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: Histology with Embryology**
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**Department: Department for Histology and Embryology**
**Study program: University Integrated Undergraduate and Graduate Study of Dental Medicine** (in English)
**Study year: First**
**Academic year: 2025/26**

# SYLLABUS

**Course description (a brief description of the course, general instructions, locations and types of lessons, necessary equipment, instructions for attendance and preparation for classes, student obligations, etc.):**

Histology with Embryology is a mandatory course during the first year of the Integrated Undergraduate and Graduate University Study of Dental Medicine in English. It consists of 40 hours of lectures, 40 hours of seminars, and 40 hours of practical laboratory classes, overall, 120 hours (8 ECTS). Lectures are held in lecture halls of the Faculty of Medicine according to the course schedule. Seminars and practical laboratory classes are held at the Department of Histology and Embryology.

**Course objectives**

Histology is a fundamental field of medicine that focuses on the microscopic structure of the human body, including cells (cytology) and tissues, as well as the fine details of organs (microscopic anatomy). It plays a crucial role in providing a basic understanding of normal structures, which is essential for interpreting physiological functions and recognizing pathophysiological changes. Special emphasis is placed on the structure of the oral cavity and teeth. Closely related to histology, embryology explores the development of the embryo from the zygote to birth, with particular focus on morphogenesis during organ formation and the molecular basis of differentiation. Understanding these developmental processes is vital for clinicians, as it helps explain congenital malformations and developmental anomalies, especially those affecting the face and teeth. Together, histology and embryology offer significant practical value in clinical practice and the study of disease mechanisms at the microscopic level.

**Expected course learning outcomes**

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Upon successful completion of this course, students will be able to:

- Demonstrate a solid understanding of human histology and embryological development, with the ability to correlate microscopic structures with their physiological functions.
- Explain how cells are organized into tissues and how these tissues integrate to form functional organs.
- Apply microscopy skills to analyze and interpret histological slides of cells, tissues, and organs using light microscopy.
- Utilize foundational knowledge in biochemistry, biology, and anatomy to deepen their understanding of the normal microscopic architecture of the human body.
- Identify, describe, and distinguish between various tissue types and organs based on cellular composition and tissue arrangement.
- Outline and explain key developmental processes, including implantation, organogenesis, and the formation of the face and teeth, with attention to both normal and abnormal (congenital) patterns.

**Course content:**

The primary role of histology in the medical curriculum is to provide a basic understanding of the function of the human body based on its microscopic structure. Emphasis is placed on the normal structure as a basis for proper functioning and for understanding pathophysiological processes.

**Histology part includes the following topics:**

The basic tissues – organization and microscopic structure of cells and extracellular substance in the epithelial and connective tissues, muscle tissues and nervous tissue.

Organ system histology - circulatory system, immune system, endocrine glands, respiratory system, digestive tract and associated glands, urinary system, reproductive system, special senses.

**Embryology part cover following topics:**

Fertilization, cleavage, gastrulation and formation of primary germ layers; differentiation of primary germ layers and organogenesis; fetal membranes and placenta. Periods of intrauterine development, development of the face and oral cavity, development of the temporo mandibular joint, birth defects.

**Part about the teeth:**

Microscopic structure of enamel, dentin-pulp complex, cementum, periodontal ligament, bony socket, and gingiva. Early development of teeth (bud, cap, bell) formation and characteristics of ameloblasts, odontoblasts, cementoblast; the formation of mineralized parts of teeth, amelogenesis, dentinogenesis, cementogenesis, development of periradicular tissues and gingiva. Physiological tooth movements: eruption and shedding.

**Assigned reading:**

T.W.Sadler: Langman's Medical Embryology, XIV edition, Wolters Kluwer Health, Philadelphia,2022.

A.L. Mescher.: Junqueira's Basic Histology, XVI edition, The McGraw –Hill Education, New York 2021.

Nanci A. Ten Cate's Oral Histology. IX edition, Elservier, 2018.

**Optional/additional reading:**

https://www.anatomicum.com/en/?articleid=58
http://microanatomy.net/digestive/tooth.htm
http://www.uky.edu/~brmacp/oralhist/html/ohtoc.htm
http://www.histologyguide.com/index.html

**COURSE TEACHING PLAN:**

**The list of lectures:**

1. **Importance of histology**
   To understanding the aim of the course. To recognize the role of Histology as a foundation for subsequent studies in pathology and physiology
2. **Epithelial tissue**
   To define the microscopic structure and function of epithelial cells. To describe characteristic features of various types of epithelia
3. **Connective tissue**
   To explain the types, characteristics, and functions of connective tissue. To describe and to define cells and ground substance (fibers and basic substances) of connective tissue proper, and connective tissues with special properties. .
4. **Blood**
   To define the specifics of microscopic and sub-microscopic blood cells (erythrocytes, leukocytes, and platelets) and blood plasma. To adopt criteria for classification of blood cells based on their morphology.
5. **Cartilage and joints**
   To explain the classification, characteristics, and functions of supporting connective tissue. To define the ECM of different types of cartilage tissue. To explain the growth and healing processes of cartilage tissue damage. To explain the histological characteristics of joints.
6. **Bone**
   To explain the classification, characteristics, and functions of supporting connective tissue. To define the specifics of cells and bone matrix. To explain the characteristics of primary and secondary bone tissue with respect to their histological properties
7. **Osification**
   To explain the processes of intramembranous and endochondral ossification. To describe features of fracture bone remodeling and repair.
8. **Nerve tissue**
   To explain the classification, characteristics, and functions of nerve cells (neurons and glial cells). To explain the processes of central and peripheral myelination. To define the cells and interstitial substances of certain parts of the central and peripheral nervous system (big and small brain, spinal cord, ganglia, peripheral nerves). To explain the ultrastructure of nerve cells, the ability to transmit signals and the structure of the synapse. To describe the histological structure of the meninges and the blood-brain barrier.
9. **Muscle tissue**

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To explain the classification, characteristics, and functions of three types of muscle tissue. To define cellular and ECM properties of smooth, skeletal, and cardiac muscle. To explain the ultrastructure of muscle fibers and morphological conditions for the possibility of contraction.

10. **Circulatory system**
    Be able to describe the histological structure of the walls of the heart, arteries, and veins, as well as the characteristics of their individual layers.
    Understand the classification of blood capillaries based on their microscopic structure.
11. **Endocrine system**
    To describe the classification, characteristics, and functions of the endocrine system. To define the specificity of the histological structure of certain endocrine glands, including the pituitary gland, epiphysis, thyroid, parathyroid glands and adrenal glands
12. **Immune system**
    To explain the characteristics and functions of the immune system. To define the histological structure of the thymus, lymph nodes, spleen, and tonsils.
13. **Urinary system**
    To explain the basic characteristics of the structure and function of the urinary system. To define the peculiarities of the kidney structure, especially the cortex, the ureter, the bladder, the male and female urethra. To describe parts of the nephron.
14. **Male reproductive system**
    To define the specifics of the histological structure of testes, epididymis and accessory glands. To understand and explain the processes of gametogenesis and spermatogenesis.
15. **Female reproductive system**
    To define and explain the histological features of the ovary, fallopian tube, uterus, and vagina during different stages of a woman's life. To learn, understand and know to explain the female reproductive cycles.Understand and explain the histological changes in the female reproductive organs during the reproductive (generative) period of a woman's life. To explain the functional stages of the female mammary glands.
16. **Introduction to embryology, fertilization, 1st and 2nd week of development**
    To learn the purpose of embryology and the fundamental developmental processes (proliferation, migration, induction, differentiation, and programmed cell death).
    Understand the difference between spermatogenesis and oogenesis.
    Explain the key characteristics of fertilization and implantation, as well as the sequence of events during the first two weeks of intrauterine development.
17. **3rd week of development, Gastrulation, Neurulation, embryonic period**
    Learn the characteristics of changes occurring during the third week (gastrulation) and the fourth week of embryonic development (neurulation, somitogenesis, and the derivatives of the germ layers).
18. **Fetal Period and Body Cavities**
    Understand the characteristics of the fetal stage of development. Learn the changes in shape and position of various body parts during fetal folding and the formation of the four major body cavities.
19. **Fetal membranes**
    Acquire knowledge about the development and function of the embryonic membranes: trophoblast, amnion, chorion, and yolk sac.

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Understand the development, structure, and function of the placenta, amniotic sac, and umbilical cord during different stages of pregnancy.

20. 21.**Development of the head**
Explain the formation of the head and the development and differentiation of the pharyngeal (branchial) arches. Understand the relationships and interactions between the germ layers. Describe the development of the stomodeum and the migration of neural crest cells. Provide a detailed description of the development of the face, oral and nasal cavities, tongue, jaws, and the temporomandibular joint.

**22. Birth defects**
Describe the most common developmental anomalies, with an emphasis on facial and dental anomalies. List the most common teratogenic factors and explain their mechanisms of action.Understand and explain the potential causes of congenital anomalies and clinically significant disorders arising during development.

**23. Respiratory system**
To define histological characteristics of parts forming the respiratory system (respiratory and olfactory region of the nose, paranasal sinuses, lungs, bronchi, bronchioles, alveoli). To understand and explain the structure and function of the blood-air barrier.

**24. Sensory organs: Skin**
To describe the structure and function of thin and thick skin layers. To understand and explain the structure of the skin glands and sensory receptors. To describe the main features of hair and nails.

**25. Sensory organs: Eye**
To define the peculiarities of the histological structure of the individual structures of the eye. To understand and explain the texture and function of the lens, cilia muscle, and individual parts of the retina.

**26. Sensory organs: Ear**
To define the histological structure of various parts of the external, middle, and internal ear. To understand the function of individual parts of the internal ear.

**27. Digestive system: Oral cavity**
Describe the characteristics of the histological structure of various parts of the oral cavity (lips, cheeks, palate, tongue). Understand and explain the structure of the mucosa in different parts of the oral cavity. Explain the characteristics of the histological structure and the specific features in the structure of the temporomandibular joint.

**28.** 29. **Digestive system: Alimentary canal**
To describe the specifics of the digestive tract. To understand the general structure of the digestive tract and its layers (epithelium, lamina propria, muscularis mucosa, submucosa, muscularis externa, Adventitia or serosa), esophagus, stomach and intestine.

**30.Digestive system: Associated organs**
To describe the specifics of the organs associated with the digestive tract (Salivary glands, Pancreas, Liver, gallbladder). To understand the hepatic blood flow and structure of the liver lobules.

31.32. **Development of the tooth**
Provide an overview and understand the early development of teeth. Clearly define the differences in origin of various cell types and the ectodermal-mesenchymal interactions during the formation of the tooth primordium. Explain the processes of proliferation and morphological shaping through the bud, cap, and bell stages. Understand the processes of

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deposition of the organic matrix and mineral substances during the initial formation of dentin and enamel.

33.34. **Dentin-pulp complex**

Describe the morphological structure of the dental pulp and dentin and explain their interrelationship. Define the differences in chemical composition and physical properties between dentin and pulp and explain the resulting differences in their structure and function.

35. **Enamel**

Describe the morphological structure of enamel. Define and explain the physical and chemical characteristics as prerequisites for its adequate function.

36. **Amelogenesis**

Understand and define the processes of enamel development, formation of enamel prisms, and the method of mineralization. Understand the differentiation and further development of ameloblasts, as well as their numerous functions during crown formation.

37. **Cementum and cementogenesis**

Describe the structure of cementum, as well as the temporal-spatial differences between different types of cementum. Understand the purpose and importance of the proper arrangement of elements in these structures. Understand development of cementum.

38. **Bony socket, PDL**

Explain and understand the structure of the periodontal ligament, its function, and remodeling.

Explain the connection between cementum and the periodontal ligament as well as the alveolar bone tissue. Describe the structure of the bone surrounding the tooth root and its specific features.

39. **Development of the root**

Describe and compare the development of dentin and cementum in the tooth root. Explain the formation of one or multiple roots in multirooted teeth. Understand the purpose and importance of the correct arrangement of elements in the tooth suspension apparatus. Relate the structure of the root to its function.

40. **Eruption of the tooth**

Describe and explain the mechanism of tooth eruption as well as the shedding of primary teeth and their replacement by permanent teeth. Understand the changes occurring under the influence of mechanical forces in various structures of the tooth suspension apparatus. Define the changes that occur over the years in individual dental tissues and understand the mechanisms of their development and potential for recovery.

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**The list of seminars with description:**

During seminars, students discuss in more detail the themes introduced during the lectures. Seminars allow students to be educated further on topics that were made insufficiently clear during lectures. The seminars also introduce the topics that will be addressed during practical laboratory classes. The theoretical knowledge of students is checked during the seminar and students are therefore obliged to come prepared for this form of teaching.

1. **Epithelial tissue**
   To classify and describe the microscopic and submicroscopic structure of epithelial cells. To define the specifics of certain types of glandular epithelia.
2. **Connective tissue, Cartilage**
   To explain the characteristics and functions of connective tissue. To define cells and ECM (fibers and ground substance), connective tissue, and connective tissues with special properties. To define cellular and interstitial parts of different types of cartilage tissue. To explain the growth and healing processes of cartilage tissue damage.
3. **Bone, Osification**
   To define the specifics of cells and ECM of bone tissue. To explain the characteristics of primary and secondary bones with respect to their histological properties. To explain the processes of osteogenesis, the process of fracture healing and bone remodeling.

4. **Nervous tissue**
   To explain the classification, characteristics, and functions of nerve cells (neurons and glial cells). To explain the processes of central and peripheral myelination. To define the cells and interstitial substances of certain parts of the central and peripheral nervous system (big and small brain, spinal cord, ganglia, peripheral nerves). To explain the ultrastructure of the nerve cells, the ability to transmit the signal, and the structure of the synapse. To describe the histological structure of meninges and the blood-brain barrier.
5. **Muscle tissue, Circulatory system**
   To clearly define cellular and interstitial properties of smooth, skeletal, and cardiac muscle tissue. To explain the ultrastructure of muscle cells and morphological conditions required for contraction in all types of muscle tissue. To describe the histological structure of the heart, artery, and vein. To adopt the classification of blood capillaries based on their microscopic structure
6. **Endocrine system**
   To describe the classification, characteristics, and functions of the endocrine system. To define the specificity of the histological structure of certain endocrine glands; pituitary gland, epiphysis, thyroid, parathyroid glands and adrenal glands
7. **Immune system**
   To explain the characteristics and general functions of the immune system. To define the histological structure of the thymus, lymph nodes, spleen, and tonsils.
8. **Urinary and male reproductive system**
   Describe and explain the specific features of the histological structure of the organs of the urinary system. Understand the structure of the nephron and clearly define the characteristics of the transitional epithelium. Define the specific features of the histological structure of the testis, as well as the ducts and glands of the male reproductive system.

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9. **Female reproductive system**
   To learn about sex cycles in males and females. To understand and explain changes in histological structure in the ovaries and uterus that precede the emergence of mature sex cells.
10. **Embryology: Development of the embryo**

Explain the sequence of events during the first week of development of the fertilized egg (zygote, cleavage) and during the second week (implantation, bilaminar embryonic disc) of intrauterine development.Explain the specific features of changes during the third week (gastrulation) and the fourth week of embryonic development (neurulation, somitogenesis, derivatives of germ layers), and describe the changes during the embryonic and fetal p

11. **Embryology: Fetal membranes and placenta**

Acquire knowledge about the origin and function of the embryonic membranes – amnion, chorion, allantois, yolk sac, and amniotic cavity – as well as the placenta. Understand the utero-placental circulation.

12. **Respiratory system**

To define the basics of development and the specifics of the histological structure of the individual parts of the respiratory system (respiratory and nerve region, nose, paranasal sinuses, lungs, bronchi, bronchioles, alveoli). To understand and explain the structure and function of the blood-air barrier.

13. **Skin, Ear**

Define the specific features of the histological structure of thin and thick skin, and become familiar with the structure of hair and nails.
Describe the structure of the external, middle, and inner ear.

14. **Eye**

To define the specifics of the histological structure of the individual structures of the eye. To understand and explain the texture and function of the lens, cilia muscle, and individual parts of the retina

15. **Digestive system: Oral cavity**
    Describe and explain the specific features of the histological structure of various parts of the oral cavity.Describe the development of the oral cavity and neighboring structures.
16. **Development of the tooth**
    Explain the development of primary and permanent teeth. Explain the processes of tooth formation in primary and secondary dentition. Explain the formation of the epithelial lamina and the stages of development of the enamel organ.
17. **Digestive system: Alimentary canal**
    Define the specific histological features of different parts of the digestive tract (esophagus, stomach, small and large intestine).
    Understand and explain the structure and function of the individual layers in various segments of the digestive tract.
18. **Digestive system: Associated organs**
    Describe and explain the histological structure of the major salivary glands, pancreas, and liver. Understand and explain the blood and bile flow within the liver.
19. **Tissues of the tooth**
    Describe the chemical and physical properties of dental tissues that determine their histological structure and morphological characteristics. Relate and explain the structural

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characteristics of different parts of the tooth with their function, and explain the changes that occur with aging

20. **Tooth and associated structures**
    Explain the relationships between different dental tissues, which change depending on the condition and function of the tooth (cementum, periodontal ligament). Relate and explain the structural characteristics of different parts of the tooth with their function, and explain the changes associated with aging (gingiva). Understand and explain the structure and development of the temporomandibular joint.
21. **Characteristic of epithelial tissues**
    Define the microscopic and submicroscopic structural features of epithelial cells.Explain the characteristics of different types of covering (surface) and glandular epithelium.
22. **Characteristic of connective tissues**
    Define the characteristics of the cells and extracellular matrix (fibers and ground substance) of connective tissue in the narrow sense, as well as specialized types of connective tissue.
23. **Cyclic changes in female reproductive organs**
    Become familiar with and acquire knowledge about the ovarian and uterine cycles. Understand and explain the changes in the female reproductive organs during a woman's reproductive age
24. **Dentinogenesis**
    Explain the mechanism of dentin formation. Describe the development of odontoblasts and their function during crown and root formation. Understand and compare the characteristics of enamel and dentin development, the processes of mineralization, and the formation of characteristic structures (e.g., prisms in enamel, tubules in dentin, etc.).
25. **Repetitipon and Consultations**

**The list of practicals with description:**

LPs are preceded by lectures and seminars on this topic. The practical part of the LPs involves an overview of histological images of tissues and organs using microscopes and atlases mentioned in the literature list. To demonstrate their understanding of the images, students will draw the observed structures and discuss them with the teacher and demonstrator. The student is expected to be able to recognize the structures of various tissues and organs in microphotographs, and to relate the observed details to the function of these tissues or organs. Students should be able to extract the important characteristics of an unknown microscopic slide, which will enable them to identify an organ or tissue based on comparison with known structures.

**Students must have the appropriate drawing equipment (wooden pencils of multiple colors), a notebook (without lines), and white coats. Digital tools for drawing (e.g., tablet computers or similar devices) are not allowed**.

Their participation in classes, understanding of the preparations, and their ability to recognize microscopic structures are evaluated in each LP. Thus, the student prepares to pass the Tissue Recognition Test at the end of the course, in which the same materials will be used. A student may miss up to 30% of exercises, but all absences must be made up. Make-up sessions (up to 30%) are organized during the last week of classes. They involve viewing and sketching slides and a theoretical evaluation, which is also confirmed with a signature from the instructor. If a student misses 30% or more of exercises, they lose the right to make up missed sessions and cannot take the final exam.

**Drinking and eating during LP is highly forbidden.**

1. **Epithelial tissue** (dental pulp, kidney, small intestine, esophagus, skin – HE)
2. **Connective tissue, Cartilage** (blood smear, skin – vital staining, tendon, cartilage – hyaline, elastic, and fibrous)
3. **Bone, Osteogenesis** (decalcified bone, bone ground section, intramembranous and endochondral ossification)
4. **Nervous tissue and system** (pinal cord – HE, silver stain, spinal ganglia, autonomic ganglia, cerebellum – HE, nerve)
5. **Muscle tissue, Vascular system** (smooth, skeletal, cardiac muscle, endocardium, artery, vein – HE)
6. **Endocrine system** (smooth, skeletal, cardiac muscle, endocardium, artery, vein – HE)
7. **Immune system** (bone marrow, tonsil, thymus, spleen, lymph node)
8. **Urinary and male reproductive system** (kidney, urinary bladder, testis and epididymis, prost ate)
9. **Female reproductive system** (kidney, urinary bladder, testis and epididymis, prostate)
10. **Embryology I** (embryo)
11. **Embryology II** (umbilical cord, placenta – chorionic villi)
12. **Respiratory system** (nose, trachea, lungs)
13. **Skin, Ear** (axillary skin, plantar skin, external and internal ear)
14. **Eye** (anterior and posterior segments)
15. **Digestive system I: Oral cavity** (lip, tongue, vallate papilla)
16. **Tooth development** (enamel organ: bud, cap, bell stages)
17. **Digestive system II: Alimentary canal** (esophagus, stomach, small and large intestine, appendix)

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18. **Digestive system III: Associated organs** (salivary glands – parotid, submandibular; pancreas, liver)
19. **Tooth structure I** (Mineralized dental tissues; tooth ground section – enamel, dentin, cementum)
20. **Tooth structure II** (Overview of tooth structure and associated tissues; decalcified tooth – dental pulp, dentin, cementum, periodontal ligament, alveolar bone, gingiva)
21. **Slide repetition**
22. **Slide recognition**

Students' obligations:

Students are expected to be prepared theoretically for seminars and practical laboratory classes in accordance with the executive education plan, which will be continuously monitored. This course encourages discussion, individualized study, and collaborative work in small groups.

Class attendance is mandatory. Students may be absent from 30% of each form of class, provided they have a justifiable cause. If a student is absent for more than 30% classes, they will have to re-enroll the course. Absence from practicals must be compensated at the end of the course. Absence of more than 30% at one form of class (i.e. lectures, seminars or laboratory practice) cannot be compensated by higher attendance at another form.

Students are expected to actively participate in all aspects of the course, complete reports from practical laboratory classes (LP) on time, and attend the examinations. During the LPs, a student is obligated to have tools (a notebook, colored pencils, white coat). Lectures, seminars, and practical classes begin precisely at the scheduled time, and any lateness by students will be considered an absence. Students must attend all forms of classes and assessments dressed appropriately. **The use of mobile phones, as well as the consumption of food and drinks, is not permitted during classes and examinations.**

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

Grading of students' work will be conducted according to the current Ordinance on Studies of the University of Rijeka.

**Assessment of student work**

Student work will be assessed and graded during the course and on the final exam. During the course, students may obtain a total of 100 grade points (credits). Students can achieve up to 70% of the final grade during the classes, and a maximum of 30% of the final grade at the final exam. Evaluation of students' progress during classes, midterms, and the final exam in the academic year 2025/2026 is shown in Table 1.

Table 1. Distribution of grade points in the course "Histology and Embryology"

| | Evaluation | Max. grade points |
|---|---|---|
| Midterm exams | Midterm exam | 15 |
| | Midterm exam | 15 |
| | Midterm exam | 15 |
| | Total | |
| Seminars/laboratory practicals | Active participation<br>Accepted notebook | 7<br>3 |
| Tissue section recognition | | 15 |
| | Total | 70 |
| Oral exam | | 30 |
| Total | | 100 |

**Midterm exams**

During the course, three written midterm exams are planned. All written midterm exams consist of 40 multiple-choice questions and will be evaluated according to the criteria shown in Table 2.

MT I – 27.04.2026.
MT II – 18.05.2026.
MT III – 29.05.2026.

Table 2. Evaluation of written midterm exams I-III

| **Number of correct answers** | **Grade points** |
|---|---|
| 0-19 | 0 |
| 20-22 | 8 |
| 23-25 | 9 |
| 26-28 | 10 |
| 29-30 | 11 |
| 31-33 | 12 |
| 34-36 | 13 |
| 37-38 | 14 |
| 39-40 | 15 |

Students can retake the midterm exam once, in the case of absence or because they are not satisfied with the obtained grade points. Then, **the points gained from the retaken midterms will be considered**.

Students will have the opportunity to correct one or more midterm exams only once. Correction of the midterm exam I-III will be held at the end of the course (01.06.2026. and 02.07.2026.), before final exams.

**Seminars and practical laboratory classes (LPs):** For active participation and demonstrated knowledge in seminars/LPs (at least 50% of seminars/LPs), students can earn a maximum of 7 points. They can receive 0–2 points per seminar/LP, and the final score will be calculated according to Table 3. For keeping a well-organized notebook with drawn and described histological specimens, the student may receive an additional 1–3 points.

Table 3:

| Received points | Grade points |
|---|---|
| 10-14 | 2 |
| 15-20 | 3 |
| 21-25 | 4 |
| 26-30 | 5 |
| 31-35 | 6 |
| 36-40 | 7 |

**Recognition of Slides (ROS) exam:** Is a mandatory oral exam and is required for students to be qualified for the final exam. Before going to this colloquium, the student must have completed all the LPs. If he/she was absent from one or more LPs, these need to be done in the time provided for making up the exercises. A student must identify at least 8 of the 10 microscopic slides, as well as the structures that are described and discussed during classes. For this ROS-examination a student can receive a maximum of 15 points. At least 8 points are required to pass the exam. Each slide is evaluated with ½, 1, or 1 ½ points depending on the student's knowledge. Recognition of the slides awards ½ point and answering additional questions adds up to 1 point for each slide. This ROS-exam will be held in the weeks before each final exam.

**Final exam**

The final exam in Histology and Embryology is oral and is held at the faculty according to a fixed schedule, which is published one day before the exam based on applications submitted through the ISVU system. The maximum number of points that can be earned on the oral exam is 30.

Students who earn fewer than 35 points during the course must re-enroll in the Histology and Embryology course in the next academic year.

<u>Eligibility for the Final Exam</u>

A student may take the final exam if they have: Earned at least 35 points during the course, and passed the ROS exam.

<u>Ineligibility for the Final Exam</u>

Students cannot take the final exam if: They have earned 0 to 34.99 points during the course, or they have 30% or more absences in any form of instruction (lectures, seminars, or practicals). Such a student is considered unsuccessful (grade: 1 – F) and must re-enroll in the course in the next academic year.

A student who is re-enrolling in the course and meets the requirements for taking the exam may submit a written request to be exempted from attending classes again and may take the exam using the points earned in the previous academic year.
All other students are required to repeat all forms of instruction.

**The final grade** represents a sum of all grade points obtained during the course and on the final exam according to the following criteria:

| | | |
|---|---|---|
| 90-100 points | A | 5 |
| 75 – 89 points | B | 4 |
| 60 – 74 points | C | 3 |
| 50 – 59 points | D | 2 |
| 0 – 49 points | F | 1 |

Final exam dates
05.06.2025,
10.07.2025
04.09.2025
25.09.2025

**Other important information regarding to the course:**

It is expected that all students follow the Code of Academic Honesty in accordance with the Code of Ethics for the students of the University of Rijeka
(https://uniri.hr/wp-content/uploads/2019/05/Etic48dki20kodeks20za20studente20i20studentice.pdf ) .
For questions and concerns, please feel free to contact us by e-mail or via Merlin.

## COURSE SCHEDULE (for the academic year 2025 / 2026)

| Day | Lectures (time and place) | Seminars (time and place) | Practicals (time and place) | Instructor |
|---|---|---|---|---|
| 13.04. 2026. | L1,L2 (9,15-11,00) Dept.of histology | | | Jelenčić |
| | | S21(11,15 – 12,00) Dept.of histology | | Jelenčić |
| | | S1 LP1 (12,30 – 14,45) Dept.of histology | | Mladenić |
| 14.04. 2026. | L3,L4 (10,15-12,00) Lecture room P4 | | | Polić |

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| | | S22 (12,15-13,00)<br>Lecture room P4 | | Polić |
| | L5 (13,15-14,00)<br>Lecture room P4 | | | Krmpotić |
| 15.04.<br>2026. | | | | |
| | | **S2LP2(12:15-15:30)** | | Kavazović |
| 16.04.<br>2026 | L6,L7 **(**11:15-13:00)<br>Lecture room P7 | | | Krmpotić |
| | L8 **(**13:15-14:00)<br>Lecture room P7 | | | Jelenčić |
| 17.04.<br>2026. | | **S3 LP3 (**8,30-11,30)<br>**S4LP4 (**12:00-14:15)<br>Dept.of histology | | Lenartić(S3LP3)<br>Šestan(S4LP4) |
| 20.04.<br>2025 | L9, L10 (8:30-10:15)<br>Lecture room P6 | | | Wensveen |
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| 21.04.<br>2026. | L11,L12 (14:15-16:00)<br>Lecture room P7 | | | Krmpotić |
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| 22.04.<br>2026. | | S5LP5 (12:30-15:45)<br>Dept.of histology | | Mladenić |
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| 23.4.2026<br>. | L13 (12:15-13:00)<br>L14 (13:15-14:00)<br>Lecture room P7 | | | Wensveen(L13)<br>Lenartić (L14) |
| | | S6LP6 (14:15-15:45)<br>Dept.of histology | | Kavazović |
| 24.04.<br>2026. | | S7LP7(8:30-11:00)<br>S8LP8 (11:15-14:30)<br>Dept.of histology | | Mladenić(S7LP7)<br>Lenartić(S8LP8) |
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| 27.04.<br>2026 | | MIDTERM EXAM 1<br>12.15-13.15<br>Lecture room P1 | | Jelenčić |
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| 28.4.2026. | L15 (11:15-12:00)<br>Lecture room P9 | S23 (12:15-13:00)<br>Lecture room P9 | Jelenčić |
| | L16 (13:15-14:00)<br>Lecture room P9 | | Šestan |
| 29.04.2026. | L17 (11:15-12:00)<br>Lecture room P7 | | Šestan |
| | | S9LP9 (12:15-15:30)<br>Dept.of histology | Babić Čač |
| 30.04.2026. | L18 (12:15-13:00)<br>L19(13:15-14:00)<br>Lecture room P5 | | Lenartić |
| 1.5.2026. | | | |
| 04.05.2026. | L20, L21 (8:30-10:15)<br>Lecture room P7 | | Babić Čač |
| | L22 (10:30-11:15)<br>Lecture room P7 | | Krmpotić |
| 05.05.2026. | L23 (11:15-12:00)<br>Lecture room P9 | | Lenartić |
| | L24 (12:15-13:00)<br>Lecture room P9 | | Lenartić |
| 06.05.2026. | | S10LP10<br>(12:15-15:30)<br>Dept.of histology | Jelenčić |
| 07.05.2026. | L25 (8:30-9:15)<br>Lecture room P7 | | Jelenčić (L25)<br>Babić Čač (L26) |
| | L26 (9:30-10:15)<br>Lecture room P7 | | |
| 08.05.2026. | | S11LP11<br>(9.15-12:30)<br>Dept.of histology | Wensveen |
| 11.05.2026. | | S12LP12 (8:30-11:00)<br>Dept.of histology | Kavazović |
| | L27 (11:15-12:00)<br>Lecture room P8 | | Jelenčić |
| 12.05.2026. | L28, L29(10:15-12:00)<br>Lecture room P5 | | Jelenčić |
| | L30 (12:15-13:00)<br>Lecture room P15 | | Šestan |
| 13.05.2026. | L31, L32<br>(10:15-12:00) | | Babić Čač |

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| | Lecture room P5 | | | |
| | | S13LP13 (12:15-15:30)<br>Dept.of histology | | Šestan |
| 14.05.<br>2026. | L33, L34 (10:15-12:00)<br>Lecture room P5 | | | Jelenčić |
| | | S24 (12:15-13:00)<br>Lecture room P5 | | Jelenčić |
| 15.05.<br>2026 | | S14LP14 (10-13:15)<br>Dept.of histology | | Kavazović |
| 18.05.<br>2026. | L35 (11:15-12:00)<br>Lecture room P8<br>L36 (12:15-13:00)<br>Lecture room P15 | MIDTERM EXAM 2<br>8:15-9:15<br>Lecture room P5 | | Babić Čač (L35,L36)<br>Jelenčić (MTE) |
| 19.05.<br>2026. | | S15LP15 (14:15-16:00)<br>Dept.of histology | | Krmpotić |
| 20.05.<br>2026. | L37,L38 (10:15-12:00)<br>Lecture room P5 | S16LP16 (12:15-15:30)<br>Dept.of histology | | Jelenčić (L37,L38)<br>Lenartić (S16LP16) |
| 21.05.<br>2026. | L39 (9:15-10:00)<br>Lecture room P5 | | | Jelenčić |
| | L40 (10:15-11:00)<br>Lecture room P5 | | | Babić Čač |
| 22.05.<br>2026. | | S17LP17(8:30-11:30)<br>S18LP18 (12:30-14)<br>Dept.of histology | | Mladenić (S17LP17)<br>Kavazović (S18LP18) |
| 25.05.<br>2026. | | | | |
| 26.05.<br>2026. | | S19LP19 (10:30-13:45)<br>Dept.of histology | | Babić Čač |
| 27.05.<br>2026. | | S20LP20 (12:15-15:30)<br>Dept.of histology | | Jelenčić |
| 28.5.2026<br>. | | | | |
| 29.5.2026<br>petak | | **MIDTERM EXAM 3**<br>**8:30-9:30 Lecture room P7** | | Jelenčić |
| | | S25 ,LP21<br>(10:30-13:30)<br>Dept.of histology | | |
| 1.6.2026. | COME (correction of midterm exam) | | | |

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| | P7 8:30-11 | | |
| 2.6.2026. | | LP22<br>(12:00-13:30)<br>Dept.of histology | |
| 3.6.2026. | | | |
| 4.6.2026. | COME<br>P7 8:30-11 | | |
| 5.6.2026. | | | |

**List of lectures, seminars and practicals:**

| | LECTURES (Topics) | Teaching hours | Location/Lecture room |
|---|---|---|---|
| L1 | Importance of Histology | 1 | Dept.of histology |
| L2 | Epithelial tissue | 1 | Dept.of histology |
| L3 | Connective tissue | 1 | P4 |
| L4 | Blood | 1 | P4 |
| L5 | Cartilage, Joints | 1 | P4 |
| L6 | Bone | 1 | P7 |
| L7 | Osteogenesis | 1 | P7 |
| L8 | Nerve tissue | 1 | P7 |
| L9 | Muscle tissue | 1 | P6 |
| L10 | Circulatory system | 1 | P6 |
| L11 | Endocrine system | 1 | P7 |
| L12 | Immune system | 1 | P7 |
| L13 | Urinary system | 1 | P7 |
| L14 | Male reproductive system | 1 | P7 |
| L15 | Female reproductive system | 1 | P9 |
| L16 | Embryology: Intro, Fertilization, 1$^{st}$ and 2$^{nd}$ week | 1 | P9 |
| L17 | Embryology: 3$^{rd}$ week of development, Gastrulation, Neurulation, embryonic period | 1 | P7 |
| L18 | Fetal period and body cavities | 1 | P5 |
| L19 | Embryology: Fetal membranes | 1 | P5 |
| L20 | Development of the head | 1 | P7 |
| L21 | Development of the head | 1 | P7 |
| L22 | Birth defects | 1 | P7 |
| L23 | Respiratory system | 1 | P9 |
| L24 | Sensory organs: Skin | 1 | P9 |
| L25 | Sensory organs: Eye | 1 | P7 |
| L26 | Sensory organs: Ear | 1 | P7 |

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| L27 | Digestive system: Oral cavity | 1 | P8 |
| L28 | Digestive system: Alimentary canal | 1 | P8 |
| L29 | Digestive system: Alimentary canal | 1 | P8 |
| L30 | Digestive system: Associated organs | 1 | P15 |
| L31 | Development of the tooth | 1 | P5 |
| L32 | Development of the tooth | 1 | P5 |
| L33 | Dentin-Pulp Complex | 1 | P5 |
| L34 | Dentin-Pulp Complex | 1 | P5 |
| L35 | Enamel | 1 | P8 |
| L36 | Amelogenesis | 1 | P15 |
| L37 | Cement, Cementogenesis | 1 | P5 |
| L38 | Bony socket, Periodontal ligament | 1 | P5 |
| L39 | Development of the root | 1 | P5 |
| L40 | Eruption of the tooth, Gingiva | 1 | P5 |
| | **TOTAL TEACHING HOURS** | **40** | |

| | **SEMINARS (Topics)** | **Teaching hours** | **Location/Lecture room** |
|---|---|---|---|
| S1 | Epithelial tissue | 1 | Dept.of histology |
| S2 | Connective tissue, Cartilage | 2 | Dept.of histology |
| S3 | Bone, Osification | 2 | Dept.of histology |
| S4 | Nerve tissue | 1 | Dept.of histology |
| S5 | Muscle tissue, Circulatory system | 2 | Dept.of histology |
| S6 | Endocrine system | 1 | Dept.of histology |
| S7 | Immune system | 1 | Dept.of histology |
| S8 | Urinary, male reproductive system | 2 | Dept.of histology |
| S9 | Female reproductive system | 2 | Dept.of histology |
| S10 | Embryology I: Development of the embrio | 3 | Dept.of histology |
| S11 | Embryology II: Fetal membranes and placenta | 2 | Dept.of histology |
| S12 | Respiratory system | 1 | Dept.of histology |
| S13 | Skin, Ear | 2 | Dept.of histology |
| S14 | Eye | 2 | Dept.of histology |
| S15 | Digestive system I: Oral cavity | 1 | Dept.of histology |
| S16 | Tooth development | 2 | Dept.of histology |
| S17 | Digestive system II: Alimentary canal | 2 | Dept.of histology |
| S18 | Digestive system III: Associated organs | 1 | Dept.of histology |
| S19 | Tissues of the tooth | 2 | Dept.of histology |
| S20 | Tooth and associated structures | 2 | Dept.of histology |

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|---|---|---|---|
| S21 | Characteristics of epithelial tissues | 1 | Dept.of histology |
| S22 | Characteristics of connective tissues | 1 | P4 |
| S23 | Cyclic changes of the female reproductive organs | 1 | P9 |
| S24 | Dentinogenesis | 1 | P5 |
| S25 | Repetition and consultation | 2 | Dept.of histology |
| | **TOTAL TEACHING HOURS** | **40** | |

| | PRACTICALS (Topics) | Teaching hours | Location/Lecture room |
|---|---|---|---|
| 1 | Epithelial tissue | 2 | Dept.of histology |
| 2 | Connective tissue, Cartilage | 2 | Dept.of histology |
| 3 | Bone, Osification | 2 | Dept.of histology |
| 4 | Nerve tissue | 2 | Dept.of histology |
| 5 | Muscle tissue, Circulatory system | 2 | Dept.of histology |
| 6 | Endocrine system | 1 | Dept.of histology |
| 7 | Immune system | 2 | Dept.of histology |
| 8 | Urinary, male reproductive system | 2 | Dept.of histology |
| 9 | Female reproductive system | 2 | Dept.of histology |
| 10 | Embryology I: Development of the embryo | 1 | Dept.of histology |
| 11 | Embryology II: Fetal membranes and placenta | 2 | Dept.of histology |
| 12 | Respiratory system | 2 | Dept.of histology |
| 13 | Skin, Ear | 2 | Dept.of histology |
| 14 | Eye | 2 | Dept.of histology |
| 15 | Digestive system I: Oral cavity | 1 | Dept.of histology |
| 16 | Tooth development | 2 | Dept.of histology |
| 17 | Digestive system II: Alimentary canal | 2 | Dept.of histology |
| 18 | Digestive system III: Associated organs | 1 | Dept.of histology |
| 19 | Tissues of the tooth | 2 | Dept.of histology |
| 20 | Tooth and associated structures | 2 | Dept.of histology |
| 21 | Slide repetition | 2 | Dept.of histology |
| 22 | Slide recognition | 2 | Dept.of histology |
| | **TOTAL TEACHING HOURS** | **40** | |

| | FINAL EXAM DATES |
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| 1. | 04.06. 2025. |
| 2. | 11.07. 2025 |
| 3. | 05.09. 2025 |

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| 4. | 24.09.2025 |

| | Lectures | Seminars | Practicals | Total |
|---|---|---|---|---|
| Total number | 40 | 40 | 40 | 120 |
| On-line | 0 | 0 | 0 | 0 |
| Percentage | 0 | 0 | 0 | 0 |