Sveučilište u Rijeci
University of Rijeka

Sveučilište u Rijeci • Fakultet dentalne medicine
University of Rijeka • Faculty of Dental Medicine
Krešimirova 40/42 • 51000 Rijeka • CROATIA
Phone : + 385 51 559 200; 559 202, 559 203

Course: Preclinical endodontics
Course Coordinator: Assistant Professor Romana Peršić Bukmir, DMD, PhD
Course Collaborators: Professor Ivana Brekalo Pršo, DMD, PhD
Professor Alen Braut, DMD, PhD
Assistant Professor Damir Šnjarić, DMD, PhD
Assistant Professor Jelena Vidas Hrstić, DMD, PhD
Assistant Professor Ivana Vidović, DMD, PhD
Ema Paljević, DMD, PhD
Elvis Božac, DMD

Department: Department of Endodontics and Restorative Dentistry
Study program: University Integrated Undergraduate and Graduate Study of Dental Medicine (in English)
Study year: 4.
Academic year: 2025./26.

SYLLABUS

Course description (a brief description of the course, general instructions, where and in what form the lessons are organized, necessary equipment, instructions for attendance and preparation for classes, student obligations, etc.):

The Preclinical Endodontics course provides students with a unified approach to etiology, pathology, diagnosis and treatment of pulp and periapical periodontal diseases at the preclinical level. Through this course, students are introduced to the morphological features of the endodontic space, pathological events in pulpal and periapical tissue, development and use of materials and medications in endodontics, instrumentation and root canal filling techniques. During the seminar, students will analyze the diagnosis and differential diagnosis of endodontic diseases, as well as the possibilities and goals of therapy for these conditions. During preclinical practicals, the diagnosis and treatment of endodontic diseases will be practiced with an emphasis on creating an access cavity, determining the working length, and instrumentation and root canal filling techniques.
Teaching is conducted in the form of lectures, seminars and exercises. At the end of the course, there will be a final exam. Students are obliged to attend all forms of classes.
For seminars and preclinical practicals, theoretical preparation according to the topics of the lectures is mandatory. Without theoretical knowledge, the student is not allowed to work on preclinical models.
5.5 ECTS points are earned by completing all teaching activities, and passing the final exam.

Assigned reading:

1. Torabinejad M, Walton RE. Principles and Practice of Endodontics, 6th Edition. Elsevier, 2020.

Optional/additional reading:

1. Cohen S, Burns RC. Pathways of the Pulp. X th., Mosby Inc. St. Louis, 2011
2. Ingle JI, Bakland LK. Endodontics. BC Decker Inc, Hamilton, London, 2008.

3. Bergenholtz G, Horsted-Bindslev P, Reit C. Textbook of Endodontology. Wiley Blackwell, 2010.
4. Patel S, Brown J, Semper M, Abella F, Mannocci F. European Society of Endodontology position statement: Use of cone beam computed tomography in Endodontics: European Society of Endodontology (ESE) developed by. Int Endod J. 2019 Dec;52(12):1675-1678. doi: 10.1111/iej.13187. Epub 2019 Aug 19. PMID: 31301231.
5. Segura-Egea JJ, Gould K, Şen BH, Jonasson P, Cotti E, Mazzoni A, Sunay H, Tjäderhane L, Dummer PMH. European Society of Endodontology position statement: the use of antibiotics in endodontics. Int Endod J. 2018 Jan;51(1):20-25. doi: 10.1111/iej.12781. Epub 2017 Jun 14. PMID: 28436043.

COURSE TEACHING PLAN:

The list of lectures (with topics and descriptions):

L1 Biology of dental pulp and periradicular tissue.
Expected learning outcomes
List the functions of the dental pulp.
Distinguish between the cells of the dental pulp.
Explain the innervation and blood supply of the dental pulp.
Describe the changes in the dental pulp caused by aging.
Describe the histology of hard dental tissues.

L2 Endodontic microbiology. Reaction of the dental pulp to caries and procedures in dental medicine.
Expected learning outcomes
Explain the importance of microorganisms in diseases of the pulp and periradicular tissues.
Describe the predominant bacteria and microbial ecosystem associated with endodontic infections.
Differentiate between irritating factors of microbiological, chemical and mechanical origin.

L3 Anamnesis and diagnostic procedures in endodontics.
Expected learning outcomes
Describe general medical and dental history.
Explain the clinical examination in endodontics.
Explain the results of clinical diagnostic procedures.

L4 Radiographs in endodontics.
Expected learning outcomes
State the X-ray techniques used in endodontics.
Analyze dental radiographs.
Describe and distinguish anatomical from pathological structures on a radiograph.

L5 Pathological changes in the pulp 1.
Expected learning outcomes
Distinguish the etiological factors that cause pulp disease.
Explain the mechanism of the formation and spread of the inflammatory reaction in the dental pulp.
Describe the histological features of pulp diseases.

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L6 Pathological changes in the pulp 2.
Expected Learning Outcomes
State the clinical classification of pulp diseases.
Explain the differences between reversible and irreversible forms of pulp diseases.
Define the symptomatology and clinical picture of individual pathological changes in the pulp.

L7 Pathological changes in periapical tissue 1.
Expected Learning Outcomes
Explain the mechanism and consequences of the spread of pulp inflammation to periapical tissues.
Define the inflammatory and immunological response of periapical tissue to etiological factors.
Classify periapical lesions of pulpal origin.

L8 Pathological changes in periapical tissue 2.
Expected Learning Outcomes
Distinguish between the histological and clinical features of different forms of apical periodontitis.
Describe the healing of a periapical lesion after endodontic treatment.
List non-endodontic pathological lesions that can mimic periapical tissue pathology.

L9 Morphology of the endodontic space 1.
Expected Learning Outcomes
Distinguish between parts of the endodontic space.
Describe the morphological variations of root canals according to Vertucci.

L10 Morphology of the endodontic space 2.
Expected Learning Outcomes
Describe the morphology of the endodontic space of each tooth.
Differentiate the incidence of the number of roots and root canals for each tooth.

L11 Dry working field and aseptic working conditions in endodontics. Preparing the patient for endodontic treatment. Indications and contraindications for endodontic treatment
Expected learning outcomes
Describe the means of ensuring a dry working field during endodontic procedures.
State the reasons for using a rubber sheet during endodontic procedures.
Describe the factors that influence the planning of endodontic procedures.

L12 Endodontic instruments
Expected learning outcomes
Differentiate between manual and machine endodontic instruments.
Explain the method of making endodontic instruments.
Define the way of using endodontic instruments with regard to their construction.

L13 Access cavity preparation
Expected learning outcomes
State the general principles of access hole preparation.
Describe the creation of the access opening for each individual tooth.
Define the positions of the entrance to the root canals for each individual tooth.

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L14 Determination of working length
Expected learning outcomes
Distinguish the basic methods of determining the working length.
Define the terms working length, reference point, apical border of the preparation.
Explain the electroodontometric method of determining the working length.
Describe the radiological method of determining the working length.

L15 Root canals instrumentation
Expected learning outcomes
State the objectives of root canal instrumentation.
Describe the basic techniques of working with certain types of endodontic instruments.
State the manual techniques of root canal instrumentation.
Describe the step-back technique of root canal instrumentation.

L16 Root canal irrigation
Expected learning outcomes
Define the purpose and objectives of root canal irrigation.
Distinguish between root canal irrigation agents.
Describe the properties and effects of individual root canal irrigation fluids.

L17 Root canal filling materials
Expected learning outcomes
Differentiate root canal filling materials based on their consistency.
List the means of an ideal root canal filling material.
Describe the properties of root canal filling materials.

L18 Root canal filling techniques
Expected learning outcomes
List the criteria for root canal filling.
Distinguish between root canal filling techniques.
Explain the procedure for filling using the cold lateral condensation technique.

L19 Pulpo-periodontal diseases
Expected learning outcomes
Describe the anatomical communications between pulpal and periodontal tissues.
State the effects of pulpal disease on the periodontium.
Describe the effects of periodontal disease on the pulp.

L20 Endodontic emergencies
Expected learning outcomes
Define the causes of emergencies that occur before, during, and after the completion of endodontic treatment.
Describe emergencies that occur before the start of endodontic treatment and their management.
Explain the treatment of emergencies that occur during endodontic treatment, between visits, or after the completion of endodontic treatment.

The list of seminars with descriptions:

S1 Preparing the patient for endodontic treatment
Expected learning outcomes

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Describe in detail the taking of a patient's medical and dental history.
Describe the procedures required to prepare a patient for endodontic treatment.
Explain the establishment of a dry working field and aseptic working conditions during an endodontic procedure.

S2 Local anesthesia
Expected learning outcomes
Describe the techniques of applying local anesthesia in dental medicine.
Define the pharmacokinetic properties of local anesthetics and indications for their use and possible complications.

S3 Morphology of the endodontic space of upper and lower incisors and canines and preparation of the access cavity
Expected learning outcomes
Opisati morfologiju endodontskog prostora gornjih i donjih sjekutića i očnjaka.
Navesti opća načela preparacije pristupnog otvora za gornje i donjesjekutiće i očnjake.
Opisati izradu pristupnog otvora za svaki pojedini zub te instrumente koji se koriste u pojedinim fazama.

S4 Morphology of the endodontic space of upper and lower premolars and molars and preparation of an access cavity
Expected learning outcomes
Describe the morphology of the endodontic space of upper and lower premolars and molars.
State the general principles of access opening preparation for upper and lower premolars and molars.
Describe the creation of the access opening for each individual tooth and the instruments used in individual stages.

S5 Construction and use of endodontic instruments
Expected learning outcomes
Explain the method of production and using manual and machine endodontic instruments.
Define the materials used in the production of modern endodontic instruments.

S6 Root canal instrumentation
Expected learning outcomes
Define the goals of root canal instrumentation.
Describe the basic principles of manual and machine instrumentation of root canals.

S7 Irrigation and disinfection of the endodontic space
Expected learning outcomes
Describe chemical agents for root canal irrigation, their properties and method of application.
Explain contemporary views on their application and application techniques.

S8 Root canal filling techniques
Expected learning outcomes
Describe and compare all root canal filling techniques.
Analyze the indications for their use, as well as the advantages and disadvantages of each technique.

S9 Radiological techniques in endodontics 1
Expected learning outcomes
Define indications for the use of 2D radiological techniques in endodontics.

Describe normal and pathological structures on periapical orthopantomogram.

S10 Radiological techniques in endodontics 2
Expected learning outcomes
Describe and adopt the indications for the use of CBCT in endodontics.
Analyze normal and pathological anatomy on 3D images.

The list of practicals with descriptions:

P1 Establishing a dry work area
Expected Learning Outcomes
Demonstrate the establishment of a dry work field.
Differentiate the techniques for establishing a dry work field according to the type of intervention.

P2 Coronal phase of endodontic treatment 1
Expected Learning Outcomes
Carry out the access cavity preparation on models or extracted single-rooted teeth.

P3 Coronal phase of endodontic treatment 2
Expected Learning Outcomes
Carry out the access cavity preparation on models or extracted multi-rooted teeth.

P4 Root canal instrumentation using the step-back technique 1
Expected Learning Outcomes
Plan and implement root canal instrumentation using the step-back technique on models or extracted single-rooted teeth.

P5 Root canal instrumentation using the step-back technique 2
Expected Learning Outcomes
Plan and implement root canal instrumentation using the step-back technique on models or extracted multi-rooted teeth.

P6 Irrigation of the endodontic space 1
Expected Learning Outcomes
Differentiate between means for root canal irrigation and irrigant activation techniques.
Perform irrigation of instrumented canals on models or extracted single-rooted teeth.

P7 Irrigation of the endodontic space 2
Expected Learning Outcomes
Perform irrigation of instrumented canals on models or extracted multi-rooted teeth.

P8 Root canal filling using the cold lateral condensation technique 1
Expected Learning Outcomes
Perform root canal filling using the cold lateral condensation technique on models or extracted single-rooted teeth.

P9 Root canal filling using the cold lateral condensation technique 2
Expected Learning Outcomes

Perform root canal filling using the cold lateral condensation technique on models or extracted multi-rooted teeth.

P10 Repetition of adopted practical material
Expected Learning Outcomes
Practical demonstration of the acquired knowledge.

Students' obligations:

Students are obliged to regularly attend and actively participate in all forms of classes.
Theoretical knowledge prepared according to lecture topics is mandatory for students' participation in seminars and practicals. The student can be absent from a maximum of 20% of each form of teaching with justification. Absence greater than 20 %, regardless of the reasons, makes it impossible for the student to take the final exam and implies re-enroling of the course for the next academic year. Two negative grades (C) obtained during practicals or seminars prevent the student from taking the final exam, which means re-enrolling in the course the following academic year.

Assessment (exams, description of written / oral / practical exam, the scoring criteria):

Student evaluation is conducted according to the current **Ordinance on Studies of the University of Rijeka (approved by the Senate).**
Students' work will be evaluated during the course, and at the final exam after the course is completed. Completing all student's obligations, are the conditions for taking the final exam. The final exam consists of a written test (free-form questions or a test with questions and multiple-choise answers).

Final grade:
The final grade consists of the grade on the final exam (70% contribution) and the average grade from practical work on pre-clinical exercises (30 % contribution).
Out of a total of **100 evaluation points**, the student can obtain **30 points** from practical work on pre-clinical exercises and **70 points** on the final exam.
To pass the student must obtain a minimum of 15 grade points (50%) from practical work on pre-clinical exercises.
To pass the final exam, the student must obtain a minimum of 35 grade points (50%).

Grade of an individual practical (A-C)	Grade of an individual practical (5-1)	Overall average grade of practicals	Number of grade points
A	5	4,5-5	30
A/B	4	3,5-4,49	25
B	3	2,5-3.49	20
B/C	2	2-2,49	15
C	1	0-1,99	<15

Grading of students is done using ECTS (A-F) and numerical system (5-1) as follows:
A (5) – 90-100 grade points
B (4) – 75-89.99 grade points
C (3) – 60-74.99 grade points
D (2) – 50-59.99 grade points
F (1) – 0-49.99 grade points

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Other important information regarding to the course:

Any use of another's text or other form of author's work, as well as the use of ChatGPT or any of another tool whose functionality is based on artificial intelligence technology, without clear and unambiguous citation of sources, is considered a violation of someone else's copyright and the principle of academic integrity and represents serious violation of student obligations, which entails disciplinary responsibility and disciplinary measures accordingly Ordinance on disciplinary responsibility of students.
Consultations:
Assistant professor Romana Peršić Bukmir, DMD, PhD: Monday from 9.00-10.00 a.m. proceeding e-mail arrangement.

COURSE SCHEDULE (for the academic year 2025/2026)

Date	Lectures (time and place)	Seminars (time and place)	Practicals (time and place)	Instructor
29.09.2025.	L1 (14.00-14.45) Lecture room Krešimirova 40			
6.10.2025.	L2 (14.00-14.45) Lecture room Krešimirova 40			
13.10.2025.	L3 (14.00-14.45) Lecture room Krešimirova 40			
20.10.2025.	L4 (14.00-14.45) Lecture room Krešimirova 40			
27.10.2025.	L5 (14.00-14.45) Lecture room Krešimirova 40			
3.11.2025.	L6 (14.00-14.45) Lecture room Krešimirova 40			
10.11.2025.	L7 (14.00-14.45) Lecture room Krešimirova 40			
17.11.2025.	L8 (14.00-14.45) Lecture room Krešimirova 40			
24.11.2025.	L9 (14.00-14.45) Lecture room Krešimirova 40			
1.12.2025.	L10 (14.00-14.45) Lecture room			

	Krešimirova 40			
8.12.2025.	L11 (14.00-14.45) Lecture room Krešimirova 40			
15.12.2025.	L12 (14.00-14.45) Lecture room Krešimirova 40			
22.12.2025.	L13 (14.00-14.45) Lecture room Krešimirova 40			
12.01.2026.	L14 (14.00-14.45) Lecture room Krešimirova 40			
19.01.2026.	L15 (14.00-14.45) Lecture room Krešimirova 40			
23.02.2026.	L16 (14.00-14.45) Lecture room Krešimirova 40			
25.02.2026.		S1 (13.15-14.00) Lecture room Krešimirova 40		
26.02.2026.			P1 (10.15-12.30)	
2.03.2026.	L17 (14.00-14.45) Lecture room Krešimirova 40			
4.03.2026.		S2 (13.15-14.00) Krešimirova 40		
5.03.2026.			P2 (10.15-12.30)	
9.03.2026.	L18 (14.00-14.45) Lecture room Krešimirova 40			
11.03.2026.		S3 (13.15-14.00) Krešimirova 40		
12.03.2026.			P3 (10.15-12.30)	
16.03.2026.	L19 (14.00-14.45) Lecture room Krešimirova 40			
18.03.2026.		S4 (13.15-14.00) Krešimirova 40		
19.03.2026.			P4 (10.15-12.30)	
23.03.2026.	L20 (14.00-14.45) Lecture room Krešimirova 40			
25.03.2026.		S5 (13.15-14.00) Krešimirova 40		
26.03.2026.			P5 (10.15-12.30)	

1.04.2026.		S6 (13.15-14.00) Krešimirova 40		
2.04.2026.			P6 (10.15-12.30)	
8.04.2026.		S7 (13.15-14.00) Krešimirova 40		
9.04.2026.			P7 (10.15-12.30)	
15.04.2026.		S8 (13.15-14.00) Krešimirova 40		
16.04.2026.			P8 (10.15-12.30)	
22.04.2026.		S9 (13.15-14.00) Krešimirova 40		
23.04.2026.			P9 (10.15-12.30)	
29.04.2026.		S10 (13.15-14.00) Krešimirova 40		
7.05.2026.			P10 (10.15-12.30)	
14.05.2026.			P (10.15-12.30)	
21.05.2026.			P (10.15-12.30)	

List of lectures, seminars and practicals:

	LECTURES (Topics)	Teaching hours	Location/Lecture room
L1	Biology of dental pulp and periradicular tissue.	1	Lecture room, Krešimirova 40
L2	Endodontic microbiology. Reaction of the dental pulp to caries and procedures in dental medicine.	1	Lecture room, Krešimirova 40
L3	Anamnesis and diagnostic procedures in endodontics.	1	Lecture room, Krešimirova 40
L4	Radiographs in endodontics.	1	Lecture room, Krešimirova 40
L5	Pathological changes in the pulp 1.	1	Lecture room, Krešimirova 40
L6	Pathological changes in the pulp 2.	1	Lecture room, Krešimirova 40
L7	Pathological changes in periapical tissue 1.	1	Lecture room, Krešimirova 40
L8	Pathological changes in periapical tissue 2.	1	Lecture room, Krešimirova 40
L9	Morphology of the endodontic space 1.	1	Lecture room, Krešimirova 40
L10	Morphology of the endodontic space 2.	1	Lecture room, Krešimirova 40

L11	Dry working field and aseptic working conditions in endodontics. Preparing the patient for endodontic treatment. Indications and contraindications for endodontic treatment	1	Lecture room, Krešimirova 40
L12	Endodontic instruments	1	Lecture room, Krešimirova 40
L13	Access cavity preparation	1	Lecture room, Krešimirova 40
L14	Determination of working length	1	Lecture room, Krešimirova 40
L15	Root canals instrumentation	1	Lecture room, Krešimirova 40
L16	Root canal irrigation	1	Lecture room, Krešimirova 40
L17	Root canal filling materials	1	Lecture room, Krešimirova 40
L18	Root canal filling techniques	1	Lecture room, Krešimirova 40
L19	Pulpo-periodontal diseases	1	Lecture room, Krešimirova 40
L20	Endodontic emergencies	1	Lecture room, Krešimirova 40
	TOTAL TEACHING HOURS	**20**	

	SEMINARS (Topics)	**Teaching hours**	**Location/Lecture room**
S1	Preparing the patient for endodontic treatment	1	Lecture room, Krešimirova 40
S2	Local anesthesia	1	Lecture room, Krešimirova 40
S3	Morphology of the endodontic space of upper and lower incisors and canines and preparation of the access cavity	1	Lecture room, Krešimirova 40
S4	Morphology of the endodontic space of upper and lower premolars and molars and preparation of the access cavity	1	Lecture room, Krešimirova 40
S5	Construction and use of endodontic instruments	1	Lecture room, Krešimirova 40
S6	Root canal instrumentation	1	Lecture room, Krešimirova 40
S7	Irrigation and disinfection of the endodontic space	1	Lecture room, Krešimirova 40
S8	Root canal filling techniques	1	Lecture room, Krešimirova 40

S9	Radiological techniques in endodontics 1	1	Lecture room, Krešimirova 40
S10	Radiological techniques in endodontics 2	1	Lecture room, Krešimirova 40
	TOTAL TEACHING HOURS		

	PRACTICALS (Topics)	Teaching hours	Location/Lecture room
P1	Establishing a dry work area	3	Krešimirova 42
P2	Coronal phase of endodontic treatment 1	3	Krešimirova 42
P3	Coronal phase of endodontic treatment 2	3	Krešimirova 42
P4	P4 Root canal instrumentation using the step-back technique 1	3	Krešimirova 42
P5	Root canal instrumentation using the step-back technique 2	3	Krešimirova 42
P6	Irrigation of the endodontic space 1	3	Krešimirova 42
P7	Irrigation of the endodontic space 2	3	Krešimirova 42
P8	Root canal filling using the cold lateral condensation technique 1	3	Krešimirova 42
P9	Root canal filling using the cold lateral condensation technique 2	3	Krešimirova 42
P10	Repetition of adopted practical material	3	Krešimirova 42
	TOTAL TEACHING HOURS	30	

	FINAL EXAM DATES
1.	17.6.2025.
2.	15.7.2026.
3.	9.9.2026.

	Lectures	Seminars	Practicals	Total
Total number	20	10	30	60
On-line				
Percentage				