



ONCOGENETICS

1. IMPRINT

Academic Year	2026/2027
Department	Faculty of Medicine
Field of study	Medicine
Main scientific discipline	Medical sciences
Study Profile	General academic
Level of studies	Uniform MSc
Form of studies	Full time studies
Type of module / course	Obligatory
Form of verification of learning outcomes	Completion
Educational Unit / Educational Units	Department of Tumor Biology and Genetics Medical University of Warsaw Pawińskiego 7 02-106 Warsaw, Poland Email: onkogenetyka@wum.edu.pl Phone: (4822) 599-1670
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2. BASIC INFORMATION

Year and semester of studies	Year 3, Semester 5 (winter)	Number of ECTS credits	1.00
FORMS OF CLASSES	Number of hours	ECTS credits calculation	
Contacting hours with academic teacher			
Lecture (L)			
Seminar (S)	3 (including 1 hour of seminar provided in e-learning)	0,1	
Classes (C)	12	0,5	
e-learning (e-L)			
Practical classes (PC)			
Work placement (WP)			
Unassisted student's work			
Preparation for classes and completions	10	0,4	

3. COURSE OBJECTIVES

O1	Acquisition of knowledge about the importance of genetic testing in modern oncology, with particular emphasis on the use of the latest technologies (such as next-generation high-throughput sequencing – NGS) in the prevention, classification and molecularly targeted therapy of cancer.
O2	Develop skills in interpreting the results of genetic and cytogenetic tests performed in oncology and hemato-oncology.
O3	Gain competence in selecting appropriate molecular techniques and determining the scope of genetic testing across diverse clinical scenarios.

4. STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING

Code and number of the effect of learning in accordance with standards of learning	Effects in the field of: <i>(in accordance with appendix to the Regulation of Minister of Science and Higher education from 29th of September 2023)</i>
Knowledge – Graduate* knows and understands:	
C.W2	genetic causes of hereditary predisposition to cancer;
C.W5	genetic determinants of the most common single-gene, polygenic and multifactorial diseases, basic chromosome aberration syndromes, syndromes caused by genomic rearrangements, polymorphisms, epigenetic and post-transcriptional changes;

C.W8	genetic diagnostic methods and the basic indications for their use;
C.W9	genetic mechanisms of drug resistance acquisition by microorganisms and cancer cells and their relationship to the need for individualisation of pharmacotherapy;
C.W26	pathogenesis of diseases, including genetic and environmental conditions;
C.W42	molecular basis of cancer and issues in cancer immunology;
C.W43	practical elements of molecular biology and immunology used in the diagnosis and therapy of oncological diseases
E.W24.3	oncology issues, including: 3) basics of early cancer detection, principles of screening and preventive measures in oncology;

Skills– Graduate* is able to:

B.U8	use medical databases and correctly interpret the information they contain to solve problems in basic and clinical sciences;
C.U2	make decisions on the need for cytogenetic and molecular tests;
C.U3	read basic genetic test results, including karyotypes;
C.U4	determine genetic risk based on bloodline and genetic test result for chromosomal aberrations, genomic rearrangements, single-gene and multifactorial diseases;

* In appendix to the Regulation of Minister of Science and Higher education from 29th of September 2023 „graduate”, not student is mentioned.

5. ADDITIONAL EFFECTS OF LEARNING *(non-compulsory)*

Number of effect of learning	Effects in the fields of:
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Knowledge – Graduate knows and understands:

K1	
K2	

Skills– Graduate is able to:

S1	relate images of tissue and organ damage to clinical signs of disease, history and laboratory findings to establish a diagnosis in the most common diseases of adults and children (C.U7);
S2	

Social Competencies – Graduate is ready for:

SC1	
SC2	

6. CLASSES

Form of class	Class contents	Effects of Learning
Seminar	Seminar 1 (<i>e-learning platform</i>) self-completed before the course - <u>Introduction to oncogenetics</u> . Carcinogenesis, oncogenes and suppressor genes. Types and examples of genetic aberrations in tumors and their nomenclature. Principles of classification of pathogenicity of genetic variants and determination of their clinical significance.	C.W2, C.W5, C.W8, C.W9, C.W42, C.W43, C.U3
Seminar	Seminar 2 - <u>Recent genetic technologies and their implementation in routine clinical practice: an introduction to precision medicine as demonstrated in oncology</u> . The most important advances in cancer genetic research over the past decade. Introduction and clarification of key concepts such as personalized oncology, precision oncology, actionable mutations, tumor profiling, and tumor mutational burden. Overview of genetic methods, from single-gene testing to multigene next-generation sequencing (NGS) in oncology, including their respective advantages and limitations. Examples of biomarkers essential for targeted therapy and the application of NGS-based genetic testing in selected solid and hematopoietic malignancies.	C.W2, C.W5, C.W8, C.W9, C.W26, C.W42, C.W43, C.U2, C.U4
Exercise	Exercise 1 – <u>Diagnosis of hematologic malignancies based on cytogenetic and molecular techniques</u> . Molecular biology and cytogenetic methods used in hemato-oncology: sample collection, DNA/RNA isolation, in vitro culture, karyotype and FISH analysis, PCR and NGS testing. Analysis of selected clinical cases, interpretation of genetic test results.	C.W2, C.W5, C.W8, C.W9, C.W26, C.W42, C.U2, C.U3
Exercise	Exercise 2 - <u>Genetic testing in selected hereditary cancers</u> . Genetic predisposition to cancer development. Recommendations for diagnostics and prevention. Application of knowledge regarding hereditary variants to implement targeted therapy, as exemplified by synthetic lethality and the use of PARP inhibitors in BRCA-mutated cancers. Analysis of patient cases and diagnostic tests illustrating the genetic basis of hereditary cancers. Interpretation of results and selection of appropriate genetic tests.	B.U8, C.W2, C.W5, C.W8, C.W9, C.W26, C.W42, C.W43, C.U2, C.U3, C.U4, E.W24.3
Exercise	Exercise 3 - <u>Genetic testing in the diagnosis, classification and treatment of solid tumors</u> . Diagnostic and prognostic factors. Integration of high-throughput genetic data with other diagnostic techniques. Molecular targets and predictive factors in personalized oncology. Pathogenicity and clinical significance of genetic alterations. Causes of resistance to targeted therapy. Analysis of clinical cases and interpretation of test results.	B.U8, C.W5, C.W8, C.W9, C.W26, C.W42
Exercise	Exercise 4 - <u>Molecular tumor board (MTB)</u> Analysis of clinical cases, determination of diagnostic and therapeutic procedures and recommendations for patients.	B.U8, C.W8, C.W43, C.U2, C.U3, C.U4

7. LITERATURE

Obligatory

Robbins, Cotran & Kumar Pathologic Basis of Disease (11. ed.), Kumar, Abbas, Aster, 2025; (selected chapters) Medical Genetics (6. ed.). Jorde, Carey, Bamshad, 2019; (selected chapters)

Supplementary

Molecular Biology of Cancer: Mechanisms, Targets, and Therapeutics (6. ed.). Pecorino; 2026; Selected publications and guidelines articles available in the e-learning platform as an integral part of the course

8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
B.U8, C.W2, C.W5, C.W8, C.W9, C.W26, C.W42, C.W43, C.U2, C.U3, C.U4, E.W24.3	Evaluation of students' preparation for seminars and exercises. Review of content posted on the e-learning platform. Assessment of active participation in seminars and exercises during classes. A multiple-choice question (MCQ) test covering material presented in seminars and exercises, consisting of 20 questions.	Completion of modules with short questions and quizzes on the e-learning platform. Positive evaluation by the teacher, confirming acquisition of relevant skills and competencies. Passing threshold: achievement of at least 60% of the maximum possible points. <i>e.g. threshold number of points</i>

9. ADDITIONAL INFORMATION

This subject is closely related to genetic research conducted at the Medical University of Warsaw and diagnostic work carried out at the Medical University of Warsaw Clinical Center. The presented clinical cases are examples from our own research and diagnostics activity.

Classes are held in weekly blocks from Monday through Friday during the winter semester.

Course regulations and a detailed schedule will be available on the website: <https://onkogenetyka.wum.edu.pl/en> before the start of the semester in which the classes are scheduled.

To successfully complete the course, students must fulfill the following requirements:

- 1) Complete all seminars on the e-learning platform,
- 2) Maintain 100% attendance at all classes,
- 3) Pass the final colloquium.

In the event of a single absence, it is possible to make up the class with another group. Making up more than one class or changing student groups requires consultation with the course coordinator.

The final colloquium is organized by the Exam Bureau with the use of computer rooms at the Teaching Center. The test consists of 20 single-choice or multiple-choice questions. Duration: 25 minutes. The pass threshold is 60%.

If a student fails to pass on two scheduled dates, a third attempt may be permitted, which may be oral or written (at the discretion of the Department Head), in accordance with the Medical University of Warsaw regulations on exams and course completion.

Academic consultations are possible after making an appointment with the teacher via e-mail or phone.

The Student Research Group (Scientific Club) "GenePath" is active at the Department.

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ATTENTION

The final 10 minutes of the last class of the block/semester/year should be allotted for students to fill out the Survey of Evaluation of Classes and Academic Teachers