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

University of Rijeka
Faculty of Dental Medicine
Course: DENTAL CARIES
Course coordinator: Assoc. Prof. Jelena Vidas Hrstić, PhD, DMD
Department: Department of Endodontics and Restorative Dentistry
Study programme: University Integrated Undergraduate and Graduate Study Programme in Dental Medicine
Year of study: 2
Academic year: 2026/2027

SYLLABUS

Course information (brief course description, general instructions, where and in what form classes are organised, required materials, instructions on attendance and preparation for classes, student obligations, etc.):

Course coordinator:	**Teaching staff:**
Assoc. Prof.Jelena Vidas Hrstić, DMD	Prof. Alen Braut, DMD Prof. Ivana Brekalo Pršo, DMD Prof. Miranda Muhvić Urek, DMD Assoc. Prof. Romana Peršić Bukmir, DMD Assoc. Prof. Ivana Vidović Zdrilić, DMD PhD, Elvis Božac, DMD

Dental caries is a compulsory course in the third year of the Integrated Undergraduate and Graduate Study Programme on Faculty of Dental Medicine. It comprises 12 hours of lectures, 10 hours of practical sessions and 8 hours of seminars, totalling 30 hours (**3.0 ECTS**). The course is held on the premises of the Faculty of Dental Medicine.

The aim of the course is to enable students to diagnose initial carious lesions and develop treatment plans, as well as to acquire knowledge of the complex interaction of factors involved in the development of dental caries. The course teaches students to recognise initial and advanced carious lesions clinically and to use contemporary diagnostic procedures in the prevention of dental caries.

Course content:
Introduction to the histological foundations, anatomy and function of teeth through the application of previously acquired knowledge from the basic biomedical sciences. Provision of theoretical foundations and practical knowledge of technical, technological and clinical procedures for the prevention and detection of early and advanced carious lesions. Procedures for establishing the conditions required for appropriate caries diagnosis, including a dry operating field and adequate illumination. Fundamentals of epidemiological indices and their analysis in planning measures to reduce the incidence of dental caries.
Cariology is a six-day course during the third semester and comprises lectures, seminars, and practical sessions. A final examination is held upon completion of the course.

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Students are required to attend all forms of teaching and to prepare for seminars and practical sessions by reviewing the relevant theoretical content covered in the lectures. Students who fail to demonstrate the required level of theoretical knowledge will not be permitted to participate in practical sessions.

Upon completing all course requirements and taking the final examination, students get 3.0 ECTS credits.

Assigned reading:

Dental Caries: The Disease and its Clinical Management by Ole Fejerskov (Editor), Bente Nyvad (Editor), Edwina Kidd (Editor) (8-May-2015).

Optional/additional reading:

Preservation and Restoration of Tooth Structure: G.J.Mount; W.R.Hume, H.C. Ngo, M.S. Wolff, 3rd Ed. Willey Blackwell. 2016

Curriculum:

List of lectures with titles and descriptions:

P1. Tooth development and the origin of formative tissues
Learning outcomes:
- become familiar with the aim of the Cariology course
- acquire knowledge of the development of teeth and surrounding tissues

P2. Morphological and structural abnormalities of dental hard tissues.
Learning outcomes:
- define physiological and pathological patterns of tooth development
- explain the development of specific structural and morphological dental abnormalities

P3. Physical and chemical damage to dental hard tissues. Response of the pulp–dentin complex to stimuli.
Learning outcomes:
• define physical and chemical damage to dental hard tissues and distinguish its basic forms;
• explain the aetiology, mechanisms and clinical features of physical and chemical damage to dental hard tissues;
• explain the defensive and reparative responses of the pulp–dentin complex to different types of stimuli;
• explain the formation of sclerotic dentin and of tertiary, reactionary and reparative dentin in response to stimuli.

P4. The oral cavity. The role of saliva in caries development.
Learning outcomes:
• understand the composition of saliva
• define the biochemical mechanisms of buffering

• explain the role of saliva in caries development
• explain the caries-protective effects of saliva

P5. Factors involved in caries development. Epidemiology of caries.
Learning outcomes:

- describe historical theories of caries development
- explain the role of diet in caries development
- understand and explain methods of recording the global prevalence of caries
- describe the contemporary theory of dental caries development

P6. Oral microflora. Dental deposits: pellicle, materia alba, dental plaque and calculus.
Learning outcomes:
• define the microbial aetiological agents of dental caries
• explain the formation, structure, composition and properties of dental biofilm
• define the cariogenic properties of bacteria in dental biofilm
• understand the mechanisms of dental plaque formation
• describe the structure and composition of dental plaque
• describe the structure and composition of dental calculus

P7. Physicochemical processes in a carious lesion
Learning outcomes:
• explain the chemical processes involved in the development of a carious lesion
• define the stages of carious lesion development
• define the differences between enamel and dentin caries development

P8. Histopathological features and classification of caries
Learning outcomes:
• define the histopathological zones of dental caries
• define the histopathological classification of dental caries
• describe the composition of the zones of enamel and dentin carious lesions

P9. Clinical presentation and diagnosis of caries.
Learning outcomes:
• define the causes of dental caries
• explain the consequences of caries and the clinical appearance of affected teeth
• define the clinical classification of caries
• describe the appearance of caries at different stages of progression
• describe the clinical appearance of caries on different tooth surfaces

P10. Classification of carious lesions (Black, ICDAS II, ICCMS).
Learning outcomes:
• define the available diagnostic procedures for caries detection
• explain the mechanisms used to diagnose carious lesions

P11. Caries risk assessment and treatment planning.
Learning outcomes:

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• define the available diagnostic procedures for caries detection
• explain the mechanisms used to diagnose carious lesions
• define the levels of risk for carious lesion development
• define aetiological factors and their role in assessing the risk of new caries or progression of existing lesions

P12. Prevention of dental caries: biochemical and clinical approaches.
Learning outcomes:

- define procedures used in the non-operative approach to dental caries prevention
- define procedures used in the operative approach to dental caries prevention
- understand and explain the mechanisms of action of preventive procedures
- define procedures used in the operative approach to dental caries prevention
- understand and explain the advantages and disadvantages of operative preventive procedures

List of seminars with descriptions:

S1. Clinical and histopathological features of caries
Learning outcomes:

- describe the clinical appearance of different carious lesions
- describe the zones of dentin and enamel caries

S2. The role of dental plaque in caries development and its control.
Learning outcomes:

- explain the role of dental plaque in caries development
- describe measures for dental plaque control

S3. Clinical diagnosis of caries
Learning outcomes:

- describe clinical procedures for diagnosing dental caries
- explain how clinical diagnostic procedures work

S4. Prevention of dental caries
Learning outcomes:

- define the concept and importance of dental caries prevention;
- explain the influence of dietary habits and the frequency of fermentable carbohydrate intake on caries development;
- describe the mechanism of the preventive action of fluorides;
- explain the role of pit and fissure sealing in the prevention of occlusal caries;
- recognise the importance of saliva and the protective factors of the oral cavity in maintaining the balance between demineralisation and remineralisation;
- select appropriate preventive procedures according to the patient's age, health status and individual caries risk

S5. Risk factors for caries development.
Learning outcomes:

- define factors involved in caries development
- describe the interaction of factors involved in dental caries development

S6. Radiographic appearance of caries
Learning outcomes:

- explain the role of radiographic diagnostics in the detection of carious lesions;
- recognise the radiographic appearance of proximal, occlusal, cervical and root caries;
- distinguish the radiographic appearance of caries in enamel and dentin;
- differentiate between initial, moderate and advanced carious lesions;
- select the appropriate radiographic method for caries diagnosis;
- explain the advantages and limitations of bitewing, periapical and panoramic radiographs in caries detection;
- differentiate a carious lesion from anatomical structures, artefacts and other radiolucent changes;
- correlate radiographic findings with information obtained through clinical examination;
- assess the need to monitor or treat a carious lesion based on clinical and radiographic findings;

S7. Patients at risk of caries
Learning outcomes:

- define the concept of a patient at risk of caries;
- recognise factors that increase the risk of caries development and progression;
- identify groups of patients with an increased caries risk;
- explain the influence of salivary flow, oral hygiene, dietary habits, fluoride exposure and general health on caries development;
- differentiate approaches for patients at low, moderate and high caries risk;
- propose individualised preventive measures for a patient at risk of caries;
- develop a basic plan for monitoring, follow-up and reassessment of caries risk;

S8. Epidemiology of dental caries
Learning outcomes:

- explain methods for analysing the data obtained
- explain the significance of the results of epidemiological analysis

List of practical sessions with descriptions:

Practical sessions for the Cariology course are held at the Faculty of Dental Medicine. Before attending individual practical sessions, students are required to acquire and demonstrate the theoretical knowledge that they will apply in practical work with one another. During the practical sessions, students will acquire the knowledge and skills required to identify initial and advanced carious lesions and to develop a treatment plan involving preventive procedures.

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Student obligations:

Students are required to attend regularly and participate actively in all forms of teaching. Theoretical knowledge prepared according to the lecture topics is mandatory for participation in seminars and practical sessions.
Students may be absent from no more than 20% of each form of teaching, provided that the reason is justified. Absence exceeding 20% of any form of teaching, regardless of the reason, prevents the student from taking the final examination and requires re-enrolment in the course in the following academic year.
Two failing grades (C) obtained during practical sessions or seminars prevent the student from taking the final examination and require re-enrolment in the course in the following academic year.

Examination (method of taking the examination, description of the written/oral/practical component, scoring method and assessment criteria):

Student evaluation is conducted according to the current Ordinance on Studies of the University of Rijeka (approved by the Senate).
Students' work is evaluated and graded during the course and in the examination held after completion of the course.

Completion of all course obligations is a prerequisite for taking the final examination. The final examination is written and consists of open-ended questions and/or multiple-choice questions.

Determination of the final grade:

The final grade is determined from the average grade achieved in practical sessions (20%), seminars (10%) and the final examination (70%). Of a total of 100 assessment points, a student may earn a maximum of 20 points in practical sessions, 10 points through seminar activity and 70 points in the final examination.

To pass the course, a student must earn at least 10 assessment points (50%) from practical work and at least 5 assessment points from seminar activity. Seminar work is an active component of teaching and requires mandatory theoretical preparation. Each student must give one PowerPoint presentation and/or oral presentation before the final examination; it will be assessed.

To pass the final examination, a student must earn at least 50% of the total available assessment points.

Assessment of practical sessions:

Theoretical and practical knowledge is assessed continuously during practical sessions. The average grade is calculated as follows:

Average grade for an individual practical session (A–C)	Average numerical grade for an individual practical session (5–1)	Overall average grade for all practical sessions	Number of assessment points
A	5	4,5- 5	20
A/B	4	3,5- 4,49	17
B	3	2,50- 3,49	13
B/C	2	2- 2,49	10
C	1	0- 1,99	0

Assessment of the final examination (70 points)

Determination of the final grade:

Points earned during the semester are added to the points earned in the final examination. Based on the total number of points, students are graded as follows:

0–49.9% fail (1) F

50–59.9% sufficient (2) D

60–74.9% good (3) C

75–89.9% very good (4) B

90–100% excellent (5) A

The numerical grading system corresponds to the ECTS grading system as follows: A – excellent (5), B – very good (4), C – good (3), D – sufficient (2), F – fail (1).

Passing the CARIOLOGY examination is a PREREQUISITE for enrolment in the RESTORATIVE DENTAL MEDICINE I course in the third year of study.

Other course-related notes important for students:

Any use of another person's text or other form of copyrighted work, as well as the use of AI tools, without clear and unambiguous citation of the source is considered an infringement of copyright and the principles of academic integrity. It constitutes a serious breach of student obligations and entails disciplinary liability and measures in accordance with the Regulations on the Disciplinary Liability of Students. Audio/video recording and photography are prohibited in all forms of teaching.
Office hours: by prior arrangement via e-mail at jelena.vidas@fdmri.uniri.hr

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COURSE SCHEDULE (for the 2026/2027 academic year)

Date	Lectures (time and venue)	Seminars (time and venue)	Practical sessions (time and venue)	Instructor
19.10.26.	L1 L2 L3 L4 L5 (9.00-12.45) Lecture room, Krešimirova 42			Assoc. Prof. Jelena Vidas Hrstić Assoc. Prof. Ivana Vidović Zdrilić Prof. Miranda Muhvić Urek
26.10.26.	L6 L7 L8 (9.00-11.15)	S1 S2 (11.15-12.45)		Assoc. Prof. Jelena Vidas Hrstić
2.11.26.	L9 L10 (9.00-10.30)	S3 S4 S5 (10.30-12.45)		Assoc. Prof. Jelena Vidas Hrstić Prof. Alen Braut PhD, Elvis Božac, DMD
9.11.26.	L11 L12 (9.00-10.30) Lecture room, Krešimirova 42	S6 S7 S8 (10.30-12.45)		Prof. Alen Braut Assoc. Prof. Jelena Vidas Hrstić
20.11.26.			V1 V2 V3 V4 V5 (9.00-12.45)	PhD, Elvis Božac, DMD
27.11.26.			V6 V7 V8 V9 V10 (9.00-12.45)	PhD, Elvis Božac, DMD

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List of lectures, seminars and practical sessions:

	LECTURES (lecture topic)	Number of teaching hours	Venue
P1	Tooth development and the origin of formative tissues	1	Krešimirova 42
P2	Morphological and structural abnormalities of dental hard tissues	1	Krešimirova 42
P3	Physical and chemical damage to dental hard tissues. Response of the pulp–dentin complex to stimuli.	1	Krešimirova 42
P4	The oral cavity. The role of saliva in caries development.	1	Krešimirova 42
P5	Factors involved in caries development. Epidemiology of caries.	1	Krešimirova 42
P6	Oral microflora. Dental deposits: pellicle, materia alba, dental plaque and calculus.	1	Krešimirova 42
P7	Physicochemical processes in a carious lesion	1	Krešimirova 42
P8	Histopathological features of caries; histopathological classification of caries	1	Krešimirova 42
P9	Clinical presentation and clinical classification of caries.	1	Krešimirova 42
P10	Diagnosis of dental caries (Black, ICDAS II, ICCMS).	1	Krešimirova 42
P11	Caries risk assessment.	1	Krešimirova 42
P12	Prevention of dental caries: biochemical and clinical approaches.	1	Krešimirova 42
	Total number of lecture hours	12	

	SEMINARS (seminar topic)	Number of teaching hours	Venue
S1	Clinical and histopathological features of caries.	1	Krešimirova 42
S2	The role of dental plaque in caries development and its control.	1	Krešimirova 42
S3	Clinical diagnosis of caries	1	Krešimirova 42
S4	Prevention of dental caries	1	Krešimirova 42
S5	Risk factors for caries development.	1	Krešimirova 42
S6	Radiographic appearance of caries	1	Krešimirova 42
S7	Patients at risk of caries	1	Krešimirova 42
S8	Epidemiology of dental caries	1	Krešimirova 42
	Total number of seminar hours	8	

	PRACTICAL SESSIONS (topic)	Number of teaching hours	Venue
V1	Initial examination and demonstration exercises	1	Krešimirova 42
V2	Initial examination and dental status	1	Krešimirova 42

V3	Caries diagnosis	1	Krešimirova 42
V4	Caries diagnosis	1	Krešimirova 42
V5	Caries diagnosis	1	Krešimirova 42
V6	Caries diagnosis	1	Krešimirova 42
V7	Caries diagnosis	1	Krešimirova 42
V8	Caries diagnosis	1	Krešimirova 42
V9	Caries diagnosis	1	Krešimirova 42
V10	Caries diagnosis	1	Krešimirova 42
	Total number of practical-session hours	10	

	EXAMINATION DATES (final examination)
1.	1.12.2026.
2.	15.12.2026.
3.	12.1.2027.

Course				
Form of teaching	Lectures	Seminars	Practical sessions	total
Total number of hours	12	8	10	30
Number of online hours				
Percentage of online teaching	0%	0%	0%	0%