

CLINICAL COURSE IV: CLINICAL CYTOLOGY	
GENERAL INFORMATIONS	
Course coordinator	Asst. Prof. Branka Lončar, MD, PhD
Assistant/Associate	Assoc. Prof. Valerija Miličić, MD, PhD Asst. Prof. Marija Perić, MD, PhD Adela Benkotić, MD
Study Programme	Undergraduate University Study of Medical Laboratory Diagnostics
Status of the course	mandatory
Year of study, semester	3 rd year, 5 th semester
ECTS	3
Workload (hours)	Lecture (5); Seminars (5); Laboratory exercises (30)
Expected number of students	30
COURSE DESCRIPTION	
Course objectives	
<p>The main goals of this course are introducing students with the routine work of the cytotechnologist in cytology laboratory and get to know basic and special staining in cytology, the way to analyze cytological preparations. Together with a mentor (a cytopathologist and cytotechnologist), students will examine cytological smears and become familiar with the cytomorphology of physiological and pathological conditions in exfoliative and aspiration cytology of diseases: of the female reproductive system, diseases of the hematopoietic, urinary and respiratory systems, and exfoliative and aspiration cytology of the breast.</p>	
Enrolment requirements and entry competencies	
<p>The basis for knowing, performing, and understanding cytological skills is a good knowledge of pathology, and to achieve consistency and applicability of cytological findings in clinical practice, it is necessary to know the clinical manifestations of the disease.</p>	
Learning outcomes at the Programme level	
1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.1, 3.2	
Learning outcomes at the course level	
<p>After completing lectures, seminars and exercises, independent study and passing the exam, students will be able to:</p> <ol style="list-style-type: none"> 1. clarify the morphology of normal cells of the female genital system and intraepithelial and invasive lesions of the cervix. 2. state the indications for cytological puncture of the bone marrow and the enlarged lymph node. 3. recognize the morphology of peripheral blood cells, make a leukogram. 4. interpret the cytochemical reaction of alkaline phosphatase of peripheral blood leukocytes. 5. know non-malignant and neoplastic diseases of the lymphocyte system. 6. explain the diagnostic value and clinical application of cytology of the respiratory tract, the diagnostic value and clinical application of cytology of the urinary tract. 7. explain 8. morphological characteristics of the physiological and pathological breast expres. 8. explain the morphological characteristics of punctate cysts in the breast and benign and malignant formations in the breast. 	
Course content	
<p>Lectures: Gynecological cytology - Screening methods and secondary prevention of cervical cancer. Cytology of amniotic fluid, determination of gestational age and premature breast of amniotic fluid. Tests</p>	

for determination of X and Y chromosomes. Normal cells of the female genital tract. Cytology of inflammation and causative agents of inflammation in Pap smear. Benign proliferative changes. Cytology of intraepithelial and invasive squamous and cylindrical lesions of the cervix. Cytology of the vulva, intraoperative cytological analysis, ovarian and endometrial cytology.

Bone Marrow and Lymph Nodes Cytology – Quantitative and qualitative cytological examination of bone marrow. Peripheral blood smear, differential blood count, interpretation, alkaline phosphatase in leukocytes, specificities of viral and bacterial diseases. Cytochemistry of acute leukemias. Cytomorphological analysis of lymph node disease. Immunocytochemistry.

Respiratory tract cytology - Cytological analysis of swabs of the nasal mucosa and sputum for eosinophils. Cytological analysis of sputum - normal cells, malignant cells. Cytological analysis of bronchial secretions and smears obtained by bronchial brushing. Cytological analysis of pleural effusion.

Urine cytology - Advantages and disadvantages of cytological analysis of urine. Diagnostic value of cytology of the urinary tract. Quality control. Cytological analysis of supravital and permanently stained urine samples. Qualitative and semi-quantitative analysis. Cytological analysis of urine sediment. Cytological analysis of urine sediment in inflammation. Hematuria. Cytological analysis of urine sediment in a patient with a urothelial tumor.

Breast Cytology - Risk factors and incidence of breast cancer in the population. Microscopic appearance of the pathological specimen. Cytomorphological characteristics of inflammation, subareolar abscess, intraductal papilloma, breast cancer. Cytodiagnostics of prints (Mb. Paget). Microscopic examination of a cytological preparation of breast explants. Microscopic analysis of punctate cysts. Microscopic analysis of solid breast punctates.

Seminars: 1. Lymphoproliferative malignant diseases (WHO classification). 2. Pap test - method of screening and secondary prevention of cervical cancer. 3. Types of samples in pulmonology cytology. Criteria for evaluating the adequacy of samples (adequacy). Instructions to the patient for obtaining an appropriate sputum sample. Sample - cytological processing - cytological analysis - clinical data - cytological diagnosis. 4. Risk factors and incidence of breast cancer in the population. 5. Advantages and disadvantages of cytological analysis of urine. Diagnostic value of cytology of the urinary tract.

Exercises:

Gynaecological Cytology: Normal cells of the female genital tract and microorganisms in the Pap smear. Benign proliferative changes. Cytology of vulva, ovarian tumors and endometrium.

Cytology of intraepithelial and invasive squamous and cylindrical lesions of the cervix.

Bone Marrow and Lymph Nodes Cytology: peripheral blood smear, differential blood count, interpretation, alkaline phosphatase in leukocytes. Making a leukogram. Bone marrow - indications for bone marrow puncture, hematopoietic cells, myelogram, and interpretation of findings. Bone marrow: aspiration punctures of bone marrow - technique (accessories and procedure) and indications; interpretation of findings; taking samples of peripheral blood, bone marrow and other materials for cytological analysis and immunophenotyping, cytogenetic and molecular tests. Qualitative and quantitative cytological examination of KS. Cytochemistry of acute leukemias. Aspiration punctures of peripheral lymph nodes and other formations - technique and indications, immunocytochemistry. Benign and malignant changes in lymph nodes.

Respiratory Tract Cytology: Cytological analysis of nasal mucosa and sputum for eosinophils (semiquantitative assessment of the percentage of eosinophils). Sputum cytology - normal cells, malignant cells. Cytological analysis of bronchial secretions and smears obtained by bronchial brushing (benign, malignant). Transthoracic punctate cytology and pleural effusion cytology (benign, malignant).

Breast Cytology. Breast discharge: normal smear cytology, inflammation, and bloody discharge cytology, malignant breast discharge cytology. Microscopic analysis of punctate cysts. Microscopic analysis of fine needle aspiration of solid breast tumors (benign/malignant).

Urine Cytology. Cytological analysis of supravital and permanently stained urine samples. Cytological analysis of pathological urine sediment. Cytological analysis of urine sediment in

inflammation. Hematuria. Cytological analysis of urine sediment in a patient with a urothelial tumor.

Mode of teaching

Lectures, Problem solving seminars, Laboratory exercises

Student obligations

Regular attendance and active participation in classes is mandatory. It is justifiable to miss 30% of each form of teaching, and uncompleted exercises and seminars must be passed. Classes are held at the prescribed time and lateness is not allowed. It is not allowed to use mobile phones, nor to bring in food and drinks. When staying at the microscopy practicum, prescribed work clothes (white coat) are required. The student is obliged to take all forms of knowledge testing.

Monitoring student work (*Connectivity of learning outcomes, teaching methods and grading*)

Type of exam: written exam.

Curricular activities	ECTS	Learning outcome	Student participation	Assessment methods	Points	
					Min.	Max.
Attendance (lectures) seminars exercises)	0,5 1.5	1-8 2-6	Class attendance, Active participation in seminars; Completed exercise and an accepted report	Records	1	5
					4	15
					15	30
Final exam	2	1-8	Preparation for the final exam	Written exam	30	50
Total	3				50	100

Evaluation of the written part of the final exam

Percentage of correctly solved tasks (%)	Points
60.00-64.99	30
65.00-69.99	33
70.00-74.99	36
75.00-79.99	39
80.00-84.99	41
85.00-89.99	43
90.00-94.99	47
95.00-100	50

Calculation of final grade:

Grade points earned in the final exam are added to the grade points earned during the course. Grading in the ECTS system is done by absolute distribution, i.e. based on total achievement and is compared to the numerical system in the following manner: A - excellent (5): 90-100 grade points; B - very good (4): 80-89.99 grade points; C - good (3): 65-79.99 grade points; D - sufficient (2): 50-64.99 grade points.

Required reading (available in the library and through other media)

Title	Number of copies in the library	Availability through other media
At the beginning of the lecture, students will receive written materials that form the base of the exam		

Pajtler M. Metode detekcije, rane dijagnoze i prevencije neoplastičnih promjena vrata maternice, Medicinski fakultet Osijek, 2007.		
Additional reading		
Gray W, Kocjan G. Diagnostic Cytopathology. Churchill Livingstone Elsevier, 2010. Loffler H, Rastetter J, Haferlach T. Atlas of Clinical Hematology. Springer, Sixth Revised Edition Selected journal articles.		
Course evaluation procedures		
Anonymous, quantitative, standardised student survey on the course and the teacher's work implemented by the Quality improvement office of the Faculty of Medicine Osijek.		
Note /Other		
E-learning is not included in the class quota, but it is used in teaching and it contains links to various sites and video and audio materials available on websites.		