



Course sheet

1. Program data

1.1.	CAROL DAVILA UNIVERSITY OF MEDICINE AND PHARMACY
1.2.	FACULTY OF MEDICINE / DEPARTMENT 8 Radiology, Oncology, Hematology
1.3.	SUBJECT HEMATOLOGY EMERGENCY UNIVERSITY HOSPITAL BUCHAREST
1.4.	FIELD OF STUDY: HEALTHCARE
1.5.	STUDY LEVEL: LICENSE
1.6.	STUDY PROGRAM: MEDICINE

2. Data on the subject

2.1.	Name of the discipline / mandatory / optional subject within the discipline: ELEMENTS OF GENETIC AND MOLECULAR DIAGNOSIS IN HEMATOLOGY						
2.2.	Location: Emergency University Hospital Bucharest						
2.3.	Responsible for lectures: PROF. UNIV. DR. VLADAREANU ANA MARIA, ASSOCIATE PROFESSOR DR. CRISTINA MAMBET, DR. STEJARA MIHAI (PhD student), DR. CATALINA FEREA(PhD student), ANDRADA- AMIRA VOINOVICI(PhD student), UNIV. ASSIST. ANDREEA SPINU						
2.4.	Responsible for practical clinical learning activities: DR. STEJARA MIHAI (PhD student), DR. CATALINA FEREA(PhD student), ANDRADA- AMIRA VOINOVICI(PhD student), UNIV. ASSIST. ANDREEA SPINU						
2.5. Year of study	III	2.6. Semester		2.7. Type of evaluation	Written exam	2.8. The type of academic discipline	Optional

3. Estimated total time (hours / semester of teaching activity) - modular education

No. of hours per week	4 hours	Of which: lecture	2 hours	Clinical internship	2 hours
Total no. of hours in the curriculum	56 hours	Of which: lecture	28 hours	Clinical internship	28 hours
Time frame	14 weeks	Of which: lecture	2 hours/week/14 weeks	Clinical internship	2 hours/week/14 weeks
Study by textbook, course support, bibliography, and notes					
Additional documentation in the library using specialized electronic platforms					
Preparation of seminars, topics, papers, portfolio, and essays					
Tutoring					
Exams					
Other activities					
Total individual study hours					

Number of credits		2
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4. Preconditions (where applicable)

4.1. curriculum	Biochemistry, Physiology, Genetics, Cellular, Molecular and Histology Biology, Pharmacology
4.2. skills	General principles of optical microscopy, clinical laboratory techniques

5. Necessary conditions (where applicable) for:

5.1. course	Classroom, Video projector, laptop / PC
5.2. clinical internship	Clinical Department of Hematology / Laboratories

6. Acquired specific skills

Professional skills (expressed through knowledge and skills)	<ul style="list-style-type: none"> - Description of the basic concepts, theories, and notions regarding the pathogenesis of hematological malignant diseases - Cytogenetic and molecular assessment of malignant hematological diseases - Theoretical bases regarding methods and technologies of genetic and molecular investigations - Ability to estimate a patient's prognosis, taking into account the genetic risk assessment - Diagnostic algorithm in a malignant hematological disease, including bone marrow aspirate and biopsy, karyotype - Understanding the principles of molecular targeted therapies in hematological malignancies.
Transversal skills (role, professional and personal development)	<ul style="list-style-type: none"> - Responsibilities in a multidisciplinary team - Helping the students to develop communications skills with the patient and the family - Developing rational thinking, empathy, professional ethics and responsibility - Ability to recognize a medical condition suggestive for a hematological disease - Efficient use of information sources and resources for communication and assisted training (Internet, specialized programs, databases, online courses, etc.).

7. The objectives of the course (based on the grid of specific skills acquired)

7.1. The main objective	Training and familiarizing the student with the genetic approach in hematology, at diagnosis and also during evolution (pathogenesis of malignant hematological diseases, general principles of the genetic technologies, clinical impact of genetic abnormalities).
7.2. Specific objectives	<p>At the end of the internship the student must be able to:</p> <ul style="list-style-type: none"> - identify malignant hematological disorders that require genetic investigations; - know the limits and advantages of each genetic technology used in the approach of the hematological patient; - draw up a genetic investigation algorithm in hematological diseases;

	<ul style="list-style-type: none"> - recognize the essential elements of an analysis report - evaluate the diagnostic and prognostic impact of genetic data. - know the hematology applications of the method
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8. Contents

8.1. Lecture	Teaching methods	Observations
1. Introduction in genetics and hematological pathologies – from the perspective of genetic determination. Introduction to the pathogenesis of hematological malignancies. Types of genetic abnormalities and their role in hematological pathology. From chromosomal abnormalities to gene mutations: types of changes, mechanisms of occurrence, and examples in hematological pathology.	Direct presentation to electronic media (Power Point presentation)	2 hours
2. Basic notions in genetics: structure and functions of chromosomes and nucleic acids.		
3. Cytogenetic diagnostic techniques. Clinical cytogenetics - normal and pathological human karyotype. Clinical applications in hematology. FISH technique; applications in hematology	Direct presentation to electronic media (Power Point presentation)	2 hours
4. PCR technology: introduction, the principle of the method, examples of applications in hemato-oncological diagnosis.		
5. High performance techniques. Microarray methodologies: introduction, principle of the method, clinical applications in hematology. Sequencing technologies - clinical applications in hematology. Next Generation Sequencing – applications in hematological diseases.	Direct presentation to electronic media (Power Point presentation)	2 hours
6. Applications of genetic and molecular diagnosis methods in oncological diseases	Direct presentation to electronic media (Power Point presentation)	2 hours
7. Applications of genetic and molecular diagnosis methods in non-oncological hematological diseases: congenital thrombophilia	Direct presentation to electronic media (Power Point presentation)	2 hours
8. Applications of genetic and molecular diagnosis methods in non-oncological hematological diseases: congenital hemophilia, and thalassemia	Direct presentation to electronic media (Power Point presentation)	2 hours
9. Applications of genetic and molecular diagnosis methods in non-oncological hematological diseases: congenital thrombocytopenia, Von Willebrand Disease	Direct presentation to electronic media (Power Point presentation)	2 hours
10. Applications of genetic and molecular diagnosis methods in others non-oncological	Direct presentation to electronic media (Power Point presentation)	2 hours

hematological diseases		
11. Hereditary hemochromatosis and other rare congenital diseases (thesaurismosis, porphyria)	Direct presentation to electronic media (Power Point presentation)	2 hours
12. Clonal hematopoiesis implications in hematology	Direct presentation to electronic media (Power Point presentation)	2 hours
13. Genetic predispositions syndromes of hematological neoplasms	Direct presentation to electronic media (Power Point presentation)	2 hours
14. New genetic perspectives in hematological neoplasms – genomic notions	Direct presentation to electronic media (Power Point presentation)	2 hours
8.2. Clinical internship	Teaching methods	Observations
Presentation of the technical working algorithm for classical cytogenetic and molecular investigations (Fluorescent in situ hybridization - FISH). Interpretation of karyotype and FISH results.	Clinical presentations, practical implications of genetic data	4 hour
Presentation of the technical working protocol for molecular genetics investigations - PCR and sequencing, as well as for microarray technologies (comparative genomic hybridization based on microarray - array-CGH). Interpretation of results.	Clinical presentations, practical implications of genetic data	6 hour
Genetic investigation strategies using modern study tools in hematological diseases: examples from different pathologies. Clinical cases and clinical reports interpretation.	Clinical presentations, practical implications of genetic data	18 hour
Bibliography		
Cursul catedrei: Hematologie Clinică, Anca Roxana Lupu, Ana Maria Vladareanu, Daniel Coriu, Editura UMF Carol Davila, Sept 2017		
Compendiu de Specialitati Medico- Chirurgicale (pentru rezidentiat), sub redactia Victor Stoica, Viorel Scripcaru, Editura Medicala, 2016		
Tehnologii de diagnostic genetic in practica medicala – aplicatii si relevanta M. Hinescu (coord.), A.Arghir, M. Budisteanu, J.-M. Dupont, K. Hackmann, S. Papuc, E. Severin, A. Tutulan-Cunita, Ed. Viata Medicala Romaneasca, București, 2013.		
Genetica Umana Mihai Isvoranu, Laurentiu Camil Bohiltea. Editura Regis Group – Colectia medicala, 2003.		

9. Corroborating the discipline content with the expectations of professional community representatives

Appropriate training for the 3rd year medical students to recognize the hematological disorders and the importance of cytogenetic and molecular assessment of malignant hematological diseases.

10. Evaluation

Type of activity	Evaluation criteria	Evaluation methods	Percentage of final degree
Lecture	Knowledge of the theoretical notions	Written exam - 5 subjects	50%
Clinical internship	Activity during the clinical internship	Attendance / discussions	10%
	- elaboration of a plan of paraclinical investigations	Practical exam	40%

	according to the clinical diagnosis; - evaluation of the essential elements of cytogenetic analysis, molecular genetics; - exposing the principles of interpreting the diagnostic and prognostic significance	Study projects on elaborated subjects	
Minimum performance standard			
5 th grade – passing grade for the written and practical exam. Minimum 50% for each component of the assessment			

Date:

22th September 2025

Signature of the course chair

According to the list of positions

Seminar chair's signature

According to the list of positions

**Date of approval in
Department Council:**

Head of Discipline

Department Director

Prof. Univ. Dr. Ana Maria Vladareanu

Prof. Univ. Dr. Daniel Coriu