**A COURSE SYLLABUS – DOCTORAL SCHOOL**

**REGARDING THE QUALIFICATION CYCLE FROM 2020 TO 2024**

| **GENERAL INFORMATION ABOUT COURSE** | |
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| Course title | Possibilities of using tissue and cellular material for scientific research |
| Name of the unit running the course | Doctoral School at University of Rzeszów |
| Type of course *(obligatory, optional)* | Optional |
| Year and semester of studies | V semester |
| Discipline | Medical sciences |
| Language of Course | Polish |
| Name of Course coordinator | Dr hab. n. med. prof. UR Ewa Kaznowska |
| Name of Course lecturer | Dr hab. n. med. prof. UR Ewa Kaznowska |
| Prerequisites | Knowledge of human anatomy, histology and pathology. Knowledge of basic concepts in the field of histological and cytological techniques. Access to computer and Internet. |

**BRIEF DESCRIPTION OF COURSE**

**(100-200 words)**

Rules for collecting material for pathological examination. Protection and transport of tissue and cytological material to the pathology department. Types of fixatives. Getting to know different types of pathological tests and the ability to choose right diagnostic methods. Preparation of tissue and cellular material for scientific research using immunohistochemical reactions, immunofluorescence techniques, molecular techniques, electron microscopy, spectroscopic techniques. Correlation of microscopic images of tissue and organ damage with clinical signs of the disease, anamnesis and results of laboratory determinations. Critical evaluation of the usefulness and limitations of the use of tissue and cellular material for scientific research.

**COURSE LEARNING OUTCOMES AND METHODS OF EVALUATING LEARNING OUTCOMES**

| Learning outcome | The description of the learning outcome defined for the course | Relation to the degree programme outcomes (symbol) | Learning Format (Lectures, classes,…) | Method of assessment of learning outcomes (e.g. test, oral exam, written exam, project,…) |
|---|---|---|---|---|
| **Knowledge (no.)** | **(Knows and understands)** | | | |
| 1. | Basics of histological and cytological techniques | P8S_WG/1 | Lecture | Oral exam |
| 2. | Anatomical and histological structure of selected tissues | P8S_WG/3 | Lecture Classes | Oral exam |
| 3. | Rules for handling material intended for pathological examination | P8S_WG/3 | Lecture Classes | Oral exam |
| 4. | Types of pathological examination and their purpose | P8S_WG/4 | Lecture Classes | Oral exam |
| 5. | General operation principles of devices used in | P8S_WG/2 | Lecture Classes | Oral exam |

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|---|---|---|---|---|
| | pathological procedures | | | |
| **Skills (no.)** | **(Able to)** | | | |
| 1. | Collect and protect tissue and cytological material for microscopic examination depending on the selected research technique | P8S_UW/1 | Classes | Oral exam |
| 2. | Correlate microscopic images of morphological changes in tissues and organs with clinical signs of the disease, history and results of laboratory determinations. | P8S_UW/1 | Classes | Oral exam |
| 3. | Critically analyse and evaluate patological findings in relation to the purpose of the scientific research and, if necessary, modify or apply a technique aimed at its implementation | P8S_UW/2 | Classes | Oral exam |
| 4. | Participate in scientific discourse at home and abroad | P8S_UK/1<br>P8S_UK/2<br>P8S_UK/3<br>P8S_UK/4<br>P8S_UK/5 | Classes | Oral exam |
| 5. | Plan and implement individual and team research projects, also in an international environment | P8S_UO | Classes | Oral exam |
| **Social competence (no.)** | **(Ready to)** | | | |
| 1. | Knows the rules of teamwork | P8S-UU/1 | Classes | Oral exam |
| 2. | Critical evaluation of achievements within a given discipline and recognition of knowledge in solving cognitive problems | P8S-KK/1<br>P8S-KK/3 | Classes | Oral exam |
| 3. | Initiate public interest activities | P8S-KO/2 | Classes | Oral exam |

**LEARNING FORMAT – NUMBER OF HOURS**

| Semester (no.) | Lectures | Seminars | Lab classes | Internships | others | ECTS |
|---|---|---|---|---|---|---|
| V | 5 | —— | 10 | —— | - | 0 |

**METHODS OF INSTRUCTION**

Lectures – multimedia presentations

Classes - practical presentation of the handling of material for pathological examination, taking into account all aspects that constitute the program content

**COURSE CONTENT**

1. Rules for collecting material for pathological examination.
2. Protection and transport of tissue and cytological material to the pathology department. Types of fixatives.
3. Getting to know different types of pathological tests and the ability to choose right diagnostic methods.
4. Preparation of tissue and cellular material for scientific research using immunohistochemical reactions, immunofluorescence techniques, molecular techniques, electron microscopy, spectroscopic techniques.
5. Correlation of microscopic images of tissue and organ damage with clinical signs of the disease, anamnesis and results of laboratory determinations.
6. Critical evaluation of the usefulness and limitations of the use of tissue and cellular material for scientific research.

**COURSE ASSESSMENT CRITERIA**

5.0 - demonstrates knowledge of each educational content at a level of 93%-100%
4.5 - demonstrates knowledge of each educational content at a level of 86%-92%
4.0 - demonstrates knowledge of each educational content at a level of 77%-85%
3.5 - demonstrates knowledge of each educational content at a level of 69%-76%
3.0 - demonstrates knowledge of each of the educational content at the level of 60%-68%
The prerequisite for passing the course is passing the exercises and a positive grade on the final exam. Passing of the exercises is based on activity during classes and evaluation of acquired skills and knowledge.
The final exam has an oral form.

**TOTAL PhD STUDENT WORKLOAD REQUIRED TO ACHIEVE THE INTENDED LEARNING OUTCOMES – NUMBER OF HOURS AND ECTS CREDITS**

| Activity | Number of hours |
|---|---|
| Scheduled course contact hours | 15 |
| Other contact hours involving the teacher (consultation hours, examinations) | 2 |
| Non-contact hours – student`s own work (preparation for classes or examinations, project, etc.) | 15 |
| **Total number of hours** | 32 |
| **Total number of ECTS credits** | 0 |

**INSTRUCTIONAL MATERIALS**

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| Compulsory literature: | 1. ORGANIZATIONAL STANDARDS AND STANDARDS OF CONDUCT IN PATHOLOGY. PATHOLOGY: STANDARDS AND EXAMPLES OF GOOD PRACTICE AND ELEMENTS OF DIFFERENTIAL DIAGNOSIS. POL-PAT.PL (TAB: FOR USE, STANDARDS AND GUIDELINES IN PATHOLOGY 2020) |
| Complementary literature: | 1. Fassan M. Molecular Diagnostics in Pathology. Time for a Next-Generation Pathologist? Arch Pathol Lab Med. 2018; 142:313–320; doi: 10.5858/ arpa.2017-0269-RA |

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| | 2. Tunnissen E. et al. Ex Vivo Artifacts and Histopathologic Pitfalls in the Lung. Arch Pathol Lab Med. 2016; 140:212–220; doi: 10.5858/ arpa.2015-0292-OA<br>3. Santana M.F., de Lima Ferreira L.C. Errors in Surgical Pathology Laboratory http://dx.doi.org/10.5772/intechopen.72919 |

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Date and signature of the Course lecturer

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Approved by the Head of the Department or an authorised person