

SYLLABUS  
concerning the cycle of education 2023-2029  
(date range)

**1.1. BASIC INFORMATION CONCERNING THIS SUBJECT / MODULE**

|                                            |                                              |
|--------------------------------------------|----------------------------------------------|
| Subject / Module                           | <b>Laboratory diagnosis</b>                  |
| Course code / module *                     | <b>DL/E</b>                                  |
| Faculty of (name of the leading direction) | <b>Medical College of Rzeszów University</b> |
| Department Name                            | <b>Medical College of Rzeszów University</b> |
| Field of study                             | <b>medical direction</b>                     |
| Level of education                         | <b>uniform master's studies</b>              |
| Profile                                    | <b>practical</b>                             |
| Form of study                              | <b>stationary / extramural</b>               |
| Year and semester                          | <b>year IV, semester VII</b>                 |
| Type of course                             | <b>obligatory</b>                            |
| Coordinator                                | <b>dr Agnieszka Banaś</b>                    |
| First and Last Name of the Teacher         |                                              |

\* - According to the resolutions of the Faculty of Medicine

**1.2. Forms of classes, number of hours and ECTS**

| Lecture | Exercise | Conversation | Laboratory | Seminar | ZP | Practical | Self-learning | Number of points ECTS |
|---------|----------|--------------|------------|---------|----|-----------|---------------|-----------------------|
| 15      | 45       | -            | -          | -       | -  | -         | -             | 3                     |

**1.3. The form of class activities**

☒ classes are in the traditional form

☐ classes are implemented using methods and techniques of distance learning

**1.4. Examination Forms / module (exam, credit with grade or credit without grade)**

**2. REQUIREMENTS**

Biology, biochemistry, physiology

**3. OBJECTIVES, OUTCOMES, AND PROGRAM CONTENT USED IN TEACHING METHODS**

### 3.1. Objectives of this course/module

|    |                                                                                                                                                    |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------|
| C1 | Acquisition of the skillful selection of laboratory tests and proper interpretation of the obtained results in solving specific clinical problems. |
| C2 | Understanding the biochemical consequences of systemic disorders and learning the analytical methods that enable their tracking.                   |
| C3 | The ability to analyze the results of laboratory tests of selected clinical cases.                                                                 |

### 3.2 OUTCOMES FOR THE COURSE / MODULE (TO BE COMPLETED BY THE COORDINATOR)

| EK (the effect of education) | The content of the learning effect defined for the subject (module)                                                             | Reference to directional effects (KEK) |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| EK_01                        | He knows the basic methods of fetal diagnostics and therapy                                                                     | E.W5.                                  |
| EK_02                        | He knows the types of biological materials used in laboratory diagnostics and the principles of collecting material for testing | E.W.37                                 |
| EK_03                        | He knows the theoretical and practical basics of laboratory diagnostics                                                         | E.W.38                                 |
| EK_04                        | He knows and understands the possibilities and limitations of laboratory tests in emergency situations                          | E.W.39                                 |
| EK_05                        | He lists the indications for the implementation of monitored therapy                                                            | E.W.40                                 |
| EK_06                        | interprets laboratory tests and identifies the causes of deviations                                                             | E.U.24                                 |
| EK_07                        | Retrieves material for tests used in laboratory diagnostics                                                                     | E.U.24                                 |
| EK_08                        | He is aware of his own limitations and the ability to constantly improve his skills                                             | K.04.                                  |

### 3.3 CONTENT CURRICULUM (filled by the coordinator)

#### A. Lectures

| Course contents                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Basic concepts used in laboratory clinical diagnostics and methods of using the result of laboratory testing in clinical practice.                                           |
| Dependent and independent of the laboratory reasons for non-compliance of the laboratory test result with the patient's condition. Doctor's cooperation with the laboratory. |
| Quality control of laboratory tests and its significance for the credibility of the result.                                                                                  |

|                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------|
| Modern laboratory methods in clinical practice, with particular emphasis on methods based on antigen-antibody reactions. |
| Diagnostic algorithms.                                                                                                   |
| Diagnosis of liver and bile duct diseases.                                                                               |
| Biochemical tests and functional tests in the diagnosis of intestinal dysfunction.                                       |
| Diagnosis of pancreatic diseases.                                                                                        |
| Selection of laboratory tests in urgent situations.                                                                      |
| Clinical Toxicology.                                                                                                     |
| Advances in medicine on the example of osteoporosis diagnosis.                                                           |

## B. Exercises

|                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Course contents</b>                                                                                                                                                                                                                                                                                                                                                                                                              |
| Diagnostic aspects of hormonal disorders. Algorithms of diagnostic procedures in selected endocrine diseases. The assessment of the usefulness of the determination of various hormones in biological material using the IMMULITE analyzer.                                                                                                                                                                                         |
| Acid-base economy of the body in terms of clinical usefulness. Analysis of results obtained in patients with disturbances of acid-base balance. Detection and initial identification of poisons in biological material by thin-layer chromatography - interpretation of the obtained results.                                                                                                                                       |
| Biochemical characteristics of pregnancy, prenatal age and older age. Evaluation (based on the PRISKA computer program) of the risk of pregnancy risk - double and triple tests.                                                                                                                                                                                                                                                    |
| Laboratory diagnosis of hemostasis and fibrinolysis disorders. Determination of haematological parameters using the apparatus for hematological determinations BC-2300 - MINDRAY HEMATOLOGY ANALIZER.                                                                                                                                                                                                                               |
| Lipid management assessment in terms of clinical usefulness. Development of individual atherosclerosis prophylaxis cards based on: total cholesterol, triglycerides, LDL and HDL cholesterol, electrophoretic separation of plasma lipoproteins and apo A1 and apo B assays. Determination of lipid metabolism parameters using the EM - 280 EMAPOL biochemical analyzer.                                                           |
| Monitoring of metabolic diseases of bone tissue. Discussion on selected cases of bone tissue metabolic diseases including osteoporosis and bone tissue cancers. Predicting the rate of bone mass loss based on nomograms based on pairs of modern markers of bone turnover: OC in pairing with NTx or CTx; bone fraction ALP in pair with CTx or DPD; PINP in tandem with NTx or CTx in selected patients with rapid bone turnover. |
| Laboratory diagnosis of blood and blood-forming diseases. Basics of haematological diagnostics: normal myelogram, cytochemical tests of the bone marrow, determination of the number of red blood cells, determination of                                                                                                                                                                                                           |

|                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| hemoglobin concentration, hematocrit, red blood cell counts, reticulocyte counts, osmotic resistance, lymphoid cell decline, oral iron load test.                                                                                                                                   |
| Serological diagnosis, blood donor, diagnostics of post-op.                                                                                                                                                                                                                         |
| Blood plasma proteins, biochemistry and laboratory diagnostics: the role of plasma proteins, disturbances of plasma protein concentration, Biernacki's reaction, plasma protein electrophoresis, selected serum proteins of recognized diagnostic importance, acute phase proteins. |
| Laboratory diagnostics of urine, cerebrospinal fluid and body cavity fluids.                                                                                                                                                                                                        |
| Evaluation of the credibility of the laboratory result.                                                                                                                                                                                                                             |

### 3.4 TEACHING METHODS

**Lecture:** multimedia presentation.

**Exercises:** practical exercises, demonstration, lecture form.

**Seminars:** group work, case study, problem solving, discussion.

**Student's own work:** working with a book, preparing for classes and preparing for the test and exam

## 4 METHODS AND EVALUATION CRITERIA

### 4.1 Methods of verification of learning outcomes

| Symbol of effect                                    | Methods of assessment of learning outcomes (Eg.: tests, oral exams, written exams, project reports, observations during classes) | Form of classes |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------|
| EK_01,<br>EK_02<br>EK_03,<br>EK_04 EK_<br>05, EK_08 | Test exam and open questions.                                                                                                    | Lecture         |
| EK_06,<br>EK_07                                     | Practical credit, problem solving of study case type                                                                             | Exercises       |

### 4.2 Conditions for completing the course (evaluation criteria)

#### **LECTURES (EK\_01, EK\_02, EK\_03, EK\_04 EK\_05):**

1. test pass and open questions:

A: Questions in the field of messages to remember;

B: Questions in the field of speech to understand;

C: Solving a typical written task;

D: Solving an atypical writing task;

- for insufficient solution of tasks only from areas A and B = grade 2.0

- for solving tasks only from areas A and B, the possibility of obtaining max. rating 3.0

- for solving tasks from the area A + B + C, the possibility of obtaining max. evaluation 4.0
- for the solution of tasks in the area A + B + C + D, the possibility of obtaining a rating of 5.0

Knowledge assessment:

Written test

5.0 - has knowledge of each of the contents of education at the level of 90% -100%

4.5 - has knowledge of each of the content of education at the level of 84% -89%

4.0 - has knowledge of each of the content of education at the level of 77% -83%

3.5 - has knowledge of each of the content of education at the level of 70% -76%

3.0 - has knowledge of each of the content of education at the level of 60% -69%

2.0 - has knowledge of each of the contents of education below 60%

**Classes, seminars (EK\_06, EK\_07):**

Skill assessment

5.0 - the student actively participates in classes, is well prepared, knows the basics of theoretical and practical laboratory diagnostics, correctly interprets laboratory tests and identifies the causes of deviations

4.5 - the student actively participates in classes, knows the basics of theoretical and practical laboratory diagnostics, correctly interprets laboratory tests and identifies the causes of deviations

4.0 - the student actively participates in classes, is improved, knows the basics of theoretical and practical laboratory diagnostics, correctly interprets laboratory tests and identifies the causes of deviations

3.5 - the student participates in classes, his scope of preparation does not allow for a comprehensive presentation of the discussed problem, he knows the theoretical and practical background of laboratory diagnostics sufficiently, interprets laboratory tests and identifies the cause of deviations

3.0 - the student participates in the classes, knows the theoretical and practical background of laboratory diagnostics sufficiently, interprets laboratory tests and identifies the reasons for deviations, but is often corrected

2.0 - the student passively participates in classes, the statements are incorrectly substantive, he does not know theoretical and practical basis of laboratory diagnostics sufficiently, he misinterprets laboratory tests and identifies the causes of deviations, however he is often corrected, he is often corrected

## 5. Total student workload required to achieve the desired result in hours and ECTS credits

| Activity                                            | Hours / student work |
|-----------------------------------------------------|----------------------|
| Hours of classes according to plan with the teacher | 60                   |
| Preparation for classes                             | 5                    |

|                                    |           |
|------------------------------------|-----------|
| Participation in the consultations | 2         |
| The time to write a paper / essay  |           |
| Preparation for tests              | 10        |
| Participation in colloquia         | <b>1</b>  |
| Other (e-learning)                 | -         |
| SUM OF HOURS                       | <b>78</b> |
| TOTAL NUMBER OF ECTS               | <b>3</b>  |

#### 6. TRAINING PRACTICES IN THE SUBJECT / MODUL

|                                   |   |
|-----------------------------------|---|
| Number of hours                   | - |
| Rules and forms of apprenticeship | - |

#### 6. LITERATURE

##### READING:

1. Diagnostyka laboratoryjna z elementami biochemii klinicznej, pod red. A. Dembińskiej-Kieć & J. Naskalskiego, Elsevier Urban & Partner, wyd. III poprawione i uzupełnione, Wrocław 2010.
2. Diagnostyka laboratoryjna. (tłumaczenie), B. Neumeister, L. Besenthal, H. Liebch, Urban & Partner, Wrocław 2001.
3. Diagnostyka laboratoryjna – J.Tomaszewski, Wydawnictwo Lekarskie PZWL, Warszawa 1997.
4. Biochemia kliniczna, pod red. S. Angielskiego, Z. Jakubowskiego & M.H. Dominiczaka, Perseusz, Gdańsk 1996.
5. Interpretacja badań laboratoryjnych. Wallah J. Warszawa 2011.
6. 250 badań laboratoryjnych- kiedy zlecać jak interpretować. Cadet R.PZWL.2012.

Acceptance Unit Manager or authorized person