

LABORATORY DIAGNOSTICS OF NEOPLASMS	
GENERAL INFORMATION	
Course teacher	Prof. Branko Dmitrović, MD, PhD
Associates	Prof. Sven Kurbel, MD, PhD Valerija Blažičević, MD, PhD Asst. Prof. Ksenija Marjanović, MD, PhD
Study programme	Graduate University Study of Medical Laboratory Diagnostics
Course status	elective
Year of study, semester	2 nd year, 4 th semester
ECTS credits	3
Form of teaching (number of classes)	Lectures 25; Seminars: 15; practicums 5
Expected number of students attending the course	50
COURSE DESCRIPTION	
Course objectives	
Introduce students to principles of laboratory diagnostics of neoplasms in pathology. Connecting genetic errors with the application of “smart” anticancer medications.	
Course entry requirements and competencies needed for the course	
Completed Undergraduate Study of Medical Laboratory Diagnostics or equivalent bachelor’s degree (baccalaureate)	
Learning outcomes at study programme level	
1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.6, 2.7, 3.1, 3.2	
Expected learning outcomes at course level	
After attending lectures, completing seminars and exercises, independent study and passing the exam, students will be able to: <ol style="list-style-type: none"> 1. explain the key methods in everyday routine pathohistological diagnosis of tumors. 2. select and apply immunohistochemical and other laboratory diagnostic methods. 3. interpret the obtained results of pathohistological diagnostics of tumors.. 4. specify molecular changes typical for more significant types of neoplasms. 5. rank different types of <i>in situ</i> hybridization along with their advantages and disadvantages. 6. explain the mechanisms of action of various “smart” cancer medications based on genetic analysis of tumour tissue. 	
Course content	
<p>Lectures: Etiopathogenesis of neoplasms (chemical and physical causes, radiotherapy, viruses, heritability, nutrition). Molecular basis of neoplasms. New discoveries about neoplasm metastasising (genes responsible for metastasising, angiogenesis as a pathohistological indicator). Genetic basis of tumours (tumour antigens - tumour-specific, tumour-associated antigens, body’s defence mechanisms against cancer). Apoptosis (its role in neoplasms, morphological characteristics, methods for its identification). Significance of molecular pathology in diagnostics of neoplasms (establishing a correct diagnosis or classifying tumours based on the molecular changes typical for particular types of tumours, early discovery of tumour cells by application of molecular techniques – IHC, flow cytometry, <i>in situ</i> hybridisation, spectral karyotyping analysis, polymerase chain reaction, apoptotic index, sequencing methods, and tissue microarray technology. Cytogenetic changes in neoplasms and diagnostic methods to prove such changes. Application of gene therapy (past discoveries, possible application, future). Application of gene therapy.</p>	

Seminars: Angiogenesis. Apoptosis. Tumor immunity. Molecular pathology in cancer diagnosis and treatment. Molecular pathology in the diagnosis and treatment of sarcoma. Molecular pathology in the diagnosis and treatment of malignant lymphomas. Molecular pathology in the diagnosis and treatment of GIST and NET. Application of gene therapy.

Exercises: Reading of immunohistochemical preparations.

Forms of teaching

Lectures; seminars; practicums; independent assignments;

Students' responsibilities

Attendance is obligatory throughout all course forms, and the student has to attend all the exams. The student may be justifiably absent for up to 30% of each teaching form. Practical work and seminars that were not completed have to be taken in the form of colloquiums. The student has to attend all forms of exams required.

Monitoring students' work (*Connecting learning outcomes, teaching methods and evaluation*)

Teaching activity	ECTS	Learning outcome	Student activity	Evaluation methods	Grade points	
					Min.	Max.
Attending classes	0.25	1-7	Attendance,	Attendance records	2	10
Seminar paper	0.5		Seminar paper – writing and presentation	Writing and presenting seminar paper	13	30
Laboratory exercises	0.25	2,3	Practical work	Laboratory exercises	5	10
Final exam	2	1-9	Studying for final exam	Written exam	30	50
Total	3				50	100

Evaluation of written part of final exam

Percentage of correct answers (%)	Grade points
>95	50
90-94.99	47
85-89.99	45
80-84.99	40
75-79.99	38
70-74.99	35
65-69.99	33
60-64.99	30

Formulating the final grade:

Grade points achieved in classes are combined with points achieved in the final exam. Grading in the ECTS system is absolute grading and represents one's final achievement. Grades are numerically expressed as follows: A – excellent (5): 80-100 grade points; B – very good (4): 70-79.99 grade points; C – good (3): 60-69.99 grade points; D – sufficient (2): 50-59.99 grade points

Assigned reading (available in the library and in other media)		
Title	Number of copies in the library	Availability in other media
Damjanov I, Seiwerth S, Jukić S, Nola M: Patologija. 4 th edition. Medicinska naklada Zagreb, 2014	15	
Selected scientific and professional papers (available online free of charge)		Yes
Further reading		
Robbins SL, Cotran, RS. Robbins Pathologic Basis of Disease. 9 th ed. Saunders Company, Philadelphia, 2015.		
Quality assurance methods that ensure the acquisition of exit competencies		
Anonymous, quantitative, standardised students' opinion survey on the course and teacher's work, carried out by the Quality Assurance Office of the Faculty of Medicine in Osijek.		