ABOUT THE COURSE

The purpose of Histology and Embryology course is to provide information about morphology of human organs and development of human being. Histology and Embryology are two related sciences. Histology is the study of microstructures of the human body and their functions; it is divided into general histology that studies the cell and extracellular matrix of the four basic types of tissue, and special histology that studies microscopic anatomy of various organs. The Embryology will explain prenatal development of human organism and is divided into general embryology that studies the development of germ cells, fertilization and early development of human embryo, and special embryology that studies formation and malformation of organs. Besides classroom lectures and seminars, the course includes laboratory practices, where morphology is studied in histological slides under light microscope.

LITERATURE

TEXTBOOKS:
- Sadler TW. Langman's Medical Embryology, 12th Edition

ATLASES (one of these):
- Sapunar D, Saraga Babić M. Histology atlas on CD. University of Split School of Medicine, Split, Croatia
- Sobotta – Histology atlas
- Bradamante Ž, Švajger A. Histology Practice. School of Medicine Zagreb, Zagreb, Croatia

TOTAL HOURS

The Histology and Embryology course has 20 units – 17 thematic units and 3 exams. Each thematic unit comprises 2 h of lectures, 2 h of seminars and 2 h of laboratory coursework (6 x 17 = 102 direct teaching hours). The total course hours are 115 h (34 h of lectures, 47 h of seminars and 34 h in the microscopy lab). We kindly ask students to prepare for the lessons. Teachers will quiz students during the lessons and students can get positive or negative points for the tests, based on this knowledge assessment. Details about the knowledge assessment during the classes are described in the chapter Studying.

SYLLABUS

1. INTRODUCTION INTO HISTOLOGY AND EMBRYOLOGY
Lecture: Introduction into histology and embryology
Seminar: Histology and its methods of study
Lab: Preparation of microscopic slides

2. GAMETOGENESIS, FIRST, SECOND AND THIRD WEEK OF DEVELOPMENT
Lecture: Gametogenesis, first and second week of development
Seminar: Menstrual and ovarian cycle, Fertilization
Lab: Ovary, Fallopian tubes, Uterus of a girl

3. EMBRYONAL AND FETAL PERIOD
Lecture: Embryonal and fetal period, Congenital malformations
Seminar: Congenital malformations, Placenta
Lab: Placenta, Umbilical cord, Vagina, Breast

4. SUPPORTING TISSUES – CONNECTIVE TISSUE AND CARTILAGE
Lecture: Supporting tissues
Seminar: Cells and intracellular matrix of the connective tissue, Cartilage
Lab: Dense irregular connective tissue, Tendon, Hyaline cartilage, Elastic cartilage, Fibrocartilage

5. SUPPORTING TISSUES – BONE, EPITHELIAL TISSUE
Lecture: Covering and lining epithelia, Glandular epithelia, Bone tissue
Seminar: Bone development and ossification
Lab: Decalcified bone, Intramembranous and endochondral ossification

6. MUSCLE TISSUE – DEVELOPMENT AND MORPHOLOGY
Lecture: Development and morphology of muscle tissue
Seminar: Morphological basis of contractility, Skin
Lab: Skin, Submandibular gland, Skeletal muscle, Smooth muscle, Heart muscle

7. NERVOUS TISSUE – DEVELOPMENT AND MORPHOLOGY
Lecture: Development and morphology of nervous tissue
Seminar: Morphological basis of nervous system excitability, Nervous system anomalies
Lab: Spinal cord, Brain, Cerebellum, Peripheral nerve and ganglia

8. PARTIAL EXAM I

9. CARDIOVASCULAR SYSTEM – DEVELOPMENT AND MORPHOLOGY
Lecture: Development and morphology of heart and vessels
Seminar: Blood, Cardiovascular system anomalies
Lab: Blood smear, Heart valve, Artery, Vein

10. LYMPHOID SYSTEM
Lecture: Lymphoid system morphology
Seminar: Lymphoid system function
Lab: Thymus, Lymph node, Spleen, Palatine tonsil

11. BODY CAVITIES, DEVELOPMENT AND MORPHOLOGY OF RESPIRATORY SYSTEM
Lecture: Body cavities, Development and morphology of respiratory system
Seminar: General morphology of the alimentary canal, Oesophagus, Stomach
Lab: Lungs, Trachea, Oesophagus, Stomach

12. DIGESTIVE SYSTEM I – ALIMENTARY CANAL
Lecture: Head and neck development (development of face, palate and teeth)
Seminar: Teeth development and morphology, Oral cavity (lips, tongue, salivary glands)
Lab: Tooth, Tooth development, Tip of tongue, Papilla vallata

13. DIGESTIVE SYSTEM II – ACCESSORY GLANDS
Lecture: Digestive system development and anomalies
Seminar: Digestive system glands – liver and pancreas
Lab: Small intestine, Large intestine, Appendix, Liver, Pancreas

14. URINARY SYSTEM DEVELOPMENT AND MORPHOLOGY
Lecture: Urinary system development and morphology
Seminar: Morphology and function of the urinary system
Lab: Kidney, Bladder, Ureter

15. GENITAL SYSTEM DEVELOPMENT AND MORPHOLOGY
Lecture: Development and morphology of the genital system
Seminar: Morphology and function of the genital system
Lab: Testis, Vas deferens, Prostate, Penis, Seminal vesicles

16. NEUROENDOCRINE SYSTEM
Lecture: Endocrine glands
Seminar: Organization and function of endocrine glands
Lab: Pituitary gland, Thyroid, Adrenal gland, Parathyroid

17. EYE
Lecture: Development and morphology of the eye
Seminar: Morphology and function of the eye
Lab: Eye

18. EAR
Lecture: Development and morphology of the ear
Seminar: Morphology and function of the ear
Lab: Ear

19. PARTIAL EXAM - II

20. PREPARATION FOR PRACTICAL EXAM
CONSULTATIONS

Teachers are available for consultations on a daily basis. Consultations are intended for students needing assistance with the coursework. We recommend contacting in advance one of the teachers that you would like to consult with. Teachers may be contacted via phone or e-mail. Personal consultations or phone consultations are generally scheduled during regular working hours, 8 AM to 4 PM. Queries sent by e-mail will be answered as soon as possible.

CLASS ATTENDANCE

Class attendance is mandatory. Students are allowed to miss up to 20% of the total course hours. A strong learner is an active participant in class, and students should come to class prepared to clarify understanding from out-of-class readings, assignments and previous lectures. If the students exhibit insufficient knowledge during the class, or if they miss a class, they are required to have a colloquium with one of the faculty member. During colloquium, students’ knowledge of a failed class is checked. Students who do not pass these colloquia are not allowed to take part in partial exams, but they may take and exam during official exam terms.

EXAMS AND EXAM TERMS

EXAMS

Parts of the exam: The Histology and Embryology exam is entirely written. There are three parts of the exam.

First partial exam (H1): consists of 50 questions (20 questions from Embryology and 30 from Histology). Duration of H1 is 45 min.

Second partial test (H2): consists of 60 questions (25 questions from Embryology and 35 from Histology). Duration of H2 is 50 min.

Third partial exam (H3): Students who have successfully passed first and second partial exam are eligible to take part in the third partial exam. H3 consists of 20 photographs of histology slides, shown using MS PPT presentation. Any organ that was seen by students in the practical part of the course, on microscopes (all of the organs stated in the syllabus section “Lab” above) can be a part of the exam. By identifying correctly all 20 slides and details indicated on them, students can get up to 2 points per slide. There are 6 slides from general and 14 from special histology. Also, 5 out of these 20 slides carry a theoretical question. These theoretical questions can be, not only about the function of the specific structure marked on one of the slides, but can also include the whole knowledge of embryology and histology. The maximum number of points for answering correctly the theoretical question is 2 (per question). If a student does not answer precisely, or identifies only the slide, but not the detail on a slide, the number of points will be lower than 2 per slide. Each slide is shown to students for 15 seconds, and then there is a break for writing the answers. All together students can get 50 points.

Grading criteria: The total percentage of correct answers for a passing grade is 60% in all parts of the exam. For passing grades on partial tests H1 and H2 there is an additional criterion that students need to have at least 50% correct answers in both Embryology and Histology part of the test.

Final grade: Average of three grades [(H1+H2+H3)/3] will be calculated to get the final grade.

Repeating the course: Students who have failed Histology and Embryology course in one academic year, and need to take the course again, are required to attend all the classes.

What to bring to the exam: To participate in the exam, a student needs to bring: Index, 2B pencil, a ball-point pen, eraser and sharpener.

Exam procedure: Bags, books and other personal items need to be disposed of at the side of a classroom, and cell phones turned off. At the beginning of the exam, students will get a form for entering answers and a booklet with questions. Students need to check if their booklet contains all the questions. Only things that are allowed on the bench are Index, pencil, pen, eraser and sharpener. Students need to enter their answers in the form, not in the booklet with questions. On the answer form students need to enter their first and last name, number of Index, course and date. On the first page of the question booklet students need to write their name too. For each question students need to enter one answer only, using soft pencil, and in case they change their mind, they need to erase the old answer very carefully (so that the optical reader machine does not have difficulties recognizing the right answer). In the end of the exam, a student needs to cross all the answers with a ball-point pen. During the exam, communication between students is not allowed. When students complete the exam, they will signal to a teacher that they are finished, give the exam to a teacher and then they can leave a room.

Asking questions during the exams is not allowed: We kindly ask students not to ask questions during the exam. By answering questions about the test, teachers may help students to answer them, which would not be fair to other students. If there are irregular
questions, students need to address that matter after the exam, not during the exam. Very often, questions that seem incorrect to students are actually correct, but students do not have a sufficient knowledge to recognize that. Furthermore, asking questions or commenting on the test results is noise that disturbs other students. Therefore, all questions and concerns regarding the test will be discussed after the exam.

**English dictionary:** If you feel that you would need an English dictionary during the course, please inform your student representative about this, and student representative should inform us. Teachers will then bring an English-English dictionary to the exam.

**ADDITIONAL EXAM TERMS:** Department of Histology and Embryology is not entitled to make decisions about additional exam terms. These questions need to be raised with the School’s management, specifically Vice-dean for education. More details about study rules at the School are available from official School’s bylaws.

**STUDENTS EXEMPT FROM ONE MODULE**

Students exempt from one module (either histology or embryology), based on equivalent grades from other universities, need to pass only the module from which they were not exempt. Those students have to attend classes from that module and are allowed to participate in partial exams, during which they take two tests from one module only. Threshold for passing each part of the test is 60%. Students will consequently get two grades, from two parts of the module. These two grades combined will make a grade for the module taken at the University of Split School of Medicine. This grade will be added to the grade for the second module from the other university, for calculation of the final grade that will be written in the Index. For example, if a student enrolls only Embryology, then a student needs to attend Embryology classes and take part in E1 and E2 parts of the partial exams. Student will get two separate grades for those two exams. First, total Embryology grade will be calculated as follows: (E1+E2)/2. Then the Embryology grade will be added to the Histology grade from another university, as follows: (E+H)/2 to calculate the final combined grade.

**INTERVENTIONS:** We kindly ask students not to interfere with the examination and grading process. All parts of the Histology and Embryology exam are written, so there is no subjectivity towards a specific student. All the exams may be verified by a third party if necessary. All the exams are archived at the Department. Teachers are always available to students for consultations and help with the coursework, but what we cannot do is “give” a point or two to a student who failed the exam, or who wants a better grade. Students who are not happy with their grade may decide to take our exam once more. Pressures by students, their parents or related persons will be reported to the School’s management. If there were mistakes made by teachers, we will be happy to correct them and apologize to students. If there are no mistakes made by our Department, the only thing that an unhappy student can do is – to try to pass exam, or get a better grade, another time.

**FREQUENTLY ASKED QUESTIONS**

1. I didn’t pass the exam, but I missed only 1 (or 2, or 3) questions. Do I really need to take the exam again?
   Answer: Yes. Even if only 1, 2 or 3 points are missing, students who do not pass the test need to take it again. Correct answers are not gifts and your teachers are not Santa Claus. Give this gift to yourself by studying hard before the test, and pass the test on your own.

2. I passed the threshold for embryology, but I didn’t pass the threshold in histology. Can I just take the histology part of the exam next time?
   Answer: No. A student needs to take the whole test again.

3. If I fail one of the tests, is this negative grade counted towards the final grade?
   Answer: No. Only 3 positive passing grades are used to calculate the average and the final grade.

4. If I fail H1, but pass H2 during the course (or the other way around), what do I need to take at the first exam term?
   Answer: On the day of the exam term, students write H1 or/and H2 in the morning (if they did not pass it during the course). Only after passing H1/H2 they can participate in the H3 exam, which takes place on the same day after noon.

5. Can I take H3 before H1/H2 at the exam term, if I did not pass H1/H2 during the course?
   Answer: No. Students may participate in H3 only after passing H1/H2.

6. If I passed H1 and H2 during the course, what happens if I fail H3 at the first exam term?
   Answer: Then at the second (third, fourth) exam term, students need to take only H3.

7. If I did not pass H1 or/and H2 during the course, and then I pass it at the first exam term, but I fail the H3, what happens?
   Answer: If students pass H1/H2, but not H3 at the first exam term, they need to take only H3 at the second exam term.

8. If I do not pass at the first exam term, can I have the exam very soon again, like in a few days or a week?
   Answer: After the course, students can participate in the exam only at the exam terms. Four exam terms are defined at the beginning of the academic year – and these four are: 1) at the end of the course, 2) in June or July, 3) at the beginning of September, 4) at the end of September. The School bylaws stipulate that at least 14 days need to pass between the two exam terms. Our department cannot independently change dates of the predetermined exam terms; students can address these issues with the School management and Director of the program.

9. If I have to repeat the year because I failed Histology and Embryology in a previous academic year, can I just take parts of the exam that I did not pass in the previous academic year?
   Answer: No. Parts of the exam passed in one academic year are valid only until the end of that same academic year. Students who will need to enroll the course again will need to take all 3 parts of the exam in the next academic year.

If you have questions that have not been answered in this document, please feel free to contact us by email.
STUDYING

We kindly ask students to prepare in advance for the lessons by reading the chapters that will be taught. Teachers will assess students’ knowledge during the teaching day and students that exhibit satisfactory knowledge about the current lesson will get one plus (+), or one minus (-) if they do not know the answer to teacher’s questions. Three such pluses will be counted as 1 additional point that can be used at the partial exam H1 if the points were collected during the first part of the course, or at the partial exam H3 if the points were collected during the second part of the course. On the contrary, three minuses will be counted as one negative point for H1 or H2, respectively.

Here is the list of chapters or parts of chapters (indicated in parenthesis) that you should read for each day:

1. INTRODUCTION INTO HISTOLOGY AND EMBRYOLOGY
   Histology: Histology & methods of its study
2. GAMETOGENESIS, FIRST, SECOND AND THIRD WEEK OF DEVELOPMENT
   Histology: The female reproductive system (Introduction, Ovaries, Uterine tubes, Uterus, Embryonic implantation, decidua and placenta, Uterine cervix)
   Embryology: Gametogenesis, First week of development, Second week of development, Third week of development
3. EMBRYONAL AND FETAL PERIOD
   Histology: The female reproductive system (Vagina, Mammary glands – all the way to the end of the chapter)
   Embryology: Third to eight weeks, Third month to birth, Birth defects and prenatal diagnosis
4. SUPPORTING TISSUES – CONNECTIVE TISSUE AND CARTILAGE
   Histology: Connective tissue, Adipose tissue, Cartilage
5. SUPPORTING TISSUES – BONE, EPITHELIAL TISSUE
   Histology: Bone, Epithelial tissue
6. MUSCLE TISSUE – DEVELOPMENT AND MORPHOLOGY
   Histology: Muscle tissue, Skin
   Embryology: Muscular system, Integumentary system, Limbs
7. NERVOUS TISSUE – DEVELOPMENT AND MORPHOLOGY
   Histology: Nerve tissue & the nervous system
   Embryology: Central nervous system
8. CARDIOVASCULAR SYSTEM – DEVELOPMENT AND MORPHOLOGY
   Histology textbook: The circulatory system, Blood, Hematopoiesis
   Embryology textbook: Cardiovascular system (without the following subsections: Aortic arches, Vitelline and umbilical arteries, Coronary arteries, Vitelline veins, Umbilical veins, Cardinal veins)
9. LYMPHOID SYSTEM
   Histology textbook: The immune system & lymphoid organs
10. BODY CAVITIES, DEVELOPMENT AND MORPHOLOGY OF RESPIRATORY SYSTEM
    Embryology textbook: Body cavities, Respiratory system
    Histology textbook: The respiratory system, Digestive tract (first 2 pages, Esophagus and Stomach)
11. DIGESTIVE SYSTEM I – ALIMENTARY CANAL
    Embryology textbook: Head and neck
    Histology textbook: Digestive tract (Oral cavity)
12. DIGESTIVE SYSTEM II – ACCESSORY GLANDS
    Embryology textbook: Digestive system
    Histology textbook: Organs associated with the digestive tract, Digestive tract (Small intestine and Large intestine)
13. URINARY SYSTEM DEVELOPMENT AND MORPHOLOGY
    Embryology textbook: Urogenital system (Urinary system)
    Histology textbook: The urinary system
14. GENITAL SYSTEM DEVELOPMENT AND MORPHOLOGY
    Embryology textbook: Urogenital system (Genital system)
    Histology textbook: The male reproductive system
15. NEUROENDOCRINE SYSTEM
    Histology textbook: Endocrine glands
16. EYE
    Embryology textbook: Eye
    Histology textbook: The eye and ear: special sense organs (Eyes: The photoreceptor system)
17. EAR
    Embryology textbook: Ear
    Histology textbook: The eye and ear: special sense organs (Ears: The vestibuloadtitory system)