint and comparison with clinical findings. Biomorphological methods of research in dental prosthodontics. Morphometric analysis of the craniofacial system. Evaluation of pathological changes in occlusion and articulation. Morphometric characteristics of soft tissues important for treatment planning.
Learning outcomes:	Knowledge: Adopt of contemporary scientific knowledge and methods when planning research in this area. Skills: Ability to recognize a scientific problem, synthesis of scientific data, critical analysis and methodological approach of research in this area. Competences: Apply scientific knowledge and methodologically perform research in this area with the application of ethical codes.

Teaching methods:	Lectures Guided practices Seminars
Assessment methods with assessment structure:	- Analysis of scientific research article on the given issue 20% of the grade structure - Preparation of seminar papers - 30% of the grade structure - Creation and presentation of a review article on a given topic 50% of the grade structure
Literature:	Required literature: 1. International organization for standardization. ISO-9917-1 International standard for water based cements Part 1 - Powder/liquid acid-base cements; 2007. 2. International organization for standardization. ISO-9917-2 International standard for water based cements part 2 - Resin-modified cements; 2017. 3. International organization for standardization. ISO-4049 - International standard for polymer based restorative materials; 2019. 4. International organization for standardization. ISO 6873 - International standard for Dentistry — Gypsum products; 2013. 5. International organization for standardization. ISO 4823 - International standard for Dentistry — Elastomeric impression and bite registration materials; 2021. 6. Shen C, Rawls HR, Esquivel-Upshaw JF, Anusavice KJ, Phillips RW, Skinner EW. Phillips' Science of Dental Materials. St. Louis, MO: Elsevier; 2022. 7. Baccouch M. Finite Element Methods and Their Applications (Internet). London: IntechOpen; 2021 (cited 2022 Sep 27). 316p. Avaible from: https://www.intechopen.com/books/9273 8. Okeson JP. Management of Temporomandibular Disorders and Occlusion. 6th Mosby, 2006. 9. Edvard F Wright: Manual of Temporomandibular disorders; Willey Blackwell third ed, 2014. 10. Kalinowska IR, Orhan K. Imaging of theTemporomandibular Joint. Springer Nature Switzerland AG, 2019. 11. Preedy VR. Handbook of Anthropometry. Physical Measures of Human Form in Health and Disease.Volume 1. Part V (Regions and Anatomical Areas of the Body: Head and Face). Springer Science+Business Media, LLC; 2012. 12. Masri R, Driscoll CF. Clinical Applications of Digital Dental Technology. First edition. Iowa, Oxford .Wiley-Blackwell;2015. 13. Original scientific papers from reference journals.

	Recommended literature: Selected peer-reviewed scientific articles from scientific journals that follow the relevant database.

COURSE SYLLABUS: PROSTHODONTICS WITH DENTAL IMPLANTOLOGY

Week	Form of teaching and materials	Number of hours
Week 1.	Lecture: Experimental laboratory research of various properties of dental materials according to standardized procedures. Guided practice: Devices and instruments necessary for the research of certain properties of dental materials, preparation and testing of samples, test procedure and interpretation of results.	2 2
Week 2.	Lecture: Possibilities of applying the finite element method in biomechanical research. Guided practice: Examination of the stress of different structures of the orofacial system and restorations made of different materials under the action of masticatory forces.	2 2
Week 3.	Lecture: Ceramic systems in dental prosthetics. Guided practice: Modern technologies in the production of fixed prosthetic restorations. CAD/CAM design, sintering and processing.	2 2

Week 4.	Lecture: Clinical evaluation of fixed-prosthetic restorations. The influence of fixed prosthetic restorations on periodontal health. Examination of periodontal indices and evaluation of bone density (radiological analyses) in fixed-prosthetic therapy. Guided practice: Examination of periodontal health in fixed-prosthetic restorations - significant periodontal indices, assessment of bone density (radiological analysis).	2 2
Week 5.	Lecture: Systemic factors in the pathogenesis of TMD, occlusion as a factor in TMD, prevention of TMD. Guided practice: Clinical analysis and assessment, presentations of cases from clinical practice.	2 2
Week 6.	Lecture: Diagnosis and differential diagnosis of TMD. Guided practice: Clinical analysis and assessment, presentations of cases from clinical practice.	2 2
Week 7.	Lecture: Methods of assessing pathological changes of the temporomandibular joint and comparison with clinical findings. Guided practice: Methods of the temporomandibular joint analysis.	2 2

Week 8.	Lecture: Biomorphological methods of research in dental prosthodontics. Morphometric analysis of the craniofacial system. Guided practice: Soft tissue and bony anthropometric landmarks. Craniofacial anthropometry.	2 2
Week 9.	Lecture: Evaluation of pathological changes in occlusion and articulation. Guided practice: Diagnostics of occlusal disorders.	2 2
Week 10.	Lecture: Morphometric characteristics of soft tissues important for treatment planning. Guided practice: Methods of analysis of morphometric characteristics of soft tissues.	2 2

SEMINAR PAPERS ON THE COURSE OF PROSTHETICS WITH DENTAL IMPLANTOLOGY - DOCTORAL STUDY

1. Algorithms for prediction of the vertical dimension of occlusion
2. Non-metal ceramic systems
3. Digital technologies in fixed prosthetics
4. Morphological changes of TMJ as a consequence of remodeling and loading
5. Digital technologies in the production of stabilizing splints

Code: SF DS GP 14E	**Course Title: ORAL MEDICINE AND PERIODONTOLOGY**		
Cycle: III study cycle	**Year: I**	**Semester: II**	**Number of ECTS credits:** 5
Status: elective		**Total number of hours: 45** **Lectures** 20 **Exercises** 20	

	Seminars 5
Teaching participants:	Teachers and associates selected in the field to which the course belongs / course
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo
Aim (objectives) of the course:	- The aim of the course is to provide the student with theoretical and practical knowledge about the etiology, pathogenesis, and clinical classification of diseases of periodontal tissues and oral mucosa, as well as the immunological, inflammatory and genetic aspects of periodontal diseases. To acquaint them with the modern radiological evaluation of periodontal diseases, the application of current therapeutic treatment protocols and the use of lasers in the treatment of periodontal and oral mucosal diseases. To educate students about the oral medical aspects of systemic diseases, the modern approach to potentially malignant oral disorders and changes in the oral mucosa in HIV and hepatitis patients . To acquaint students with the most modern diagnosis of oral diseases, medicinal therapies, as well as the latest technologies that are applied.
Thematic units:	LECTURES : 1. Biochemical composition, structure, morphology of biofilm and its role in the development of periodontal disease 2.Immunological and inflammatory aspects of periodontal disease A scientific approach to the genetics of periodontal disease 3. Oral pathological changes in the gingiva and the periodontium Clinical and contemporary radiological evaluation of periodontal diseases 4. Non-invasive periodontology: A treatment philosophy and suggested approach 5. Goals, problems and aesthetic solutions in periodontology 6. Modern surgical procedures in therapy of gingival recessions 7. Regenerative periodontal therapy: biological, clinical considerations and prospect for the future 8. Application of bio membranes and bone substitutes in regenerative periodontal therapy and factors that affect clinical outcome 9. Modern therapeutic approach to lasers in the treatment of periodontal diseases 10. The significanve of clinical signs ans symptoms in oral disease diagnosis

Microbiological methodes in oral medicine
Saliva as a diagnostic sample

GUIDED PRATICE :

1. Basic diagnostic and therapeutic procedures in periodontology Molecular biological tests in the diagnostics of periodontal diseases The significance of saliva analysis in the early detection of the diseases of the periodontium
2. Clinical and radiological assessment of the success of initial periodontal therapy Pharmacologically assisted periodontal therapy
3. Conventional and digital radiography in the risk assessment of focal diseases
4. Making a diagnosis for operative procedure and patient preparation
5. Clinical and radiological assessment of periodontal health after surgical methods of treatment in periodontology
   Significance of supportive periodontal therapy and risk assessment for periodontal disease
6. Differential diagnosis of pathological changes in the oral mucosa
7. Presentations of clinical cases of application of regenerative methods in the treatment of periodontal diseases
8. Guided bone and tissue regeneration, when and why?
9. Clinical and laboratory analysis of the use of lasers in the treatment of periodontal diseases
10. Differential diagnosis of pathological changes in the oral mucosa
    Oral tests and microbiological test results in the diagnostics of oral diseases
11. Application of specific protocols of dental treatments in patients with diseases of individual organ systems
12. Evaluation of clinical results, lab and ph results of precancerous lesions, Quantitative and qualitative saliva analysis in oral diseases
13. Diagnosis and therapy protocol in HIV patients
14. Presentation of clinical cases and differential diagnosis of oral ulcerations
15. Drug therapy – significance and side effects

SEMINARS:

1. Contemporary classification of periodontal diseases - new research and clinical application
2. Contemporary radiological evaluation in periodontal therapy planning
3. Regenerative principles of periodontal treatment - Contemporary aspect
4. Differential diagnosis of dark and white lesions on the oral mucosa

Potentially malignant oral disorders - new protocols in diagnosis and therapy

Learning outcomes:	- The student should know and will be able to use modern diagnostic methods in the diagnosis of periodontal diseases and diseases of the oral mucosa, modern therapeutic procedures in the treatment of the mentioned diseases, as well as the evaluation of the success of the therapeutic procedure
Teaching methods:	Lectures, practice and seminars
Knowledge assessment methods with assessment structure:	Regular lectures and practice attendance – 10 points Activity on practice-15 Seminars – 30 points Final exam – 45points
Literature:	1. Enes Pašić, Sanja Hadžić, Mirjana Gojkov Vukelić, Mirsada Hukić. Oralna mikrobiologija. Sarajevo, Univerzitet u Sarajevu, Stomatološki fakultet. 2017. 2. Greenberg MS, Glick M. Burketova oralna medicina: dijagnoza i liječenje. 1. Hrvatsko izdanje, Medicinska naklada Zagreb, 2006. 3. Laskaris G. Atlas oralnih bolesti. Hrvatsko izdanje, Naklada Slap, Zagreb. 4. Herbert F. Wolf, Edith M. Rateitschak, Klaus H. Rateitschak. Parodontologija. Stomatološki atlas. 1. hrvatsko izdanje, Zagreb, Naklada Slap, 2008. 5. Jan Lindhe, Thorkild Karring, Niklaus P. Lang. Klinička parodontologija i dentalna implantologija. 1. hrvatsko izdanje, Zagreb, Globus, 2004. 6. Otto Zuhr, Marc Hurzeler. Estetska, parodonta plastična i implatološka kirurgija. Mikrohirurški koncept. Zagreb, Printera grupa d.o.o. Sveta nedjelja, 2012. 7. Hadžić S, Gojkov-Vukelić M, Pašić E, Mujić Jahić I, Muharemović A, Konjhodžić Prcić A. Potencijalno maligni oralni poremećaji – oralne prekanceroze. Sarajevo, Univerzitet u Sarajevu, Stomatološki fakultet sa klinikama, Dobra knjiga, 2022. 8. Gojkov – Vukelić M, Hadžić S, Pašić E, Mujić Jahić I. Osnovni hirurški praktikum u dentalnoj medicini. Sarajevo, Univerzitet u Sarajevu, Stomatološki fakultet sa klinikama, Dobra knjiga, 2022.

Item code: SF DS GP 15E	**Course Title: PREVENTIVE DENTISTRY AND PEDODONTICS**		
Cycle: III study cycle	**Year: I**	**Semester: II**	**Number of ECTS credits:** 5
Status: elective	**Total number of hours: 45** **Lectures** 20		

	Exercises 20 **Seminar/scientific paper/publication at a congress or journal 5**
Teaching participants:	**Teachers and associates selected in the field to which the subject belongs / subject** [d**o not enter names in this section. Leave the wording as indicated in this sectio**n]
Prerequisite for enrollment:	All students who chose to take this course in the second semester
Aim (objectives) of the course:	The course of Pediatric Dentistry within the Doctorate program aims to educate specialists who are competent and experienced in meeting the oral health care needs of infants, children, adolescents, and patients with special care needs and are capable of designing and conducting scientific research in the area of specialty and take part in education in pediatric dentistry for their academic careers.
Thematic units:(*If necessary, the performance plan is determined by taking into account the specifics of organizational units*)	Writing a doctoral thesis through a clinical topic in the field of pedodontics Endodontic treatment of primary teeth and immature permanent teeth Primary prophylaxis measures in children and adolescents Experimental studies of biocompatibility and cytotoxicity of dental materials Specificities and possibilities of research according to age within the children's population Research of the frequency and etiology of periodontal disease in children. Defining risk and researching risk factors for periodontal disease in children. Motivation to preserve oral health within specific population groups. The immune system of the oral cavity. Microbiological aspect of caries in deciduous and young permanent dentition. Epidemiology and risk factors of severe early childhood caries - guidelines for further research
Learning outcomes:	Knowledge: After this course, doctoral students will: -Adopt a basic scientific methodological approach when planning and conducting research in the field of pedodontics. -They will know how to plan and carry out original scientific research in the field of children's dental medicine, which will lead to new knowledge and the results of which will be published in scientific journals. -They will know to apply ethical codes during scientific research and publishing. Skills: The program focuses on biomedical research, clinical research, population health and health services research (oral health promotion and access to care for disadvantaged children). Competencies: After the completion of this course, PhD students will be competent to pursue a career as a teacher/researcher and emphasizes scientific methodology together with research experience to develop skills required for independent research.

Teaching methods:	Classes are conducted in the form of: • lectures; • guided practicum • consultation.
Assessment methods with assessment structure:	Acquired knowledge will be verified through class activities and the preparation of 5 seminar papers or scientific paper/publication at a congress or journal. Class activities present 10% of the total grade Each written and successfully defended seminar work on the course subject presents 30% of the total grade. The final grade is formed based on points won and according to the scale of points: 10 (A) - exceptional success, without mistakes or with minor mistakes, carries 95-100 points. 9 (B) - above average, with some errors, carries 85-94 points 8 (C) - average, with noticeable errors, carries 75-84 points 7 (D) -generally good, but with significant shortcomings, carries 65-74 points. 6 (E) -satisfies the minimum criteria, carries 55-64 points. 5 (F) - does not meet the minimum criteria, less than 55 points.
Literature:	Required: • *Koch* G (ed), *Poulsen* S (ed), Espelid I (ed), Haubek D (ed). Pediatric Dentistry: A Clinical Approach, 3 rd Edition Wiley-Blackwell (2017) Additional: • Cameron AC, Widmer RP. Handbook of Pediatric Dentistry (2003). • Pinkham JR i sar. Pediatric Dentistry-Infancy through Adolescence (2005).

COURSE EXECUTION PLAN: **PREVENTIVE DENTISTRY AND PEDODONTICS**

Week		Number of hours
1.	Writing a doctoral thesis through a clinical topic in the field of pedodontics	2
2.	Dental anxiety and behavioral techniques in pediatric dentistry	2

3.	Primary prophylaxis measures in children and adolescents	2
4.	Microbiological aspect of caries in deciduous and young permanent dentition	2
5.	Endodontic treatment of primary and immature permanent teeth	2
6.	Research of the frequency and etiology of periodontal disease in children. Defining risk and researching risk factors for periodontal disease in children.	2
7.	Experimental studies of biocompatibility and cytotoxicity of dental materials	2
8.	The immune system of the oral cavity	2
9.	Sedated dental treatment in children	2
10.	General anesthesia for oral and dental care in paediatric patients	2

Week	**GUIDED CLINICAL PRACTICE- CONTENT**	**Number of hours**
1.	Analysis of the evaluation methods of different materials in restorative dentistry	1
2.	Epidemiology of oral health	1
3.	Calibration of researchers in epidemiological studies to assess oral health status.	1
4.	Survey as a method of scientific research work	1
5.	Identification of the impact of systemic diseases on oral health in children	1
6.	Analysis of risk assessment methods for dental caries in children.	1
7.	Analysis of risk assessment methods for periodontal disease in children and adolescents.	1
8.	Examination of the influence of therapeutic and prophylactic agents in the treatment of initial carious lesions.	1
9.	Analysis of methods for assessing the effectiveness of preventive measures and prophylactic procedures for the protection of oral health in children and adolescents	1
10.	Methods and means of oral health promotion and motivation of the profession, society and individual to preserve oral health.	1
11.	Aesthetic aspects of dental trauma restorations in children	1
12.	Minimally invasive therapy - a modern aspect of the dental caries solution	1
13.	Stem cells- possibilities of the application in regenerative therapy	1
14.	Analysis of oral health profiles within specific population groups	1

15.	Analysis of motivational models for preserving and improving oral health	1
16.	Immune system of mucous membranes	1
17.	Analysis of microbiological dental caries research	1
18.	Epidemiology and risk factors of severe early childhood caries - guidelines for further research	1
19.	Evaluation of risk factors in the application of inhalation sedation in pedodontics	1
20.	Evaluation of risk factors in the therapy of pedodontic patients under total anesthesia	1

Code: SF DS GP 16E	**Course Title: ORTHODONTICS**		
Cycle: III	**Year: I**	**Semester: II**	**Number of ETCS credits: 5**
Status: Elective	**Total number of hours: 45** Lectures: 20 Guided practice: 20 Seminars: 5		
Teaching participants:	**Teachers and associates selected in the field to which the subject belongs / subject**		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	- Student will be able to independently search the literature in orthodontics, both from the aspect of basic orthodontic research, as well as clinical and epidemiological studies - The aim of the course is to introduce students with contemporary diagnostic procedures in orthodontics and research opportunities - Provide students with basic and new knowledge about the outcomes of orthodontic treatment - Introduce students to the possibilities of an interdisciplinary approach in orthodontics		
Thematic units:	Thematic units were formed with the aim of providing students with basic and new knowledge of orthodontics in the areas of growth and development of the craniofacial complex, orthodontic anomalies, experimental research in orthodontics, contemporary diagnostic procedures in orthodontics, treatment outcomes and multidisciplinary research. The teaching plan is attached.		
Learning outcomes:	Knowledge: The student will be able to search and analyze the scientific literature of orthodontics and recognize open scientific questions		

	Skills: The student will be able to conduct a comprehensive literature search, critically evaluate and interpret published scientific works Competences: The student will be able to write a review article and choose a journal to publish the article
Teaching methods:	Lectures Guided practice Seminars
Assessment methods with assessment structure:	Analysis of a published scientific research article on a specific topic (25% of the grade structure) Preparation and presentation of a paper on a specific or free topic, in the form of a review paper/article (75% of the grade structure)
Literatura:	1. Proffit WR, Fields HW, Sarver DM. Contemporary Orthodontics, 6th edition. Mosby. 2018. 2. Graber LW, Vanarsdall RL, Vig KWL, Huang GJ. Orthodontics: Current Principles and Techniques, 6th edition. Elsevier. 2017.

COURSE EXECUTION PLAN: ORTHODONTICS

Week	Course form and content	Number of hours
1	Lecture: Growth and development of the craniofacial complex and areas of research Guided practice: Search and analysis of literature on the growth and development of the craniofacial complex through periods of growth and development (prenatal period)	2 2
2	Lecture: Growth and development of the craniofacial complex and areas of research Guided practice: Search and analysis of literature on the growth and development of the craniofacial complex through periods of growth and development (postnatal period)	1 1
3	Lecture: Malocclusions Guided practice: Critical evaluation and interpretation of study results about malocclusions	2 2
4	Lecture: Malocclusions – Assessment of orthodontic treatment need	1 1

		Guided practice: Critical evaluation and interpretation of study results (Assessment of orthodontic treatment need)	
5		Lecture: Impact of malocclusion on quality of life Guided practice: Critical evaluation and interpretation of study results (Impact of malocclusion on quality of life)	1 1
6		Lecture: Epidemiological research in orthodontics Guided practice: Analysis of epidemiological research in orthodontics	2 2
7		Lecture: Contemporary diagnostic procedures in orthodontics Guided practice: Search of literature and recognition of open scientific questions about morphometrics	2 2
8		Lecture: Digital technologies in orthodontics Guided practice: Search of literature and recognition of open scientific questions about digital technologies in orthodontics	2 2
9		Lecture: Photogrammetry Guided practice: Search of literature and recognition of open scientific questions about photogrammetry in orthodontics	1 1
10		Lecture: Electromyography in orthodontics Guided practice: Search of literature and recognition of open scientific questions about electromyography in orthodontics	1 1
11		Lecture: Experimental research in orthodontics Guided practice: Learning about the methodological approach in planning and conducting	1 1 1

		experimental research in orthodontics Seminar: Experimental research in orthodontics	
12		Lecture: Experimental research in orthodontics Guided practice: Learning about the methodological approach in planning and conducting experimental research in orthodontics Seminar: Clinical studies	1 1 2
13		Lecture: Outcomes of orthodontic treatment Guided practice: Learning about the methodological approach in planning and conducting studies on the outcomes of orthodontic treatment Seminar: Preparation of different types of presentations (poster and oral presentation)	1 1 2
14		Lecture: Multidisciplinary research Guided practice: Presentation of prepared work	1 1
15		Lecture: Presentation of orthodontic scientific papers Guided practice: Selection of journals and the process of publishing a review article	1 1

Code: SF DS GP 17E	**Course title: ORAL SURGERY WITH DENTAL IMPLANTOLOGY**		
Cycle: III	**Year: I**	**Semester: II**	**Number of ECTS credits:** 5
Status: ELECTIVE	**Total number of hours: 45** Lectures 20 Exercises 20 Seminar 5		

Učesnici u nastavi	**Teachers and associates selected in the field to which the subject belongs / subject**
Prerequisite for enrollment:	
Aim (objectives) of the course:	Familiarize the student with possible failures of local anesthesia with reference to anatomical details, then familiarize the student with possible emergency conditions during and after the application of local anesthesia. Acquaint the student with the basic principles of work in general anesthesia, the possibilities of applying modern radiological diagnostic procedures in oral surgical case studies, the importance of using PRF, ultrasound surgery.
Thematic units:	
Learning outcomes:	Knowledge: The student will master alternative techniques of local anesthesia, the modern approach in the diagnosis of periapical lesions and their therapy, as well as the materials used for retrograde sealing of root canals. They will master the approach to patients with blood-borne infections, blood dyscrasias and patients with malignant diseases with a review on malignant areas of the head and neck
Teaching methods:	Lectures, seminars, exercises
Assessment methods with assessment structure:	Regular attendance and activities at lectures - 20 points Seminar papers – 30 points final exam – 50 points <55 points - grade 5 55-64 points - grade 6 65-74 points - grade 7 75-84 points - grade 8 85-94 points - grade 9 95-100 points - grade 10
Literature:	Mandatory:1. Kućanski B, Sulejmanagić H, Mustagrudić D, Gojkov T. Oralna hirurgija, I dio, II izdanje, urednik: Sulejmanagić H. Sarajevo: USBiH; 1998. 2. Sulejmanagić H. Infekcije dentogene etiologije. Sarajevo: USBIH; 2000. 3. Perović J, Jojić B. Oralna hirurgija. Beograd; 2000. 4. Miše I. Oralna kirurgija. Zagreb: Jumena, 2. izd. ;1988. 5. Knežević G. Oralna kirurgija II. Medicinska naklada, Zagreb 2003. . 6. Šečić S Ajanović M,Ahmić A, Zukić s, Zukanović A Tosum S, Dervišević A Stomatoloska anesteziologija, Sarajevo 2018 Additional: 1.Todorović et al, Oralna hirurgija; Izdavačko preduzeće Nauka, I izdanje, 2002. 2. 2.F.M. Andreasen, J.O. Andreasen, L.K. Bakland, M.T. Flores.Traumatske ozljede zubi, 2008. 3. Peterson L, Ellis E, Hupp J, Tucker M. Contemporary Oral and Maxillofacial Surgery. 5th Edition, 2008. 4.Miron j Richard, Choukrroun Josph Platelet rich fibrin in regenerative dentistry Florida,USA 5. Michael Milloro, Antonia Kolokythas Management of complications in oral and maxillofacial surgery,2022

III CYCLE OF STUDIES

COURSE EXECUTION PLAN: **ORAL SURGERY WITH DENTAL IMPLANTOLOGY**

Week	**LECTURE CONTENT**	Number of hours (lectures, practical classes)
1.	Failures and inadequate effects of local anesthesia in everyday practice with reference to anatomical variations Alternative techniques of local anesthesia and their application in order to achieve analgesia	3
2.	Local phenomena and possible complications of the application of local anesthesia Urgent conditions as a consequence of the application of local anesthesia (recognition and principles of prompt action)	3
3.	Application of modern radiological methods in diagnosis and differential diagnosis of oral surgical cases	2
4.	Application of general anesthesia in oral surgery (indications, contraindications, patient preparation, operative procedure, postoperative treatment, complications)	2
5.	Apicotomy with reference to modern comprehensive approach (diagnosis, indications, contraindications, preoperative preparation and postoperative treatment) Characteristics and selection of certain materials for retrograde filling of root canals	2
6.	Alveotomy with all the specifics and possible occurrences and complications during and after alveotomy Dilemmas of using the traditional method or ultrasound surgery in alveotomy	2
7.	Orthodontic surgical symbiosis within the therapy of impacted canines - a modern approach	2
8.	Pre-prosthetic surgery - an aspect of bone tissue surgery	1
9.	Pre-prosthetic surgery - an aspect of soft tissue surgery	1
10.	Diagnosis, differential diagnosis and possibilities of surgical therapy of cysts and cyst-like formations with reference to modern diagnostic possibilities	2

GUIDED PRACTICES

No	GUIDED PRACTICUM	Hours No
1.	Traumatic injuries of the dentoalveolar system (etiology, incidence and prevalence Classification of injuries and possibilities of treatment of traumatic injuries	3
2.	Benign tumors in oral surgery cases - diagnosis and differential diagnosis Surgical therapy in the treatment of benign tumors	2
3.	PRF in oral surgery	2
4.	Use of medications in oral surgery with reference to the use of antibiotics (types, indications, contraindications, choice, side effects, antibiotic prophylaxis, dosage)	2
5.	Odontogenic inflammation (dg, differential diagnosis and therapy with reference to surgical procedures)	3
6,	Odontogenic inflammation and tooth extraction - dilemmas	2
7.	Oral surgical interventions in oncology patients with a focus on specifics in patients with malignancies in the head and neck area	3
8.	Oral surgical interventions in patients with blood dyscrasias	3

SEMINARS:

1. Experimental research in oral surgery
2. Searching scientific databases for the purpose of research
3. Clinical studies in oral surgery
4. Preparation of various forms of presentation professional and scientific results
5. Multidisciplinarity and its importance in planning oral surgery

Code: SF DS GP 28E	**Course title: MAXILLOFACIAL SURGERY**		
Cycle: III study cycle	**Year: I**	**Semester: II**	**Number of ECTS credits:** 5
Status: elective		**Total number of hours: 45** **Lectures** 20 **Exercises** 20	

	Seminars 5
Teaching participants:	Teachers and associates selected in the field to which the course belongs / course
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo
Aim (objectives) of the course:	Application of acquired knowledge from the purpose of scientific research and practical work on the preparation of one's own doctoral dissertation
Thematic units:	Lectures: 1. Infection of the deep spaces of the head and neck in general 2 2. Specific head and neck inflammations 2 3. Infections of bone tissue of the viscerocranium 2 4. Fractures of bony structures of the visceral skull and soft tissue injuries 2 5. Diseases of cranial nerves 2 6. Diseases of the temporomandibular joint 2 7. Diseases of the salivary glands 2 8. Tumors of the maxillofacial region 2 9. Congenital soft tissue anomalies and bony deformities of the maxillofacial region 2 10. Reconstructive procedures in maxillofacial surgery and aesthetic facial surgery 2 Exercises: 1. Analysis of basic diagnostic procedures in head and neck surgery, MRI and CT, EHO, etc. 2 2. Clinical examinations / inspection - directoscopy, indirectoscopy, palpation, percussion, etc. 1 3. Forming a medical history for a hospital patient 2 4. Less invasive diagnostic procedures in MFH surgery 1 5. Minor interventional surgical procedures in outpatient MFH surgery type 1 6. Implementation in the operating room 2 7. Monitoring of local and general status in the early postoperative period 2 8. Conducting in the operating room - video conference 1 9. Conducting in the operating room - video conference 2 10. Conducting in the operating room - video conference 1 11. Conducting in the operating room - video conference 1 12. Conducting in the operating room - video conference 1 13. Implementation in the operating room 1 14. Implementation in the operating room 1 15. Implementation in the operating room 1

	Seminars: 1. Traumatology of the maxillofacial region. 2. Deformities of the maxillofacial region. 3. Neuralgia of the trigeminal nerve - treatment. 4. Skull base tumors 5. Malignant tumors of the maxillofacial region.
Learning outcomes:	Knowledge, skills, competences: Upon completion of the class, students will master the basic clinical recognition and behavior of various forms of diseases and injuries of the maxillofacial region and master the algorithms in the therapy mode through exercises and research of various databases
Teaching methods:	Lectures, practice and seminars
Knowledge assessment methods with assessment structure:	Regular attendance at lectures and exercises - 20 points Seminars – 30 points Final exam – 50 points FORMATION OF CUMULATIVE ASSESSMENT: 10(A) - exceptional success without errors or with minor errors, carries 95-100 points; 9 (B) - above average, with some errors, carries 85-94 points; 8 (C)- average, with noticeable errors, carries 75-84 points; 7 (D)-generally good, but with significant defects, carries 65-74; 6 (E)-satisfies the minimum criteria, carries 55-64 points; 5 (F)-does not meet the minimum criteria, less than 55 points.
Literature:	Obligatory: Osnovi maksilofacijalne hirurgije, Prof. Dr Tarik Mašić Additional: • Piranić H, Dautović S, Dizdarević R. Maksilofacijalna hirurgija – praktikum, Sarajevo, 2004 • Maksilofacijalna hirurgija(skripta grupe autora Mladenović, Piranić, Latić • S. Dautović, Z.Tomić.- Tumori maksilofacijalne regije. • H. Piranić Ratne povrede maksilofacijalne regije.

Item code: SF DS GP 19E	**Course Title: DENTAL IMPLANTOLOGY**		
Cycle: III study cycle	**Year: I**	**Semester: II**	**Number of ECTS credits: 5**
Status: elective	**Total number of hours: 40** Lectures 20 Exercises 20 Seminars 5		
Teaching participants:	**Teachers and associates selected in the field to which the subject belongs / subject** **Department of Prosthodontics with Dental Implantology**		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	The aim is to provide participants with knowledge and skills related to understanding the scientific approach, recognizing open scientific questions, planning and conducting scientific research, critical analysis of one's own and others' scientific conclusions, writing and publishing the results of scientific work and synthesizing existing research results into new knowledge that should contribute to the advancement of the dental implantology profession and society as a whole. To provide participants with additional information in the field of dental implantology as a basis for the successful preparation of a doctoral dissertation.		
Thematic units:	Application and proper selection of radiological methods in dental implantology - present the fundamental radiological methods used to diagnose and planning in dental implantology. Explain use of Sidex and Galileos implant planning software and coDiagnostiX. Treatment planning and surgical procedures in dental implantology - explain the planning postulates in dental implantology with reference to anatomical limits and physiology of the bone. Peri-implant histology. The lecture will bring closer the relationship between the implant and the surrounding bone tissue and biological changes that occur in bone tissue after implant insertion. Augmentation techniques. Sinus lift – assessment of success with different operative techniques. Cases report in dental implantology. Through the cases report will be presented, the correct selection of patients, planning in dental implantology, presentation of the latest strategic surgical procedures of implantation, recommendations to reduce postoperative complications. Types of fixed prosthetic restorations on implants - possible solutions. Types of removable prosthetic restorations on implants - possible solutions.		

	Biomechanics in implant prosthetic therapy. Management of soft tissues in implantology.
Learning outcomes:	Knowledge: Adoption of modern scientific and methodological knowledge in the field of dental implantology. Skills: Ability to understand a scientific problem, synthesis of scientific data, critical analysis and methodological approach in research in the field of dental implantology. Competences: Application of scientific knowledge and the possibility of methodologically conducting research in the field of dental implantology.
Teaching methods:	Lectures Guided practices Seminars
Assessment methods with assessment structure:	- Analysis of scientific research work on the given issue 20 % of the grade structure - Preparation of seminar papers - 30% of the grade structure - Final exam 50% of the grade structure
Literature:	Required literature: 1. Carl E. Misch. Contemporary Implant Dentistry. 4th edition. Mosby Elsevier; 2020. 2. Wolfart S. Implant Prosthodontics. A Patient-Oriented Strategy. 1st ed. Quintessence Publishing; 2016. 3. Al-Faraje L. Oral Implantology Review: A Study Guide. 2nd ed. Quintessence Publishing; 2023. 4. Froum SJ. Dental Implant Complications: Etiology, Prevention, and Treatment. 1st ed. Wiley Blackwell; 2015. 5. Sadowsky SJ. Evidence-based Implant Treatment Planning and Clinical Protocols. 1st ed. Wiley Blackwell; 2017. 6. Lang NP, Lindhe J. Periodontology and Implant Dentistry. Sixtd edition. West Sussex: Wiley Blackwell; 2015. 7. Grunder U. Implants in the Esthetic Zone: A Step-by-Step Treatment Strategy. 1st ed. Quintessence Publishing; 2016. Recommended literature: 1. Hughes FJ, Seymour KG, Turner W, Shahdad S, Nohl F. Clinical Problem Solving in Periodontology and Implantology (Clinical Problem Solving in Dentistry). 1st ed. Churchill Livingstone; 2012.

	2. Selected peer-reviewed scientific articles from scientific journals that follow the relevant database.

COURSE SYLLABUS: DENTAL IMPLANTOLOGY

Week	Form of teaching and materials	Number of hours
Week 1.	Lecture: Application and proper selection of radiological methods in dental implantology - present the fundamental radiological methods used to diagnose and planning in dental implantology. Explained use of Sidex and Galileos implant planning software and coDiagnostiX. Guided practice: The use of the 3D CTCB device in implantology and the analysis of cases using Sidex and Galileos implant planning software and coDiagnostiX.	2 2
Week 2.	Lecture: Treatment planning and surgical procedures in dental implantology - explain the planning postulates in dental implantology with reference to anatomical limits and physiology of the bone. Guided practice: Planning of the implant placement in the upper jaw with reference to anatomical limits and bone physiology.	2 2
Week 3.	Lecture: Peri-implant histology. The lecture will bring closer the relationship between the implant and the surrounding bone tissue and biological changes that occur in bone tissue after implant insertion. Guided practice: Planning of the implant placement in the lower jaw with reference to anatomical limits and bone physiology.	2 2
Week 4.	Lecture: Augmentation techniques. Guided practice: Augmentation techniques.	2 2
Week 5.	Lecture: Sinus lift – assessment of success with different operative techniques. Guided practice: Surgical procedures of sinus lift surgery.	2 2

Week 6.	Lecture: Cases report in dental implantology. Through the cases report will be presented, the correct selection of patients, planning in dental implantology, presentation of the latest strategic surgical procedures of implantation, recommendations to reduce postoperative complications. Each case will be in detail analyzed and discussed. Guided practice: Presentation of implant placement in the aesthetic and lateral region.	2 2
Week 7.	Lecture: Types of fixed prosthetic restorations on implants - possible solutions. Guided practice: Presentations of cases of solutions in implant prosthetics - missing one tooth.	2 2
Week 8.	Lecture: Types of removable prosthetic restorations on implants - possible solutions. Guided practice: Presentations of cases of solutions in implant prosthetics - partially edentulous patients.	2 2
Week 9.	Lecture: Biomechanics in implant prosthetic therapy. Guided practice: Presentations of cases of solutions in implant prosthetics - completely edentulous patients.	2 2
Week 10.	Lecture: Management of soft tissues in implantology. Guided practice: Presentations of cases of soft tissue management procedures.	2 2

SEMINAR PAPERS ON THE COURSE OF DENTAL IMPLANTOLOGY - DOCTORAL STUDY

1. Therapeutic possibilities in patients with bone deficiency
2. Complications of implant prosthetic therapy (surgical, prosthetic)
3. Peri-implantitis
4. Clinical and radiological examination of the success of implant prosthetic therapy
5. Evaluation of the success of restorations on implants

Code: SF DS GP 110E	**Course Title: DENTAL RADIOLOGY**		
Cycle: III study cycle	**Year: I**	**Semester: II**	**Number of ECTS credits: 5**
Status: elective	**Total number of hours: 40** Lectures 20 Guided practices 20 Seminars 5		
Teaching participants:	**Teachers and associates selected in the field to which the subject belongs / subject** **Department of prosthodontics with dental implantology**		
Prerequisite for enrollment:	In line with regulations for III cycle of the study of the University of Sarajevo		
Aim (objectives) of the course:	Adopt and apply modern scientific knowledge and methodological approach related to the planning and implementation of scientific research work in the field of dental radiology.		
Thematic units:	Diagnostic reasoning in dental radiology. Applied imaging diagnostics of bone structure diseases, disease mechanism, metabolic bone abnormalities of jaws. MRI in the diagnosis of pathological conditions of the orofacial system. Imaging techniques in assessment and treatment planning. 3D imaging – computer guided treatment planning. Postoperative imaging and monitoring. Inflammatory conditions of the jaws – osteomyelitis. Osteonecrosis, specificities. Dentoalveolar trauma, identification and monitoring. Temporomandibular joint abnormalities - analysis and evaluation.		
Learning outcomes:	Knowledge: Adopt contemporary scientific knowledge and a scientific methodological approach in the field of dental radiology. Skills: Analysis and synthesis of contemporary scientific data, recognition of a scientific problem, planning of scientific research and application of appropriate research methods. Competences: Apply contemporary scientific knowledge and methodologically perform research with the application of ethical codes in the field of dental radiology.		

Teaching methods:	Lectures Guided practices Seminars
Assessment methods with assessment structure:	-Analysis of scientific research work on the given issue - 20 % of the grade structure - Preparation of seminar papers – 30% of the grade structure - Final exam 50% of the grade structure
Literature:	Required literature: 1. Sanjay M, Ernest L. White and Pharoah`s Oral Radiology Principles and Interpretation. 8th Edition, St. Louis : Elsevier; 2018. 2. White, S.C. and Pharoah, M.J. Oral Radiology: Principles and Interpretation. 7th Edition. Health Sciences Division, Amsterdam Elsevier; 2014. 3. Neugebauer J, Zöller JE. Cone Beam Volumetric Imaging in Dental, Oral and Maxillofacial Medicine Fundamentals, Diagnostics and Treatment Planning. 2nd revised and expanded ed. Quintessence Publishing; 2014. Recommended literature: 1. Koong B. Atlas of Oral and Maxillofacial Radiology. 1st ed. Wiley Blackwell; 2017. 2. Selected peer-reviewed scientific articles from scientific journals that follow the relevant database.

COURSE SYLLABUS: DENTAL RADIOLOGY

Week	Form of teaching and materials (lectures, guided practices, independent practice)	Number of hours (lectures, guided practices)
Week 1.	Lecture: Diagnostic reasoning in dental radiology. Guided practices: Evaluation of appropriate diagnostic procedures, specific considerations.	2 2
Week 2.	Lecture: Applied imaging diagnostics of bone structure diseases, disease mechanism, metabolic bone abnormalities of jaws. Guided practices: Methods of assessment and analysis of the condition.	2 2

Week 3.	Lecture: MRI in the diagnosis of pathological conditions of the orofacial system. Guided practices: Specificities of certain conditions and differential diagnosis.	2 2
Week 4.	Lecture: Imaging techniques in assessment and treatment planning. Guided practices: Radiological analysis and assessment, presentation of clinical cases.	2 2
Week 5.	Lecture: 3D imaging – computer guided treatment planning. Guided practices: Computer guided treatment planning through presentation of clinical cases.	2 2
Week 6.	Lecture: Postoperative imaging and monitoring. Guided practices: Postoperative imaging and monitoring - case report.	2 2
Week 7.	Lecture: Inflammatory conditions of the jaws – osteomyelitis. Guided practices: Radiological analysis and evaluation, specificities.	2 2
Week 8.	Lecture: Osteonecrosis, specificities. Guided practices: Imaging diagnostics and differential diagnostics.	2 2
Week 9.	Lecture: Dentoalveolar trauma, identification and monitoring. Guided practices: Dentoalveolar trauma, identification and monitoring - presentation of clinical cases.	2 2
Week 10.	Lecture: Temporomandibular joint abnormalities - analysis and evaluation. Guided practices: Diagnosis and differential diagnosis of the condition.	2 2

SEMINAR PAPERS ON THE COURSE OF DENTAL RADIOLOGY - DOCTORAL STUDY

1. Analysis of metal artifacts on CBCT and MRI
2. Evaluation of bone quality CBCT

3. MRI findings in TMD patients

4. Horizontal and vertical bone defects

5. 3D virtual treatment planning