

Faculty of Medicine, University of Rijeka

Course: Histology with Embryology

Course Coordinator: Ester Pernjak Pugel, MD, PhD, Full Professor

Department: Department of Histology and Embryology

Study: Integrated Undergraduate and Graduate University Study of Dental Medicine in English

Year of the study: First

Academic year: 2021/2022

COURSE SYLLABUS

Course information (basic description, general information, teaching overview, required equipment, and preparation, etc.)

Histology with Embryology is a compulsory course at the first year of the Integrated Undergraduate and Graduate University Study of Dental Medicine in English. It consists of 30 hours of lectures, 30 hours of seminars, and 30 hours of laboratory practicals, overall 90 hours (7 ECTS).

Course objectives

Histology is one of the basic fields of medicine, which deals with the structure of a human body that can be studied using the light microscope or related devices. Histology also deals with the cell morphology (cytology) and with the fine structure of some organs (microscopic anatomy). Histology encompasses the entire microscopic and submicroscopic structure of an organism. Embryology studies the development of the embryo and helps students understand the complex relationship within the structure of the human body. Emphasis is on the morphogenesis during the organogenesis and on understanding the molecular and cellular basis of differentiation. Its practical medical implications are also of great importance since it accounts for the appearance of anomalies in the development of certain organs. Relationships between congenital malformations and errors in embryological development are discussed.

Expected course learning outcomes

At the end of this course student will be able to demonstrate a working knowledge of human histology and development and correlate the structure and function of human body. Students will acquire a reasonable working knowledge of: how cells associate to perform the functions for which they are specialized and how organized groups of cells (tissues) are arranged to form the organ systems of the body. Students should be thoroughly acquainted with structures and development of the human body by means of classical and contemporary methods of microscopic investigations and embryonic development; they should master the skills of microscopy of the most characteristic cells, tissues, and organs presented as histological slides. By utilizing their previous knowledge in biochemistry, biology, and anatomy, students should gain insight into the normal structure of the human body by means of light and electron microscopy.

Course content

The major role of **histology** in the medical curriculum is to provide basic understanding of many different aspects of structure and function of the human body. Emphasis is placed on the normal structure as a basis for proper functioning and for understanding pathophysiological processes. The following topics and subtopics will be considered: epithelial tissues (cellular membrane, basal lamina, cell-cell interactions); connective tissue (general characteristics, cells and intercellular substance, fibers, and ground substance); types of connective tissue (proper - dense, regular and irregular, adipose tissue); cartilage (hyaline elastic, fibrocartilage); bone (microscopic structure of bones, bone cells, histogenesis of bone, synovial membrane), blood, lymphocytes and their immune role; muscular tissue (smooth, skeletal, cardiac muscle), nervous

tissue (structure of neuron, nerve fiber, synapse and the relationship of neurons, neuroglia, choroid plexus); blood vascular system, lymphatic system, endocrine system, respiratory system, gastrointestinal tract, kidney and urinary tract, reproductive system, special senses.

The purpose of **embryology** is to provide students with a general outline of human development and to help them understand the complex relationship within the structure of the human body. Its practical medical implications are also of great importance since it can explain developmental anomalies. The following topics and subtopic will be covered: fertilization, cleavage, gastrulation and formation of primary germ layers; differentiation of primary germ layers and organogenesis; extraembryonic coelom, connecting stalk, amnion, corium, placenta; neural plate, groove and tube; sex cycles, male and female sex organs; embryonic and fetal development; relationships between congenital malformations and errors in embryological development; environmental factors as causes of birth defects; prenatal diagnostics.

Student obligations:

Students are obliged to be prepared theoretically for seminars and practicals according to the executive education plan and this will be continuously checked. This course encourages discussion, individualized study, and work in small groups.

Class attendance, including test attendance, is mandatory. Students may be absent from 30% of each form of classes, provided they have a justifiable cause. If a student is absent for more than 30% of classes, they will have to re-enroll the course.

Students are expected to actively participate in all aspects of the course, complete reports from practicals on time, and attend the examinations. During LP, a student is obligated to have tools (a notebook, a blue and a red pencil, white coat).

As current epidemiological conditions do not allow direct teaching, it will be conducted according to the hybrid model as follows:

Lectures - recorded lectures that include individual teaching units will be available to the student on the Merlin platform according to the schedule specified in the course syllabus.

Seminars and laboratory practical - will take place in the lecture halls of the faculty according to the schedule in the syllabus with the use of histological images from the atlas, microscopes and histology slides.

Students will be able to come on-site for consultations before each midterm and before the final exam. The schedule of consultations will be agreed with students. Consultations will also be organized on-site for the repetition of histological slides with the Institute's demonstrators. If necessary, all this consultation will be organized online.

Required literature:

1. A.L. Mescher.: Junqueira's Basic Histology, XIV edition, The McGraw –Hill Education, New York 2016.
2. T.W.Sadler: Langman's Medical Embryology, XIII edition, Wolters Kluwer Health, Philadelphia,2015.
- 3) <http://medsci.indiana.edu/junqueira/virtual/junqueira.htm>
- 4) <https://accessmedicine.mhmedical.com/book.aspx?bookid=2430>

Recommended for additional reading:

- 1) Sobotta: "Atlas histologije", Naklada SLAP, Jastrebarsko, 2004
- 2) Bradamante Ž, Švajger A. Vježbe iz histologije. Zagreb: Medicinski fakultet Zagreb.

Course teaching plan:

The list of lectures (with titles and learning outcomes):

<p>L1 Importance of Histology in Understanding Human Tissue Formation and Function To understanding the aim of the course. To recognize the role of Histology as a foundation for subsequent studies in pathology and physiology.</p> <p>L2-3 Epithelial Tissue To define the microscopic structure and function of epithelial cells. To describe characteristic features of various types of epithelia.</p> <p>L4 Connective Tissue To explain the types, characteristics, and functions of the 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.</p> <p>L5 Cartilage, Blood 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 define the peculiarities of microscopic and submicroscopic blood cells - erythrocytes, leukocytes, and platelets, and blood plasma. To adopt criteria for classification of blood cells based on their morphology.</p> <p>L6-7 Bone, Osteogenesis, Joints To explain the classification, characteristics, and functions of supporting connective tissue. To define the peculiarities of cells and bone matrix. To explain the characteristics of primary and secondary bone tissue with respect to their histological properties. To explain the processes of intramembranous and endochondral ossification. To describe features of fracture bone remodeling and repair. To explain the histological characteristics of joints.</p> <p>L8 Temporomandibular Joint, Bone marrow To explain main characteristic and peculiarities of TMJ. To define the individualities of blood cells development.</p> <p>L9-10 Muscle Tissue, Circulatory System 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. To describe the histological structure of heart and vasculature.</p> <p>L11-12 Nerve Tissue, Nervous System 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 blood-brain barrier.</p> <p>L13 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.</p> <p>L14 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.</p> <p>L15 Skin and derivatives 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.</p> <p>L16 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.</p>

L17-19 Digestive tract

To define the general structure of the digestive tract. To describe the peculiarities of organs in the oral cavity, esophagus, stomach, intestine, organs associated with the digestive tract – salivary glands, liver, pancreas, gallbladder.

L20 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, adrenal glands.

L21 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.

L22 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. To define the characteristics of the transient epithelium.

L23 Male Reproductive System

To define the peculiarities of the histological structure of testes, epididymis, accessory glands.

L24 Female Reproductive System, Sex Cycles

To define the peculiarities of histological characteristics of the female reproductive system during different periods of a woman's life. To learn and adopt knowledge about sex cycles in male and female sex. To understand and explain changes during the generative period of life.

L25-29 Embryology – First Week, Second Week, Embryonic Period, Fetus, Body Cavities, Placenta

To become familiar with the goal of learning developmental processes, fertilization, embryonic and fetal development of human embryos. To understand the underlying developmental processes: proliferation, migration, induction, differentiation, programmed morphogenic cell death.

To overcome the peculiarities of changes during the first week of development of the fertilized ovary (zygote). To outline the general changes during the second week (implantation, two-layered embryonic disc) and the third week (gastrulation) of development. To explain the process during embryonic, fetal development, embryonic derivatives. To adopt knowledge about the development and function of fetal membranes: trophoblasts, amnions, coronas, egg yolks. To understand the development, texture, and function of placenta and umbilicus in different periods of pregnancy. To understand the uterus-placental bloodstream.

L30 Birth Defects, Teratology

To define critical periods of development and to indicate teratogenic factors. To understand and explain the possibility of the emergence of anomalies and clinically important disorders that arise during development.

The list of seminars (S) and laboratory practicals (LP) with short explanations:

During seminars, students discuss in more detail themes introduced on the lectures and explain the unclear and insufficiently understandable topics. The seminars also provide an introduction to the topics that will be revealed on LP. Students' theoretical knowledge for each seminar is checked and students are therefore obliged to come prepared for this form of teaching. LP are followed by lecture topics or seminars that precede. The practical part of the exercise involves an overview of histological images of tissues and organs using light microscopes and an atlas available on the Institute's website and other ones mentioned in literature list and drawing and a discussion with the teacher and demonstrator. The student is expected to be able to recognize the structures of various tissues and organs on microphotography, to be able to relate the observed details to the function of tissues or organs, and to be able to extract important characteristics of an unknown microscopic slide, compare with known structures and determine which organ or tissue is involved.

Students must have the appropriate drawing equipment (wooden pencils - red and blue) and a notebook

(without lines). 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. In the description of learning outcomes for each seminar and LP, a list of histological slides is added.

S1LP1 Histology and its Methods of Study

To explain the basic facts of the development of histological techniques and microscopy. To get acquainted with and acquire knowledge about the way of preparing classic histological slides, as well as various histological, histochemical, and immunohistological techniques. To explain the principle of the methods used in histology laboratories and microscopy.

S2LP2 Epithelial Tissue

To classify and describe the microscopic and submicroscopic structure of epithelial cells. To define the peculiarities of certain types of glandular epithelia.

(dental pulp - endothelium, small intestine – simple columnar, goblet cells, simple tubular glands, esophagus – squamous moist, mucous glands, skin – squamous dry, merocrine, holocrine, apocrine glands)

S3LP3 Connective Tissue, Blood

To explain the characteristics and functions of the connective tissue. To define cells and ECM (fibers and ground substances), connective tissue, and connective tissues with special properties. To compare the similarities and differences between these two types of tissues. To define the peculiarities of microscopic and submicroscopic structure of blood cells. To adopt criteria for blood cell on the basis of their morphology. (mesenchyme, skin – intravital staining, tendon, blood smear, epicardium)

S4LP4 Cartilage

To define cellular and interstitial parts of different types of cartilage tissue. To explain the growth and healing processes of cartilage tissue damage. To explain the characteristics of the histological structure of joints.

(trachea, ear auricle – HE, orcein staining, meniscus)

S5LP5 Bone, bone marrow

To define the peculiarities 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 fracture healing process, and bone remodeling.

To describe histological characteristics of bone marrow. To understand the emergence of individual blood cells during intrauterine development, as well as the basis of the hematopoietic process later in life.

(ground bone, decalcified bone, fetal skull and finger, bone marrow)

S6LP6 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 for the possibility of 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.

(skeletal, cardiac, smooth muscle, endocardium, small artery and vein – HE, orcein staining)

S7LP7 Nerve Tissue, Nervous System

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 blood-brain barrier. (spinal cord and cerebellum – HE, silver staining, cerebrum, nerves, sensory, autonomic ganglia)

S8LP8 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. (cornea, iris, ciliary body, lens, retina)

S9LP9 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. (auricle, inner ear)

S10LP10 Skin

To clearly define the peculiarities of the histological structure of the skin. To understand and explain the facts about the skin glands. To describe hair and nails. To adopt knowledge about differences in appearance and function of the breast and breastfeeding between pregnant women and women that are not pregnant. (thin skin with glands – axilla, hair, thick skin, mammary gland – 2 stages)

S11LP11 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. (thymus, lymph node, spleen, tonsil)

S12LP12 Oral Cavity

To define the peculiarities of the individual parts of the oral cavity - lip, tongue, palate. (lip, tongue, filiform and vallate papillae)

S13LP13 Digestive Tube

To define the histological structure of certain parts of the digestive tract (esophagus, stomach, intestine, and colon). To understand and explain the structure and function of the individual layers in the structure of various segments. (esophagus, stomach, small intestine, large intestine, vermiform appendix)

S14LP14 Digestive Glands

To understand and explain the structure and function of intestinal glands. To understand and explain the flow of blood and bile inside the liver. (salivary glands, liver, pancreas, gallbladder).

S15LP15 Respiratory System

To define the basics 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. (nasal cavity, trachea, lungs)

S16LP16 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, adrenal glands.

(pituitary gland, adrenal gland, thyroid gland, pineal gland)

S17LP17 Male Reproductive System

To define the peculiarities of the histological structure of testes, epididymis, accessory glands.
(testes, epididymis, vas deferens, prostate gland)

S18LP18 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. To define the characteristics of the transient epithelium.
(kidney, ureters, bladder)

S19LP19 Female Reproductive System

To understand and explain changes in histological structure in the ovaries that precede the emergence of mature sex cells. To explain the basic characteristics of the structure and function of the female reproductive organs.
(ovary, uterine tube, uterus, vagina)

S20LP20 Embryology

To learn about sex cycles in male and female sex. To explain the process of conversion of germ cells into male and female gametes. To understand and explain the processes of gametogenesis and the difference between spermatogenesis and oogenesis. To overcome the peculiarities of changes during the first week of embryonal development - zygote, pruning, second week – implantation, formation of a double layered shield. To overcome the peculiarities of changes during third week - embryonic, fetal development (neurulation, somitogenesis, germinal derivatives).
(embryo)

S21LP21 Embryology

To explain the development of placental blood flow and function of embryonic envelopes – amnion, chorion, allantois, egg yolk sack. To understand the development, texture, and function of the placenta in different periods of pregnancy.
(chorionic villi, umbilical cord)

S22LP22 Repetition, consultation

Student obligations:

Class attendance, including test attendance, is mandatory. Students may be absent from 30% of each form of teaching provided they have a justifiable cause. If a student is absent for more than 30% of the classes, they will have to re-enroll the course.

Students are expected to actively participate in all aspects of the course, complete laboratory reports on time, and attend the examinations. Moreover, preparation of the course content, which is going to be discussed during seminars and laboratory practicals, is obligatory.

Exam (exam taking, detailed exam description of the oral/written/practical part, point distribution, grading criteria):

Student grading will be conducted according to the current Ordinance on Studies of the University of Rijeka (approved by the Senate) and the Ordinance on Student Grading at the Faculty of Medicine in Rijeka (approved by the Faculty Council).

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 2020/2021 is shown in Table 1.

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

	Evaluation	Grade points
Midterm exams	Midterm exam I	23
	Midterm exam II	23
	Total	46
Seminars, Laboratory practicals	Active participation/short written exams Completed practicals and an accepted written report	9
Tissue section recognition		15
TOTAL		70
	Oral exam	30
	Total	30
TOTAL		100

Written midterm exams

During the semester, two written midterm exams are planned that will include the content of lectures, seminars, and laboratory practicals. At each midterm exam, the maximum of grade points that a student can obtain is 23.

All written midterm exams consist of 60 multiple-choice questions and are evaluated according to the criteria shown in Table 2.

MT I – 28.04.2022.

MT II –13.05.2022.

Table 2. Evaluation of written midterm exams I-II

No. of correctly answered questions	Grade points/credits
26 – 29	8
30 – 32	12
33 – 36	14
37 – 40	16
41 – 44	18
45 – 48	19
49 – 52	20
53 – 56	21
57 – 60	23

Correction of the midterm exams

A student can access the correction of the midterm exams if they: i) did not obtain a minimum criteria (50% on each midterm) or ii) are not satisfied with the obtained credits and iii) in case of absence at the midterm

exam due to a justified reason.

If a student retakes the midterm exam because they are not satisfied with the obtained grade points, only the credits gained from the retaken midterms will be considered.

Evaluation of the midterm corrections will be performed according to the criteria shown in Table 2.

Students will have the opportunity to correct one or more midterm exam only once. Correction of the midterm exam I-II will be held after completing regular classes in terms set by the course schedule, before final exams.

Seminars and laboratory practicals

A student can obtain 9 credits (Table 3) throughout seminars and laboratory practicals after passing through 18 Topics (listed below). Evaluation of laboratory practicals implies a completed and accepted written report with all slides drawings. During laboratory practicals and seminars, the oral examination can be performed by the teacher or through short written exams.

Table 3. Evaluation of seminars and laboratory practicals

Topics evaluation	Grade points/credits
2,0 – 2,5	5
2,6 – 3,0	6
3,1 – 3,5	7
3,6 – 4,0	8
4,1 – 5,0	9

Topics

T1 – Epithelial Tissue

T2 – Connective Tissue, Blood, Cartilage,

T3 – Bone, Osteogenesis, Bone Remodeling, Bone Marrow

T4 – Muscle Tissue, Circulatory System

T5 – Nerve Tissue, Nervous System

T6 – Eye

T7 – Ear

T8 – Skin and Derivates

T9 – Immune System

T10 – Oral Cavity, Digestive Tract

T11 – Organ Associated with DT

T12 – Respiratory System

T13 – Endocrine Glands

T14 – Male Reproductive System

T15 – Urinary System

T16 — Female Reproductive System,

T17 — Gametogenesis, First Week of Development, Second, Third Week of Development, Embryonic Period, Fetus

T18 — Fetal Membranes, Placenta, Twins

Tissue section recognition

Is a compulsory oral exam and is required for students to be qualified for the final exam. A student must identify at least 8 of the 10 microscopic slides, as well as the structures that are described (and drawn)

during the laboratory practicals, and can receive a maximum of 15 points. At least 8 points are required for passing the exam. Each slide is evaluated with $\frac{1}{2}$, 1, or $1\frac{1}{2}$ points depending on the student's knowledge. This exam will be held in the week before each final exam. At that time, the student can access the Tissue section recognition several times. Accurate dates and hours will be determined in agreement with the students.

Final exam

The final oral exam is mandatory and covers the entire course content. During the final exam, students can obtain a maximum of 30 credits.

Assessment of the oral part of the final exam:

- up to 15 credits: minimum criteria satisfied
- 16 – 20 credits: average criteria satisfied with noticeable errors
- 21 – 25 credits: answers with a few errors
- 26 – 30 credits: outstanding answers.

If a student is not satisfied with the final grade, they may refuse the grade. In case a student does not accept the grade, he/she must re-enter the final exam.

Conditions for admission to the final exam

A student who accomplishes 35 or more grade points during all course classes and/or after correction of the midterm exams, and passes Tissue section recognition with a minimum of 8 points can access the final exam.

A student who achieves less than 35 grade points during all course classes even after the correction of the midterm exams, or didn't achieve a minimum of 8 point on Tissue section recognition or is absent for more than 30% of all forms of classes, is graded as unsuccessful (F) and must re-enter the course.

Final grade

The final grade represents a sum of all grade points obtained during all course classes and on the final exam. Students are evaluated according to the ECTS (A-F) and numerical (5-1) system.

The ECTS and the numerical grading system are defined by the following criteria:

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

Final exam dates

15/06/2022, 29/06/2022, 13/07/2022
02/09/2022, 16/09/2022

Other important information regarding the course:

Teaching is held at the prescribed time and it is not possible to enter after the teacher enters. Food and beverages are not permitted in the classroom or in the laboratory. This includes plate lunches, drinks, candies, etc., whether opened or not. Likewise, cell phones are not allowed in the classroom during the midterm or final exams. Students must arrive on time for exam attendance. Anyone late for more than 15 minutes may be refused to undertake the exam.

Academic Honesty

It is expected that all students and teachers follow the Code of Academic Honesty in accordance with the Code of Ethics for the students of the Faculty of Medicine at the University of Rijeka.

Please read the policy regarding academic honesty at:

<http://medical-studies-in-english.com/wp-content/uploads/2016/12/CODE-OF-ETHICS.pdf>

Contact information

For questions and concerns, please feel free to contact us by e-mail or via MsTeams.

If you want to speak with a teacher during office hours (each working day between 11:00 am and 13:00 am), please let us know by e-mail or in class.

Expected competencies at course enrollment:

Students are expected to have basic knowledge of biology and anatomy.

COURSE SCHEDULE for academic year 2021/2022

Datum	Lectures	Seminars Laboratory Practicals	Lecturer
1st week 11/04/2022.	L 1, 2, 3 (9:00 – 12:00)		Prof.dr.sc. E. Pernjak Pugel
12/04/2022		S1LP1 group A (8:15 – 10:15)	Prof.dr.sc. T. Lenac Roviš / A. Benić
		S2LP2 group A (10:30 – 12:15)	Prof.dr.sc. E. Pernjak Pugel / Doc.dr.sc. M. Lenartić
		S1LP1 group B (12:30 – 14:30)	Prof.dr.sc. T. Lenac Roviš / A. Benić
		S2LP2 group B (14:45– 16:30)	Prof.dr.sc. E. Pernjak Pugel / Doc.dr.sc. M. Lenartić
13/04/2022	L 4, 5, 6 (9:00 – 12:00)		Prof.dr.sc. J.Tomac
14/04/2022	L 7, 8, 9 (9:00 – 12:00)		Prof.dr.sc. E. Pernjak Pugel
15/04/2022		S3LP3 group A (8:15 – 10:15)	Prof.dr.sc. J. Tomac / J. Materljan, dr. med.
		S4LP4 group A (10:30 – 11:30)	Prof.dr.sc. J. Tomac / J. Materljan, dr. med.
		S3LP3 group B (12:00 – 14:00)	Prof.dr.sc. J. Tomac / J. Materljan, dr. med.
		S4LP4 group B (14:15 – 15:15)	Prof.dr.sc. J. Tomac / J. Materljan, dr. med.
2nd week 18/04/2022		Holiday	
19/04/2022		S5LP5 group A (8:15 – 11:15)	Prof.dr.sc. E.Pernjak Pugel / A. Benić
		S5LP5 group B (11:30 – 14:30)	Prof.dr.sc. E.Pernjak Pugel / A. Benić
20/04/2022	L 10, 11, 12 (9:00 – 12:00)		Prof.dr.sc. E.Pernjak Pugel
	L 13 (13:00 – 14:00)		Prof.dr.sc. J.Tomac
21/04/2022	L 14, 15, 16 (9:00 – 12:00)		Prof.dr.sc. J.Tomac
	L 17, 18 (13:00 – 15:00)		Prof.dr.sc. E.Pernjak Pugel
22/04/2022		S6LP6 group A (8:15 – 11:15)	Prof.dr.sc. J. Tomac / Dr.sc. M. Lenartić
		S6LP6 group B (11:30 – 14:30)	Prof.dr.sc. J. Tomac / Dr.sc. M. Lenartić
3rd week 25/04/2022		S7LP7 group A (8:15 – 11:15)	Prof.dr.sc. E.Pernjak Pugel / Dr.sc. V. Jelinčić

		S7LP7 group B (11:30 – 14:30)	Prof.dr.sc. E.Pernjak Pugel / Dr.sc. V. Jelinčič
26/04/2022		S8LP8 group A (8:15 – 10:00)	Prof.dr.sc. J.Tomac / Dr. sc. I. Kavazović
		S9LP9 group A (10:15 – 11:15)	Prof.dr.sc. E.Pernjak Pugel / Dr. sc. I. Kavazović
		S8LP8 group B (11:30 – 13:15)	Prof.dr.sc. J.Tomac / Dr. sc. I. Kavazović
		S9LP9 group B (13:30 – 14:30)	Prof.dr.sc. E.Pernjak Pugel / Dr. sc. I. Kavazović
27/04/2022	L 19, 20, 21 (9:00 – 12:00)		Prof.dr.sc. E.Pernjak Pugel
28/04/2022		Midterm exam I	
	L 22, 23 (12:00 – 14:00)		
29/04/2022		S10LP10 group B (8:15 – 10:15)	Prof.dr.sc. E.Pernjak Pugel / Dr.sc. M. Lenartič
		S11LP11 group B (10:30 – 11:45)	Prof.dr.sc. J.Tomac / A. Benič
		S10LP10 group A (12:00 – 14:00)	Prof.dr.sc. E.Pernjak Pugel / Dr.sc. M. Lenartič
		S11LP11 group A (14:15 – 15:30)	Prof.dr.sc. J.Tomac / A. Benič
4th week 02/05/2022		S12LP12 group B (8:15 – 9:30)	Prof.dr.sc. E.Pernjak Pugel / J. Materljan, dr. med.
		S13LP13 group B (9:45 – 11:30)	Prof.dr.sc. E.Pernjak Pugel / J. Materljan, dr. med
		S12LP12 group A (12:00 – 13:15)	Prof.dr.sc. E.Pernjak Pugel / J. Materljan, dr. med
		S13LP13 group A (13:30 – 15:15)	Prof.dr.sc. E.Pernjak Pugel / J. Materljan, dr. med
03/05/2022		S14LP14 group B (8:15 – 9:30)	Prof.dr.sc. J.Tomac / Dr.sc. V. Jelenčič
		S15LP15 group B (9:45 – 11:00)	Prof.dr.sc. E.Pernjak Pugel / Dr. sc. I. Kavazović
		S14LP14 group A (11:30 – 12:45)	Prof.dr.sc. J.Tomac / Dr.sc. V. Jelenčič
		S15LP15 group A (13:00 – 14:15)	Prof.dr.sc. E.Pernjak Pugel / Dr. sc. I. Kavazović
04/05/2022	L 24, 25, 26 (9:00 – 11:00)		Prof.dr.sc. J.Tomac
05/05/2022	L 27, 28, 29 (9:00 – 12:00)		Prof.dr.sc. E.Pernjak Pugel
06/05/2022		S16LP16 group B (8:15 – 9:45)	Prof.dr.sc. E.Pernjak Pugel / Dr. sc. I. Kavazović
		S17LP17 group B (10:00 – 11:30)	Prof.dr.sc. J.Tomac / J. Materljan, dr.med.

		S16LP16 group A (12:00 – 13:30)	Prof.dr.sc. E.Pernjak Pugel / Dr. sc. I. Kavazović
		S17LP17 group A (13:45 – 15:15)	Prof.dr.sc. J.Tomac / J. Materljan, dr.med.
5th week 09/05/2022		S18LP18 group B (8:15 – 9:45)	Prof.dr.sc. E.Pernjak Pugel / Dr.sc. V. Jelenčić
		S19LP19 group B (10:00 – 11:30)	Prof.dr.sc. J.Tomac / Dr. sc. M. Lenartić
		S18LP18 group A (12:00 – 13:30)	Prof.dr.sc. E.Pernjak Pugel / Dr. sc. V. Jelenčić
		S19LP19 group A (13:45 – 15:15)	Prof.dr.sc. J.Tomac / Dr. sc. M. Lenartić
10/05/2022		S20LP20 group B (8:15 – 10:00)	Prof.dr.sc. E.Pernjak Pugel
		S21LP21 group B (10:15 – 11:45)	Prof.dr.sc. J.Tomac
		S20LP20 group A (12:00 – 13:45)	Prof.dr.sc. E.Pernjak Pugel
		S21LP21 group A (14:00 – 15:30)	Prof.dr.sc. J.Tomac
11/05/2022	L 30 (9:00 – 10:00)		
		S22LP22 group B (10:15 – 11:45)	
		S22LP22 group A (12:00 – 13:45)	
12/05/2022		Tissue recognition test	
13/05/2022		Midterm exam II	

List of lectures, seminars, and practicals:

	Lectures (topics)	Teaching Hours	Lecture Room
L1	Importance of Histology in Understanding Human Tissue Formation and Function	1	Department of Histology and Embryology
L2,3	Epithelial Tissue	2	Merlin
L4	Connective Tissue	1	Merlin
L5	Blood, Cartilage	1	Merlin
L6,7	Bone, Osteogenesis, Joints,	2	Merlin
L8	Temporomandibular joint, Bone marrow	1	Merlin
L9,10	Muscle Tissue, Circulatory System	2	Merlin
L11-L12	Nerve Tissue, Nervous System	2	Merlin
L13	Eye	1	Merlin
L14	Ear	1	Merlin
L15	Skin and Derivates	1	Merlin
L16	Immune System	1	Merlin
L17-19	Digestive tract	3	Merlin
L20	Endocrine System	1	Merlin
L21	Respiratory System	1	Merlin
L22	Urinary system	1	Merlin
L23	Male Reproductive System	1	Merlin
L24	Female Reproductive System, Sex Cycles	1	Merlin
L25-29	Embryology – Fertilization, Implantation Second Week, Embryonic Period, Fetus, Body Cavities, Placenta	5	Merlin
L30	Birth Defects, Teratology	1	Merlin
	Total number of lectures	30	

	Seminars (topics)	Teaching Hours	Lecture Room
S1	Histology and its Methods of Study	1	Department of Histology and Embryology
S2	Epithelial Tissue	1	Department of Histology and Embryology
S3	Connective Tissue, Blood	1	Department of Histology and Embryology
S4	Cartilage	1	Department of Histology and Embryology
S5	Bone, Bone Marrow	2	Department of Histology and Embryology
S6	Muscle Tissue, Circulatory System	1	Department of Histology and Embryology

S7	Nerve Tissue, Nervous System	1	Department of Histology and Embryology
S8	Eye	1	Department of Histology and Embryology
S9	Ear	1	Department of Histology and Embryology
S10	Skin	1	Department of Histology and Embryology
S11	Immune System	1	Department of Histology and Embryology
S12	Oral Cavity	1	Department of Histology and Embryology
S13	Digestive tube	1	Department of Histology and Embryology
S14	Digestive Glands	1	Department of Histology and Embryology
S15	Respiratory System	1	Department of Histology and Embryology
S16	Endocrine System	1	Department of Histology and Embryology
S17	Male Reproductive System	1	Department of Histology and Embryology
S18	Urinary System	1	Department of Histology and Embryology
S19	Female Reproductive System	2	Department of Histology and Embryology
S20	Embryology	2	Department of Histology and Embryology
S21	Embryology	4	Department of Histology and Embryology
S22	Consultation	2	Department of Histology and Embryology
	Total	30	

	Laboratory practicals (topics)	Teaching Hours	Lecture Room
LP1	Methods in Histology	2	Department of Histology and Embryology
LP2	Epithelial Tissue	2	Department of Histology and Embryology
LP3	Connective Tissue	2	Department of Histology and Embryology
LP4	Cartilage	1	Department of Histology and Embryology
LP5	Bone	2	Department of Histology and Embryology
LP6	Muscle Tissue, Cardiovascular System	2	Department of Histology and Embryology

LP7	Nervous Tissue	2	Department of Histology and Embryology
LP8	Eye	1	Department of Histology and Embryology
LP9	Ear	1	Department of Histology and Embryology
LP10	Skin	1	Department of Histology and Embryology
LP11	Immune System	1	Department of Histology and Embryology
LP12	Oral Cavity	1	Department of Histology and Embryology
LP13	Digestive System	1	Department of Histology and Embryology
LP14	Digestive Glands	1	Department of Histology and Embryology
LP15	Respiratory System	1	Department of Histology and Embryology
LP16	Endocrine System	1	Department of Histology and Embryology
LP17	Male Reproductive System	1	Department of Histology and Embryology
LP18	Urinary System	1	Department of Histology and Embryology
LP19	Female Reproductive System	1	Department of Histology and Embryology
LP20	Embryology	2	Department of Histology and Embryology
LP21	Embryology	1	Department of Histology and Embryology
LP22	Histology slide repetition	2	Department of Histology and Embryology
	Total	30	

	Final exam dates
1.	15/06/2022
2.	29/06/2022
3.	13/07/2022
4.	02/09/2022
5.	16/09/2022