A COURSE SYLLABUS – DOCTORAL SCHOOL

REGARDING THE QUALIFICATION CYCLE FROM 2025/2026 TO 2028/2029

GENERAL INFORMATION ABOUT COURSE	
Course title	**DOCTORAL SEMINAR**
Name of the unit running the course	Rzeszów University Doctoral School
Type of course *(obligatory, optional)*	compulsory subject
Year and semester of studies	years I-IV, semesters: I-VII
Discipline	**Medical sciences**
Language of Course	Polish language
Name of Course coordinator	**Radosław Chaber**
Name of Course instructor	**Radosław Chaber**
Prerequisites	Academic education at master's degree level; knowledge, skills and social competences at level 7 of the Polish Qualifications Framework; foreign language proficiency at level B2 (CEFR).

BRIEF DESCRIPTION OF COURSE
(100-200 words)

The doctoral seminar serves to systematically organize knowledge and develop research skills in the area of objective assessment of iron metabolism in children with hematological and oncological diseases. During the course, the doctoral student analyzes current scientific achievements regarding biomarkers and methods of assessing iron deficiency (including ferritin, TSAT, sTfR, sTfR/log(ferritin) index, Hb of reticulocytes, hepcidin, inflammatory markers), differentiation of iron deficiency anemia from inflammatory anemia, as well as problems of iron excess related to transfusions and oncological treatment/HSCT. The seminar takes the form of a discussion (Journal Club), a presentation of one's own progress in the doctoral project, methodological consultations and a critical evaluation of the publication. The result is preparation for planning and implementing research, data analysis and disseminating the results in the scientific community.

COURSE LEARNING OUTCOMES AND METHODS OF EVALUATING LEARNING OUTCOMES

Learning outcome	The description of the learning outcome defined for the course	Reference to learning outcomes for qualifications at Level 8 of the Polish Qualification Framework (PRK) (symbol)	Learning Format (Lectures, classes,...)	Method of assessment of learning outcomes (e.g. test, oral exam, written exam, project,...)
Knowledge: (no.)	***knows and understands***			
P8S_WG1	He has extensive knowledge of iron metabolism and laboratory/imaging markers and methods for assessing iron status in children with hematological and oncological diseases, taking into account current global achievements.	**P8S_WG**	seminar	oral presentation, discussion,
P8S_WG2	He knows the directions of development and the latest discoveries regarding the regulation of iron metabolism (including the hepcidin–ferroportin axis) and new	**P8S_WG**	seminar	oral presentation, discussion,

	biomarkers and diagnostic algorithms in the pediatric population.			
P8S_WG3	Knows and understands the terminology and criteria for recognizing: iron deficiency, functional iron deficiency, inflammatory anemia, and iron overload; uses the conceptual framework in Polish and English.	**P8S_WG**	seminar	oral presentation, discussion,
Skills: (no.)	***is able to***			
P8S_UW1	It can define the research problem, objective and hypothesis regarding the objective assessment of iron status in selected disease entities, select and improve research methods and draw conclusions based on the obtained results.	**P8S_UW**	seminar	oral presentation, discussion, written assignments,
P8S_UW2	Can critically select and use the scientific literature to develop a review, identify research gaps, and build a diagnostic framework/algorithm for assessing iron balance in pediatric hematooncology.	**P8S_UW**	seminar	oral presentation, discussion, written assignments,
P8S_UW3	It critically analyses and evaluates research results (including the quality of laboratory methods, preanalytical and confounding factors), formulates conclusions and recommendations, and assesses their clinical implications.	**P8S_UW**	seminar	oral presentation, discussion, written assignments,
P8S_UK6	Can prepare and present a presentation of research results or literature analysis and actively participate in scientific discussion in a foreign language at the B2 level.	**P8S_UK**	seminar	presentation, discussion, continuous evaluation
Social competence: (no.)	***is ready to***			
P8S_KK1	He is ready to critically evaluate scientific achievements in the area of iron economy and to reflect on his own contribution to the development of the discipline.	**P8S_KK**	seminar	oral presentation, discussion, written assignments,
P8S_KK3	Recognizes the importance of evidence-based knowledge in addressing cognitive and practical issues; responsibly plans research activities with patient safety and ethics in mind.	**P8S_KK**	seminar	continuous evaluation, discussion

LEARNING FORMAT – NUMBER OF HOURS						
Semester (no.)	Lectures	Seminars	Lab classes	Placements	other	ECTS
I - VII	-	**-**	-	-	**7 x 15 hrs. - 105 hrs.**	**7 x 2 ECTS – 14 ECTS**

METHODS OF INSTRUCTION

- SCIENTIFIC DISCUSSION (JOURNAL CLUB) ON PUBLICATIONS IN THE FIELD OF IRON ECONOMY DIAGNOSTICS;
- DOCTORAL STUDENT PRESENTATIONS (LITERATURE, RESEARCH PROTOCOL, PARTIAL RESULTS) AND MODERATED DISCUSSION;
- ANALYSIS OF CLINICAL CASES (PEDIATRIC HEMATOONCOLOGY) AS A CONTEXT FOR BIOMARKER INTERPRETATION;
- WORKING WITH DATA: STATISTICAL ANALYSIS PLAN, INTERPRETATION OF RESULTS, PREPARATION OF TABLES AND FIGURES;
- CONSULTATIONS WITH THE SUPERVISOR/AUXILIARY SUPERVISOR REGARDING THE PROGRESS OF THE DOCTORAL DISSERTATION.

COURSE CONTENT

1. Lecture / Conversatorium:

Semester I: basics of the physiology and pathophysiology of iron metabolism; review of markers (ferritin, TSAT, sTfR, CHr, hepcidin); literature review plan.

Semester II: definitions and recognition criteria (ID, IDA, ACD/AI, functional iron deficiency); impact of inflammation and cancer on markers.

Semester III: iron balance in pediatric oncology (chemotherapy, supportive care, anemia); principles of interpretation of results during therapy.

Semester IV: iron management in hematological diseases (hemolysis, thalassemia, chronic diseases); transfusions and iron overload, diagnosis and monitoring.

Semester V: research methodology in the doctoral project: population selection, time points, pre-analysis, standardization of collections; diagnostic algorithms and statistical methods (ROC, multivariate models).

Semester VI: data analysis and interpretation of results; preparation of the manuscript (methods, results, discussion), reporting rules.

Semester VII: synthesis of results, preparation of dissertation chapters, plan for disseminating results (conferences, publications), preparation for defense.

2. Exercises / laboratories / other:
Preparation of presentations and abstracts of articles (Journal Club), development of research protocols and tools (CRF/database), preparation of a statistical analysis plan and doctoral progress reports.

COURSE ASSESSMENT CRITERIA

Pass after each semester (Z1–Z7) based on continuous assessment.
Minimum requirements per semester: (1) active participation in the discussion, (2) at least one Journal Club presentation or progress report, (3) submission of a short written paper (critical abstract/review excerpt/protocol/methods/analysis), (4) documented progress in implementing the individual research plan and preparing the doctoral dissertation.

Assessment: zal. – meeting requirements and substantive progress; nzal. – no implementation of requirements or no progress.

TOTAL DOCTORAL STUDENT WORKLOAD REQUIRED TO ACHIEVE THE EXPECTED LEARNING OUTCOMES– NUMBER OF HOURS AND ECTS CREDITS	
Activity	Number of hours
Scheduled course contact hours	**7 x 15 hrs. – 105 hrs.**
Other contact hours involving the instructor (duty hours, examinations)	**6 hrs.**
Non-contact hours – student`s own work (preparation for classes or examinations, project, etc.)	**309 hrs.**
Total number of hours	**420 hrs.**
Total number of ECTS credits	**7 x 2 ECTS – 14 ECTS**

INSTRUCTIONAL MATERIALS	
Compulsory literature:	- Chaber R, Helwich E, Lauterbach R, Mastalerz-Migas A, Matysiak M, Peregud-Pogorzelski J, et al. Diagnostyka i leczenie niedoboru żelaza oraz niedokrwistości z niedoboru żelaza u dzieci i młodzieży. Rekomendacje Polskiego Towarzystwa Pediatrycznego, Polskiego Towarzystwa Onkologii i Hematologii Dziecięcej, Polskiego Towarzystwa Neonatologicznego, Polskiego Towarzystwa Medycyny Rodzinnej. Przegl Pediatr. 2023;52:29–55. doi:10.26625/10029. - Camaschella C. Iron-deficiency anemia. N Engl J Med. 2015;372(19):1832–1843. doi:10.1056/NEJMra1401038. - Ganz T, Nemeth E. Hepcidin and iron homeostasis. Biochim Biophys Acta. 2012;1823(9):1434–1443. doi:10.1016/j.bbamcr.2012.01.014. - Fish JD, Lipton JM, Lanzkowsky P, eds. Lanzkowsky's Manual of Pediatric Hematology and Oncology. 7th ed. Academic Press (Elsevier); 2021. - Orkin SH, Nathan DG, Ginsburg D, Look AT, Fisher DE, Lux SE, eds. Nathan and Oski's Hematology of Infancy and Childhood. 7th ed. Elsevier; 2008. - Blaney SM, Adamson PC, Helman LJ, eds. Pizzo & Poplack's Pediatric Oncology. 8th ed. Wolters Kluwer (Lippincott Williams & Wilkins); 2021.
Complementary literature:	- Review publications and meta-analyses on the markers: sTfR, CHr/Ret-He, hepcidin, ZPP and composite indices (sTfR/log(ferritins)). - Guidelines for the management of anemia and iron overload in the pediatric population (consensuses of scientific societies). - Work on the impact of inflammation/cancer, transfusion therapy and HSCT on iron metabolism and the risk of infection and complications. - Current source articles discussed in the Journal Club format (selected depending on the doctoral project).

***(1 ECTS POINT CORRESPONDS TO 25–30 HOURS OF TOTAL WORK BY THE DOCTORAL STUDENT REQUIRED TO ACHIEVE THE INTENDED RESULTS)**

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Date and signature of the Course instructor

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Approved by the Head of the Department or an authorised person