# DISCIPLINE SHEET

## 1. Study programme

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| 1.1. | "CAROL DAVILA" UNIVERSITY OF MEDICINE AND PHARMACY BUCHAREST |
| 1.2. | FACULTY OF DENTISTRY |
| 1.3. | DEPARTMENT: DENTISTRY II |
| 1.4. | DIVISION: HISTOLOGY |
| 1.5. | STUDY DOMAIN: Health, sectoral regulated within the European Union |
| 1.6. | STUDY LEVEL: I (Bachelor's degree) and II (Master's degree) |
| 1.7. | STUDY PROGRAMME: DENTAL MEDICINE IN ENGLISH |

## 2. Discipline

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| 2.1. | Discipline name according to the study curriculum: HISTOLOGY | | | | |
| 2.2. | Discipline code: MD01F12EN | | | | |
| 2.3. | Discipline type (FD/SD/CD): FD | | | | |
| 2.4. | Discipline optionality (COD/ED/FAD): COD | | | | |
| 2.5. | Lectures tenure: Assoc.Prof.Dr. Mihnea-Ioan NICOLESCU | | | | |
| 2.6. | Practical classes / seminar tenure: Assoc.Prof.Dr. Mihnea-Ioan NICOLESCU<br>Assist.Prof.Dr. Iulia ROATEȘI<br>Assist.Prof.Dr. David REMBAS | | | | |
| 2.7. Year of study | I | 2.8. Semester | II | 2.9. Evaluation (E/C/V) | E |

## 3. Estimated total time (hours/ semester of teaching and training activity /individual study)

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| **I. University training** | | | | | | |
| 3.1. Number of hours per week | 4 | from which: | 3.2. lecture | 2 | 3.3. practical class/ seminar | 2 |
| 3.4. Total hours in the study curriculum | 56 | from which: | 3.5. lecture | 28 | 3.6. practical class/ seminar | 28 |
| **II. Preparation/ individual study** | | | | | | |
| Time distribution | | | | | | hours |
| Study of lecture materials, textbooks, books, study of the minimum recommended bibliography | | | | | | 30 |
| Additional documentation activity in the library, on online platforms | | | | | | 10 |
| Specific preparation activities for projects, practical classes, preparation of assignments, reports | | | | | | 15 |
| Preparation for presentations or evaluations, preparation for the final examination | | | | | | 30 |
| Tutoring activity | | | | | | 7 |
| Other activities | | | | | | 2 |
| 3.7. Total hours of individual study | | | | | | 94 |
| 3.8. Total hours per semester (3.4.+3.7.) | | | | | | 150 |
| 3.9. Number of credits | | | | | | 5 |

## 4. Prerequisites (where appropriate)

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| **4.1. curriculum** | **Cell and Molecular Biology (Semester I).**<br>Understanding the ultrastructure of the eukaryotic cell and the functions of organelles. Knowledge of the main classes of biomolecules |
| **4.2. proficiencies** | **Laboratory skills:**<br>- Correct and autonomous use of the optical microscope. Ability to examine and interpret simple biological preparations<br>**Digital skills:**<br>- Ability to use an e-learning platform and search engines for scientific documentation<br>**Linguistic skills:**<br>Knowledge of the English language at level B2-C1 is highly recommended. |

## 5. Conditions (where appropriate)

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| **5.1. for lecture activity** | **Location**: Courses are held in an amphitheater equipped with modern multimedia equipment (video projector, sound system, internet connection) to allow the presentation of high-resolution histological images and comparative diagrams.<br>**Attendance**: Attendance at the course is required for a thorough understanding of histological diagnostic logic and clinical correlations.<br>**Materials**: Course materials in electronic format available to students on the university's e-learning platform.<br>**Interactivity**: Students are encouraged to actively participate in the course by asking questions and engaging in discussions based on clinical cases, to transform the lecture into an active learning experience. |
| **5.2. for practical class/ seminar activity** | **Slide preparation laboratory equipment**: Histological technique laboratory for obtaining permanent microscopic preparations, equipped with specific equipment for fixation, dehydration, embedding, sectioning, staining, mounting, labeling and accessories, including but not limited to: microscope with multiple objectives, histokinette for histological processing, histological preparation staining battery, paraffin microtome, adjustable temperature thermostat, refrigerator, histotheque, instruments, reagents, glassware and necessary consumables.<br>**Teaching base equipment**: Permanent didactic microscopic preparations, slides, electron micrographs, didactic 3D animations, 3D reproductions of didactic materials, optical microscope image capture and transmission system, interactive multimedia platform<br>**Location**: Activities are carried out in a properly equipped histology laboratory, with enough functional optical microscopes (ideally, one microscope for every 1-2 students).<br>**Attendance**: Attendance at all practical work is mandatory. The motivation for absences is done according to university regulations, and their recovery is necessary to participate in the final examination.<br>**Mandatory individual equipment:** Each student must wear a white, clean lab coat and have a notebook for practical work and writing/drawing instruments.<br>**Safety and conduct rules:**<br>- Punctuality is mandatory. Access to the laboratory after the start of the work may be restricted. |

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| | - Strict compliance with the labor protection rules and hygiene rules specific to the biology laboratory.<br>- Careful use of the equipment provided (especially microscopes). Any malfunction must be reported immediately to the teaching staff.<br>- Consumption of food and drinks in the laboratory is prohibited.<br>**Preparation and participation**: Students are required to study the practical work protocol *before* coming to the laboratory. Active participation, completion of practical tasks and involvement in discussions are essential for promoting laboratory activity. |

**6. Learning outcomes***

| **Knowledge** |
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| **K1:** Description of the microscopic architecture, cytological characteristics and functions of the four fundamental tissue types (epithelial, connective, muscular, nervous). |
| **K2:** Differentiation of tissue subtypes based on cellular organization, extracellular matrix composition and functional specializations. |
| **K3:** Correlation of the histological structure of organs in the main systems (cardiovascular, respiratory, digestive, urinary, endocrine) with their specific functions. |
| **K4:** In-depth knowledge of the histology of hard (enamel, dentin, cementum, alveolar bone) and soft (pulp, gingiva, oral mucosa) tissues of the stomatognathic system. |
| **K5:** Recognition and definition of normal histological aspects as an indispensable premise for the subsequent understanding of pathological processes. |
| **Skills** |
| **S1:** Correctly and efficiently identify types of tissues, cells and other specific structures on standard histological preparations, through the autonomous use of the optical microscope. |
| **S2:** Produce clear schematic drawings, faithful to the microscopic image and correctly captioned, in the practical workbook, as evidence of understanding of the structures analyzed. |
| **S3:** Apply a histological diagnostic algorithm to identify an organ based on its specific tissue architecture and its characteristic elements. |
| **S4:** Critically interpret histological images, correlating morphological appearance with function (e.g.: recognizing a neutrophil granulocyte and correlating the morphology of the nucleus with the function of phagocytosis). |
| **S5:** Appropriate, precise and fluent use of histological terminology in the description of preparations and in scientific communication. |
| **Responsibility and Autonomy** |
| **RA1:** Awareness of the importance of biological foundations for evidence-based medical practice and assuming responsibility for one's own training. |
| **RA2:** Developing ethical and responsible behavior during laboratory activities, respecting safety standards and the integrity of equipment. |
| **RA3:** Manifesting a critical spirit and scientific curiosity, by formulating pertinent questions and actively seeking answers. |
| **RA4:** Ability to work effectively in a team (within the laboratory) to achieve common goals. |

## 7. Discipline objectives (correlated with learning outcomes)

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| **7.1. General objective** | **HST-GO:** The discipline aims to provide dental students with the theoretical knowledge and practical skills essential for recognizing and understanding the microscopic architecture of human tissues and organs, with a particular emphasis on the stomatognathic system. This forms the indispensable morphological foundation for understanding physiological processes, pathology and therapeutic principles in dental medicine. |
| **7.2. Specific objectives** | **HST-SO1:** Identification, description and differentiation under the optical microscope of the characteristics of the four fundamental tissue types and their subtypes. *(correlated with C1, C2, A1, A2, A5)*<br><br>**HST-SO2:** Understanding the principles of tissue organization of the main organs and systems, constantly correlating histological structure with function. *(correlated with C3, A3, A4)*<br><br>**HST-SO3:** Deepening the knowledge of oral histology, through detailed analysis of dental tissues (hard and soft) and periodontal supporting structures. *(correlated with C4, A1, A4, A5)*<br><br>**HST-SO4:** Formation of practical skills in histological diagnosis, from the correct and autonomous manipulation of the microscope to the application of logical reasoning in the interpretation of preparations. *(correlated with A1, A3, A4, RA1, RA2)*<br><br>**HST-SO5:** Building a solid base of normal morphological knowledge, essential for approaching subsequent preclinical and clinical disciplines (e.g. pathophysiology, pathological anatomy, periodontology). *(correlated with C5, RA3, RA4)* |

## 8. Contents

| 8.1 Courses | Teaching Methods | Observations |
|---|---|---|
| **HIS-C1.** Epithelial tissue. Covering epithelia: simple and stratified. Glandular epithelia. | Interactive lecture, with visual support (microphotographs, diagrams). The basic notions of histological technique are introduced. | Emphasis is placed on classifications and structure-function correlations. |
| **HIS-C2.** Connective tissue. Cells and fibers. Varieties. Cartilaginous tissue. Bone tissue. Ossification. Correlations of bone remodeling in dentistry. | Problem-based presentation; comparative method for differentiating tissue subtypes. | The clinical relevance of bone remodeling in orthodontics and implantology is emphasized. |
| **HIS-C3.** Muscle tissue (striated skeletal, cardiac, smooth). Nervous tissue (neurons, glial cells, synapses). | Lecture with video support to illustrate muscle contraction and synaptic transmission. | The characteristics of the three types of muscles are constantly compared. |
| **HIS-C4.** Circulatory system. Blood. Hematopoiesis. Arterial, venous, capillary vessels. | Learning based on logical schemes to explain hematopoiesis and the structure of the vascular wall. | Correlate the types of vessels with their hemodynamic function. |

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| **HIS-C5.** Lymphoid organs. Thymus, lymph node, spleen, mesenteric lymphoid tissue (MALT). | Interactive lecture; discusses the architecture of lymphoid organs in the context of the immune response. | |
| **HIS-C6.** Endocrine glands. Pituitary, pineal, thyroid, parathyroid, adrenal, endocrine pancreas. | Comparative method to differentiate the histological organization of the main endocrine glands. | |
| **HIS-C7.** Respiratory system. Trachea, structure of bronchi and bronchioles. Lung, structure of pulmonary alveoli. | Integrated learning: the path of air from the upper airways to the alveoli is traced histologically. | |
| **HIS-C8.** Urinary system. Nephron, juxtaglomerular apparatus. Urinary tract. | Case study: examples are used to illustrate the functional importance of renal structures. | |
| **HIS-C9.** The female reproductive system (ovary, fallopian tube, uterus, vagina, mammary gland) and male reproductive system (testicle, genital tract, accessory glands). | Exposure with rich visual support to cover the structural complexity of the organs. | The content is presented at the level of recognition of the main structures. |
| **HIS-C10.** Skin (epidermis, dermis, appendages). Sense organs (eye, ear - structure and histophysiology, olfaction). | Lecture focused on recognizing the layers of the skin. | The sense organs are presented schematically. |
| **HIS-C11.** Digestive tract. Esophagus, stomach, intestines. Adnexal organs (salivary glands, liver, gallbladder, exocrine pancreas). | Comparative method to highlight regional differences in the digestive tract and the structure of the adnexal glands. | |
| **HIS-C12.** Oral histology I - oral hard tissues. Odontogenesis. Enamel, pulp-dentin complex, cementum, alveolar bone. | Lecture with high-quality visual support, focused on structures specific to dentistry. | Courses with maximum direct clinical relevance. |
| **HIS-C13.** Oral Histology II – Oral Soft Tissues. Oral mucosa, gingiva, junctional epithelium, periodontal ligament, tongue. | In-depth study with multiple clinical correlations related to oral pathology (caries, periodontal disease). | |
| **HIS-C14.** Review. Translational education: clinical correlations and current research directions in oral tissues. | Interactive review session. Discussions based on clinical cases. Questions and answers session. | Active preparation for the final exam. |

| 8.2. Laboratory sessions | Teaching methods | Observations |
|---|---|---|
| **HST-LP1. Epithelial tissue:** covering and glandular. | Formative demonstration. Guided observation under the microscope. | |
| **HST-LP2. Connective tissue:** cells, fibers, varieties (loose, dense, adipose). | Collaborative learning in small teams. | |
| **HST-LP3. Cartilaginous tissue** (hyaline, elastic, fibrous)<br>**Bone tissue** (compact, spongy, ossification). | - interactive slide presentations and educational films<br>- practical demonstrations<br>- examination under the microscope of histological preparations and their explanation during practical sessions<br>- examination of cells in optical microscopy images<br>- exercises based on the practical knowledge acquired | Exercises to identify Haversian systems and types of cartilage. |
| **HST-LP4. Muscle tissue** (skeletal, cardiac, smooth)<br>**Nervous tissue** (neurons, glial cells, peripheral nerves). | | Guided observation to compare the three types of muscles and nerve structure |
| **HST-LP5. Circulatory system:** Blood (smear), arteries, veins, capillaries. Heart. | | Differential diagnosis of artery/vein. |
| **HST-LP6. Lymphoid organs**: Thymus, lymph node, spleen, palatine tonsil. | | Identification of the structure of the ganglion and spleen. |
| **HST-LP7. Endocrine glands:** Pituitary, thyroid, parathyroid, adrenal, endocrine pancreas. | | Recognition of specific histological patterns (follicles, cords, etc.). |
| **HST-LP8. Respiratory system** (airways, blood-air barrier)<br>**Urinary system** (urinary tract, juxtaglomerular apparatus). | | Diagnostic algorithm to recognize the trachea and lung.<br>Identification of nephron components on kidney preparations. |
| **HST-LP9. Reproductive system (female and male).** | | Recognition of ovarian structures (follicles) and seminiferous tubules. |
| **HST-LP10. Skin and its appendages.**<br>**Sense organs** (eyes, inner ear, olfactory mucosa). | | Observation of skin layers and sensory organs special histology. |
| **HST-LP11. Digestive tract**: Esophagus, stomach, small intestine, large intestine, ileocecal appendix.<br>**Accessory organs of the digestive tract** (salivary glands, liver, exocrine pancreas) | | Comparative analysis of the digestive tract and accessory glands. |
| **HST-LP12. Oral histology.** Dry and polished tooth, decalcified tooth, developing tooth. Oral mucosa. Sagittal section of the lip, tongue (highlighting lingual papillae and taste buds). | | Salivary glands are studied in comparison with the liver/pancreas, followed by in-depth study of teeth and oral mucosa. |
| **HST-LP13. Final review:** Comparative examination of the preparations. | | Algorithms for analyzing microscopic fields are applied. |
| **HST-LP14. Colloquium:** verification of the concepts and skills acquired in practical work. | Verification of the concepts and skills acquired in laboratory sessions. | Individual evaluation of examination of a specimen under the microscope. |

**8.3. Bibliography for lectures and laboratory/practical sessions**

*Basic notions:*

- Lectures and practical sessions explanations (digital versions available via e-learning platform)
- Mescher AL. **Junqueira's Basic Histology, Text & Atlas.** 17th ed., McGrawHill/Lange, 2013, ISBN 978-1264932146

*Advanced notions:*

- Pawlina W. **Ross's Histology, a Text and Atlas.** 9th ed., Lippincott Williams & Wilkins, 2023, ISBN 978-1975181512

*Supplemental notions (optional)*

- Lowe JS et al. **Stevens & Lowe's Human Histology**. 6th ed. Elsevier, 2024, ISBN 978-0443109706
- Gartner L. **Textbook of Histology**. 5th ed. Elsevier, 2020, ISBN 978-0323672726

*Oral Histology*

- Berkovitz BKB et al. **Oral Anatomy, Histology and Embryology**. 6th edition. Elsevier, 2024, ISBN 978-0323935210
- Chiego D. **Essentials of Oral Histology and Embryology**. 6th edition. Elsevier, 2024, ISBN 978-0323876643
- Fehrenbach M & Popowics T. **Illustrated Dental Embryology, Histology, and Anatomy.** 6th ed. Elsevier, 2025, ISBN 978-0443104244

*Scientific journals (optional):*

- Journal of Dental Research (ISSN: 0022-0345)
- Dentistry Journal (ISSN: 2304-6767)

*Online resources (optional):* **Khan Academy, Osmosis, Ninja Nerd, PubMed**

## 9. Assessment

| Activity type | a. Evaluation criteria | b. Evaluation methods | c. Percentage of final grade |
|---|---|---|---|
| **9.1. Lecture** | - Correctness and completeness of theoretical knowledge<br>- Ability to correlate microscopic structure with tissue and organ function and clinical relevance<br>- Correct use of specialized terminology | **Final written exam**, consisting of multiple-choice questions, short answer/correlation questions and image interpretation) | **60%** |
| **9.2. Practical classes/ seminar** | - - Degree of involvement in didactic dialogue and active participation in the laboratory sessions<br>- Level of understanding of theoretical concepts related to laboratory sessions<br>- Accuracy and speed of identifying structures under the microscope<br>- Ability to describe preparations in detail and to | **Continuous assessment:**<br>- observing the activity during the laboratory,<br>- asking oral questions<br>- periodically checking the practical workbook | **20%** |
| | | **Final practical colloquium** (conditioned on the lab notebook):<br>Individual practical examination:<br>- identification of structures on two histological slides | **20%** |

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| | make correlations between structure and function<br>- Correct and autonomous use of the optical microscope (mandatory condition)<br>- Degree of completion and correctness of the lab notebook | - answers to theoretical questions related to the preparations | |
| **9.3. Individual project** (if any) | N/A | N/A | N/A |

**Minimum performance standard**

In accordance with the university regulations in force, passing the subject is conditional on the **cumulative** and **mandatory** fulfillment of the following requirements:
- passing the laboratory activity, a mandatory condition for participating in the final exam. Passing requires full attendance at the practical work and obtaining an average of at least 5 in the mid-term and colloquium assessments.
- obtaining a minimum grade of 5 in the final written exam.

Failure to comply with **any** of these conditions automatically leads to failure to pass the subject.

The student must demonstrate a **basic familiarity with the notions of histology**, be able to recognize terms and perform simple identification tasks under a microscope.

**The autonomous and correct use of the optical microscope is a mandatory condition for promotion.**

**Knowledge (reflected in the final exam):**
- recognition and memorization: the student can define the central notions (e.g. what is an epithelial tissue, what is an osteon) and list components (e.g. connective tissue cells).
- simple identification: the student can recognize main structures on clear histological diagrams and images (e.g. can identify the tunics of a blood vessel).
- answers to factual questions: the student can correctly answer questions of the type "what?" and "where?" (e.g. "what type of cartilage is found in the pinna of the ear?").
- exam performance: the student obtains a result of approximately 50-55% on the final exam.

**Skills (reflected in the laboratory work and the practical colloquium):**
- autonomous use of the microscope: the student can bring a preparation into the focal plane (clear) without help with the help of the teaching staff and can use low and medium magnification objectives.
- basic visual identification: in the practical colloquium, the student can recognize the fundamental tissue type and an obvious structure on a pre-selected preparation.
- completion of minimum tasks: the student has the complete practical workbook (mandatory condition), but the drawings are schematic, and the descriptions are superficial, often copied without demonstrating their own understanding.
- performance in continuous assessment: the student has an average performance of 50-60% in the course assessments and manages to pass the minimum threshold in the practical colloquium (correct identification, laconic answer to the question).