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
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Course: Orthodontics I
Course Coordinators: Assistant Professor Magda Trinajstić Zrinski, PhD
Course Collaborators: Professor Stjepan Špalj, MSc, PhD; Visiting professor Vaska Vandevska-Radunović, Matea Badnjević, DMD; Matea Tomljanović, DMD
Department: Department of Orthodontics
Study program: University Integrated Undergraduate and Graduate Study of Dental Medicine (in English)
Study year: 4th
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 course **Orthodontics I** is a compulsory course in the first year of the Integrated Undergraduate and Graduate University Study of Dental Medicine and consists of 15 hours of lectures and 45 hours of practicals, totaling 60 hours (4 ECTS). The course is delivered in the premises of the Faculty of Dental Medicine and via e-course on the Merlin platform.

The aim of the course is to educate students on the growth and development of the craniofacies and the dentition, on preclinical orthodontic procedures and on the design and manufacture of removable and fixed orthodontic appliances.

The content of the course is as follows:
Growth and development of the craniofacies and the dentition. Methods of following growth and development. Key of occlusion. Malocclusions – clinical presentation. Taking impressions and manufacture of plaster casts. Design and laboratory fabrication of retention clasps, labial arch and springs. The design and positioning of screws. Polymerization techniques for the manufacturing of orthodontic appliances. The manufacturing of vacuum-formed appliances. Soldering and brazing. Construction of fixed appliances. Polishing of removable orthodontic appliances. Bite templates and the fixator. Philosophy and neurophysiology of the construction bite.

Classes:
Classes are held in the form of lectures and practicals. During the practicals, the lecturer supervises the students' independent work and encourages them to discuss the theme of the present practical. Students are required to attend the praticals wearing adequate working uniforms. They are also required to prepare for the practicals by reading the recommended literature. Additional forms of teaching include independent tasks, education using multimedia and the Internet as well as mentor work. Tests will be held during the lessons. After the end of the lessons a practical test, as well as a final exam will be held. By completing all the assignments and the exam, the student acquires 3 ECTS points.

Assigned reading:

- Littlewood SJ, Mitchell L. An introduction to orthodontics. 5th ed. London: Oxford University Press; 2019
- Proffit, W.R. Contemporary Orthodontics. Philadelphia: Elsevier; 2019. (Section I and II, pp. 3-161)

Optional/additional reading:

- Georgieva Gurgurieva, V. Orthdontic Syllabus for Students. Sofia: Medical University of Sofia; 2014.
- Bishara SE. Textbook of orthodontics. Philadelphia: WB Saunders Company; 2001. (Section I. Growth and development, pp. 1-98.
- Wirtz U. Atlas of orthodontic and orofacial orthopedic technique. Ispringen: Dentaurum; 2007.

COURSE TEACHING PLAN:

The list of lectures (with topics and descriptions):

L1 Introduction to orthodontics and classification of malocclusion
Define the scope of orthodontics. Define malocclusion.
L2 Keys of occlusion, class I normal occlusion and malocclusion
Name Andrews' six keys of occlusion and explain their importance, define normal occlusion in class I, and describe class I malocclusions.
L3 Etiology of malocclusion
Discuss the factors that lead to the development of malocclusion and the possibilities of prevention. Analyze the role of general and local factors in the development of malocclusion.
L4 Prenatal growth and development of the head and face
Describe the growth of the craniofacial region in utero.
L5 Concepts of growth and development and postnatal craniofacial growth
Explain the theories and mechanisms of growth and development of the craniofacial region. Describe the postnatal growth and development of the head and face.
L6 Development of the dentition, dental arches, and occlusion
Define intermaxillary relationships during the phase of edentulous alveolar ridges
Describe the appearance and characteristics of the primary dentition. Recognize the risky primary dentition. Describe the characteristics of the mixed dentition. Distinguish the early and late mixed dentition and recognize physiological processes in tooth positioning during the change of dentition. Discuss the chronology of the change of dentition.
Define the characteristics of the permanent dentition.
L7 Orthodontic appliances
Analyse the types of orthodontic appliances.
L8 Problems of space
Define and describe the prevalence, etiology, characteristics, and classification of crowding; recognize it on a cast.
Define and describe the prevalence, etiology, characteristics, and classification of spacing; recognize it on a cast.
L9 Sagittal malocclusions – Class II/1
Define and describe the prevalence, etiology, characteristics, and classification of Class II/1; list diagnostic procedures; recognize the malocclusion on a cast.
L10 Sagittal malocclusions – Class II/2
Define and describe the prevalence, etiology, characteristics, and classification of Class II/2; list diagnostic procedures; recognize the malocclusion on a cast.
L11 Sagittal malocclusions – Class III

Define and describe the prevalence, etiology, characteristics, and classification of Class III malocclusions; list diagnostic procedures; recognize the malocclusion on a cast.

L12 Transverse malocclusions

Define and describe the prevalence, etiology, characteristics, and classification of crossbite; list diagnostic procedures; recognize the anomaly on a cast; list possible treatment options.

L13 Vertical malocclusions – open bite

Define and describe the prevalence, etiology, and characteristics of open bite; list diagnostic procedures; recognize the malocclusion on a cast.

L14 Vertical malocclusions – deep bite

Define and describe the prevalence, etiology, and characteristics of deep bite; list diagnostic procedures; recognize the malocclusion on a cast.

The list of seminars with descriptions:

The list of practicals with descriptions:

P1 Impression procedures and casts

Obtain the skill of taking orthodontic impressions and scans. Define and describe plaster casts and digital casts in orthodontics.

P2 Analysis of plaster casts – tooth position

Define and describe the types of tooth malposition. Understand the relationship between tooth malposition and malocclusion.

P3 Analysis of plaster casts in three dimensions

Recognize malocclusions on plaster casts in three dimensions.

P4 Basics of radiologic cephalometry

Describe the process of recording the lateral cephalogram

Know the principal sagittal, vertical and incisor-related cephalometric parameters.

P5 Cephalometric following of growth

Recognize the importance of superimposition of lateral cephalograms for following the the growth and for assessing orthodontic treatment results.

Know the superimposition according to Pancherz.

P6 Analysis of the orthopantomogram

Describe skeletal and dental structures and recognize anomalies of the number of teeth on the orthopantomogram.

P7 Differences between primary and permanent teeth on plaster casts

Distinguish primary and permanent teeth on plaster casts.

P8 Estimates of dental and skeletal age

Determine the dental age by analysing the orthopantomogram. Determine skeletal maturity by analysing cervical vertebrae.

P9 Plate appliances – techniques of manufacture and recognition

Describe the different parts of the plate appliance. Describe the techniques of manufacturing plate appliances.

P10 Functional appliances. Manufacturing the bite template and production of the construction bite.

Produce the bite template and the construction bite for manufacturing an orthodontic functional appliance. Describe various functional appliances and their elements.

P11 Appliances produced by soldering and brazing – demonstration, recognizing the appliances

Describe the laboratory procedure of manufacturing metal appliances (Hyrax, Quad helix, transpalatal arch, lingual arch). Recognize the different appliances.

P12 Vacuum-formed thermoplastic appliances - demonstration, recognizing the appliances

Describe the laboratory procedure of manufacturing metal appliances (aligner, Essix retainer, positioner). Recognize the different appliances.
P13 Bonding of brackets on a cast.
Describe the activity of the fixed continuous appliance.
Determine the phases of direct bonding of the fixed continuous appliance.
P14 Preventive and interceptive appliances and selective interproximal reduction
Define and describe the preventive and interceptive orthodontic appliances. Describe the indications for selective interproximal reduction of primary teeth and its purpose.

Students' obligations:

Students are required to attend regularly and participate actively in all forms of education. The practical test and final exam are mandatory. The student may be absent from 30% of the teaching exclusively for health reasons, which needs to be corroborated by a doctor's note. Attendance of the lectures is mandatory. The student may compensate for the absence by a previous arrangement with the course coordinator. If the student is absent from more than 30% of the teaching, he or she cannot continue following the course and is not allowed to participate at the final exam. This equals to 0 ECTS credits and an F grade.

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

ECTS credit grading system:
Student assessment is carried out according to the current Regulations on Studies of the University of Rijeka. Student work will be evaluated and graded during classes and at the final exam. Out of a total of 100 grade points, a student can achieve 50 points during classes and another 50 points on the exam.
Student assessment is performed using ECTS (A-F) and number system (5-1). Grading in the ECTS system is performed by absolute distribution.

Students who gain from 0 to 24.9% of grades that could be obtained during classes through forms of continuous monitoring and evaluation of students are graded F (unsuccessful), cannot gain ECTS credits and must re-enroll the course.
The student gains grades by actively participating in classes and performing the set tasks and attending the colloquiums in the following manner:

<u>During the classes, the the evaluation is carried out by (maximum up to 50 points):</u>

a) a written colloquium (up to 25 points)
b) a practical colloquium (up to 25 points)

a) Written colloquium (up to 25 points)
During the classes all students are required to attend a written colloquium in which that may gain a maximum of 25 points. The grading is performed by multiplying the resolution ratio with a weight of 0.25, while the threshold for passing the colloquium is 50%.

b) Practical colloquium (up to 25 points)
During classes all students all students are required to attend a practical colloquium in which that may gain a maximum of 25 points. The coordinator will grade the acquired knowledge and skills of the student with points in the following manner:

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grade	scalar points
2	12.5
2-3	15
3	17
3-4	19
4	21
4-5	23
5	25

Final exam (total 50 points)

Who can take the final exam:
Students who have achieved 50% and more grade points during classes through forms of continuous monitoring and evaluation of students.

Who cannot take the final exam:
Students who achieved from 0 to 49,9% of grades during classes are graded F (unsuccessful), cannot gain ECTS credits and must re-enroll in the course.

A maximum of 50 points may be gained in the final exam (range from 25 to 50).

The grading of the final exam in points is as follows:

grade	scalar points
2	25
2-3	29
3	33
3-4	37
4	42
4-5	46
5	50

To pass the final exam and for the final grade (including the addition of previously achieved grade points during classes), the student must have a positive grade in the final exam and achieve a minimum of 50% of points.

Assessment in the ECTS system is performed by absolute distribution, i.e. on the basis of the final achievement:
A– 90-100% points
B – 75-89,9 %
C – 60-74,9 %
D -- 50-59,9%
F – 0-49,9%

Grades in the ECTS system are transformed into a numerical system as follows:
A = excellent (5)
B = very good (4)
C = good (3)
D = sufficient (2)

F = insufficient (1)

Other important information regarding to the course:

Any use of another person's text or other form of copyrighted work, as well as the use of ChatGPT or any other tool based on artificial intelligence technology, without clear and unambiguous citation of the source, shall be considered a violation of copyright and the principles of academic integrity. Such conduct constitutes a serious breach of student obligations and entails disciplinary responsibility and disciplinary measures in accordance with the Regulations on Student Disciplinary Responsibility.
Teaching content and all information related to the course as well as exam dates can be found on the e-course on the Merlin platform.
Consultations: Wednesdays at 14:00

COURSE SCHEDULE (for the academic year 2025/2026)

Date	Lectures (time and place)	Seminars (time and place)	Practicals (time and place)	Instructor
24.02.2026.			P1 D (8.00–10.15) P1 E (10.15–12.30) Krešimirova 42	Matea Badnjevic, DMD
03.03.2026.			P2 D (8.00–10.15) P2 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
06.03.2026.	L1 (12.30–13.15) Krešimirova 40			Asst Prof Magda Trinajstić Zrinski
06.03.2026.	L2 (13.15–14.00) Krešimirova 40			Asst Prof Magda Trinajstić Zrinski
10.03.2026.			P3 D (8.00–10.15) P3 E (10.15–12.30) Krešimirova 42	Matea Badnjevic, DMD
17.03.2026.			P4 D (8.00–10.15) P4 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
20.03.2026.	L3 (12.30–13.15) Krešimirova 40			Prof Stjepan Špalj
20.03.2026.	L4 (13.15–14.00) Krešimirova 40			Prof Stjepan Špalj
24.03.2026.			P5 D (8.00–10.15) P5 E (10.15–12.30) Krešimirova 42	Matea Badnjevic, DMD
31.03.2026.			P6 D (8.00–10.15) P6 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
03.04.2026.	L5 (12.30–13.15) Krešimirova 40			Asst Prof Magda Trinajstić Zrinski

03.04.2026.	L6 (13.15–14.00) Krešimirova 40			Asst Prof Magda Trinajstić Zrinski
07.04.2026.			P7 D (8.00–10.15) P7 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
14.04.2026.			P8 D (8.00–10.15) P8 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
17.04.2026.	L7 (12.30–13.15) Krešimirova 40			Prof Stjepan Špalj
17.04.2026.	L8 (13.15–14.00) Krešimirova 40			Prof Stjepan Špalj
21.04.2026.			P9 D (8.00–10.15) P9 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
28.04.2026.			P10 D (8.00–10.15) P10 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
	L9 asynchronous webinar			Asst Prof Magda Trinajstić Zrinski
	L10 asynchronous webinar			Asst Prof Magda Trinajstić Zrinski
05.05.2026.			P11 D (8.00–10.15) P11 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
12.05.2026.			P12 D (8.00–10.15) P12 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
15.05.2026.	L11 (12.30–13.15) Krešimirova 40			Prof Stjepan Špalj
15.05.2026.	L12 (13.15–14.00) Krešimirova 40			Prof Stjepan Špalj
19.05.2026.			P13 D (8.00–10.15) P13 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
26.05.2026.			P14 D (8.00–10.15) P14 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD
29.05.2026.	L13 (12.30–13.15) Krešimirova 40			Asst Prof Magda Trinajstić Zrinski
29.05.2026.	L14 (13.15–14.00) Krešimirova 40			Asst Prof Magda Trinajstić Zrinski
02.06.2026.			P15 D (8.00–10.15) P15 E (10.15–12.30) Krešimirova 42	Matea Tomljanovic, DMD

List of lectures, seminars and practicals:

	LECTURES (Topics)	Teaching hours	Location/Lecture room
L1	Introduction to Orthodontics and Classification of Malocclusions	1	Krešimirova 40
L2	Keys to Ideal Occlusion, Class I Normal Occlusion and Malocclusion	1	Krešimirova 40
L3	Etiology of Malocclusions	1	webinar
L4	Prenatal Growth and Development of the Head and Face	1	Krešimirova 40
L5	Concepts of Growth and Development and Postnatal Craniofacial Growth	1	Krešimirova 40
L6	Development of the Dentition, Dental Arches and Occlusion	1	Krešimirova 40
L7	Orthodontic Appliances	1	Krešimirova 40
L8	Problems of Space	1	Krešimirova 40
L9	Sagittal Malocclusions – Class II/1	1	webinar
L10	Sagittal Malocclusions – Class II/2	1	webinar
L11	Sagittal Malocclusions – Class III	1	Krešimirova 40
L12	Transverse Malocclusions	1	Krešimirova 40
L13	Vertical Malocclusions – Open Bite	1	Krešimirova 40
L14	Vertical Malocclusions – Deep Bite	1	Krešimirova 40
	TOTAL TEACHING HOURS	**14**	

	SEMINARS (Topics)	Teaching hours	Location/Lecture room
	TOTAL TEACHING HOURS		

	PRACTICALS (Topics)	Teaching hours	Location/Lecture room
P1	Impression procedures and casts	3	Krešimirova 40
P2	Analysis of plaster casts – tooth position	3	Krešimirova 40
P3	Analysis of plaster casts in three dimensions	3	Krešimirova 40
P4	Basics of radiologic cephalometry	3	Krešimirova 40
P5	Cephalometric following of growth	3	Krešimirova 40
P6	Analysis of the orthopantomogram	3	Krešimirova 40
P7	Differences between primary and permanent teeth on plaster casts	3	Krešimirova 40
P8	Estimates of dental and skeletal age	3	Krešimirova 40

P9	Plate appliances – techniques of manufacture and recognition	3	Krešimirova 40
P10	Functional appliances. Manufacturing the bite template and production of the construction bite.	3	Krešimirova 40
P11	Appliances produced by soldering and brazing – demonstration, recognizing the appliances	3	Krešimirova 40
P12	Vacuum-formed thermoplastic appliances - demonstration, recognizing the appliances	3	Krešimirova 40
P13	Bonding of brackets on a cast.	3	Krešimirova 40
P14	Preventive appliances and selective interproximal reduction	3	Krešimirova 40
P15	interceptive appliances and selective interproximal reduction	3	Krešimirova 40
	TOTAL TEACHING HOURS	**45**	

	FINAL EXAM DATES
1.	12.6.2026.
2.	26.6.2026.
3.	10.7.2026.
4.	11.9.2026.

	Lectures	**Seminars**	**Practicals**	**Total**
Total number	14	0	45	59
On-line	2	0	0	2
Percentage	14%	0%	0%	3%