**FacultYof MEDICINE**

**STUDY PROGRAM 0912.1 MEDICINE**

**Internal Medicine DEpartment**

**DISCIPLINE of hematology**

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| --- | --- |
| APPROVEDat the meeting of the Commission for Quality Assurance and Evaluationof the Curriculum Faculty MedicineMinutes No.\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Chairman, PHD,univesity professorSuman Serghei\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | APPROVEDat the Council meeting of the Faculty Medicine 2Minutes No.\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_Dean of the FacultyMedicine – 2,associate professorMircea Betiu\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| APPROVEDat the meeting of the Discipline of HematologyMinutes No. 5of10.10.2017Head of the Discipline of Hematology,associate professorMaria Robu\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**SYLLABUS**

## DISCIPLINE Hematology

**Integrated studies**

Type of course: **Compulsory**

Chisinau, 2019

1. **INTRODUCTION**
* General presentation of the discipline: place and role of the discipline in the formation of the specific competences of theprofessional / specialty training program

The study of hematology, one of the branches of internal medicine, is of great importance in training doctors of different specialties. It should be mentioned that patients with diseases of the hematopoietic system first consult family doctors, internists, surgeons, dentists, etc. The right diagnosis and early detection of hematologic pathologies depend on the level of knowledge of this field of medicine in doctors of various specialties. Acute emergency situations often develop in diseases of the hematopoietic system. Knowledge of methods of providing emergency assistance will contribute to providing life-saving treatment of patients. Learning of elements of proper clinical examination of patients with diseases of hematopoietic system is important.

Mission of the curriculum (aim) in professional training

The study of etiology, pathogenesis, clinical manifestations, methods of instrumental and laboratory investigation of the patient for the diagnosis of diseases of the hematopoietic system, learning the general principles of treatment and prophylaxis of these diseases.

* Language (s) of the course:English;
* Beneficiaries: students of the IV-th year, facultyof Medicine II.
1. **MANAGEMENT OF THE DISCIPLINE**

|  |  |
| --- | --- |
| Code of discipline | **S.08.O.069** |
| Name of the discipline | **Hematology** |
| Person(s) in charge of the discipline | **Maria Robu, PhD, associate professor** |
| Year | **IV** | Semester/Semesters | **VII - VIII** |
| Total number of hours, including: | **90** |
| Lectures | **20** | Practical | **25** |
| Seminars | **25** | Self-training | **20** |
| Form of assessment | **E**  | Number of credits | **3** |

**III: TRAINING aims within the discipline**

• To acquire knowledge about the morphology and physiology of the hematopoietic system;

• To acquire knowledge about the etiology and pathogenesis of benign and malignant hemopathies;

• To acquire knowledge about clinical hematological and morphological features of benign and malignant pathologies of the hematopoietic system;

• The acquisition of practical skills in making the diagnosis and providing medical assistance to patients with benign and malignant hematologic pathologies;

• Developing the skills of surveillance and application of methods of investigation, treatment and prevention in pathologies of the hematopoietic system;

• Developing professional capacities focused on providing emergency medical assistance;

• Promoting the principles of ethics and deontology in the medical care of patients with benign and malignant pathologies of the hematopoietic system;

•Focusing the training on family medicine, highlighting the most frequent pathologies in the practice of haematologists.

# *At the end of the discipline study the student will be able to know:*

# *◼at the level of knowledge and understanding:*

• To define the theoretical foundations of haematology in norm and pathology;

• To know the etiology, pathogenesis, epidemiology of diseases of the haematopoietic system;

• To identify the features of clinical and laboratory examination of the patient with pathology of the haematopoietic system;

• To detect the symptoms and clinical syndromes of the disease of the haematopoietic system;

• To define diagnostic criteria and to identify nosologicalhematological entities;

• To know the principles of treatment and prophylaxis of diseases of the hematopoietic system.

# *◼at the application level:*

• History-taking of the haematological patient and interpretation of the data of physical examination;

• To use the methods of diagnosis of anemias;

• To make the diagnosis and to provide medical assistance to patients with different forms of anemia;

• To master the methods of investigation (puncture of the lymph nodes, sternal puncture) of patients with hematologic malignancies;

• To interpret the blood counts and myelograms in various forms of hematologic malignancies;

• To conduct the differential diagnosis of lymphadenopathies and splenomegaly;

• To use the algorithm to identify the major groups of hemorrhagic diathesis;

• To argue the plan of laboratory investigations of the patient with haemorrhagic diathesis;

• To interpret the coagulogram in different coagulopathies;

• To provide emergency aid in hemolytic crises and hemorrhages causedby primary and secondary hemostasis disorders.

 ***◼at the integration level:***

• To estimate the importance of haematology in the context of General Medicine and its integration with related medical disciplines;

• To know the reactions of the haematopoietic system in various pathologies of internal organs;

• To conduct differential diagnosis of haematological malignancies and leukemoid reactions;

• To assess acute hemostatic disorders in surgical and obstetric practice;

• To take optimal decisions in providing emergency aid in critical situations;

• To formulate the principles of ethics and deontology in the medical care of patients with leukemias and malignant lymphomas.

1. **provisional terms and conditions**

Fundamental knowledge: histology, cytology, physiology, pathophysiology, pathology, biochemistry, immunology, internal medicine

1. **themesand ESTIMATE distribution of hours**

***Lectures, practical hours/ laboratory hours/seminarsand self-training***

| No.d/o | ТHEME | Number of hours |
| --- | --- | --- |
| Lectures | Practical/Seminars | Self-training |
|  | Morphology and physiology of the hematopoietic system. Anemias. Classification of anemias. Iron deficiency anemias. | 2 | 5 | - |
|  | Megaloblastic anemias. Vitamin B12 deficiency anemia. Folic acid deficiency anemia. | 2 | 5 | - |
|  | Aplastic anemias. Metaplastic anemias. Renal anemias. Anemias of chronic disorders. | 2 | 5 | - |
|  | Hereditary and acquired hemolytic anemias. | 2 | 5 | 5 |
|  | Hematologic malignancies. Classification and their correlation with the scheme of hematopoiesis. Epidemiology. Etiology. Pathogenesis. Acute leukemias. Agranulocytosis. | 2 | 5 | 10 |
|  | Chronic myeloid leukemia. Idiopathic myelofibrosis. Polycythemia vera. | 2 | 5 | - |
|  | Chronic lymphocytic leukemia. Malignant paraproteinemic hemopathies. Multiple myeloma. Waldenström macroglobulinemia. | 2 | 5 | - |
| 8. | Malignant lymphomas. Hodgkin's Lymphoma. Non-Hodgkin's lymphomas. | 2 | 5 | - |
| 9. | Normal hemostasis. Haemorrhagic diathesis with the disorders of primary hemostasis. Immune thrombocytopenia. Hereditary hemorrhagic telangioectasia. | 2 | 5 | - |
| 10. | Haemorrhagic diathesis with the disorders of secondary hemostasis. Haemophilia. Von Willebrand's disease. The syndrome of disseminated intravascular coagulation . | 2 | 5 | 5 |
|  | **20** | **50** | **20** |
| **Total** | **90** |

1. **REFERENCE Objectives and content units**

| **Objectives** | **Content units** |
| --- | --- |
| **Theme1. Hematology. The field of research and fundamental concepts** |
| • To define the fundamental concepts of haematology;• To know the particularities of the examination of the patient with various forms of anemia;• To know the methods of instrumental and laboratory research of patients with anemia; • To demonstrate skills of analysis and systematization of the knowledge of the different forms of anemia;• To apply knowledge from other disciplines;• To formulate conclusions. | 1.The fundamental concepts of haematology.2.The definition of anemia.3.Classification of anemias.4.Anemia due to disorder of formation of erythrocytes.5.Anemia due to accelerated destruction of erythrocytes.6. Posthaemorrhagic anaemia. |
| **Theme 2.Hematologic malignancies** |
| •To define the fundamental concepts of haematological malignancies;• To know the particularities of examination of patients with acute leukaemias and chronic;• To know the methods of instrumental and laboratory research of patients with acute leukaemias and chronic;• To demonstrate skills of analysis and systematization of knowledge of various forms of leukemias;•To formulate conclusions | 1.The fundamental concepts of haematological malignancies.2.Classification of haematological malignancies.3.Acute leukaemias.4.Chronic myeloid leukemia. Idiopathic myelofibrosis. Polycythemia vera. Chronic lymphocytic leukemia. Paraproteinemic hemopathies. |
| **Theme 3. Malignant Lymphomas** |
| • To define the fundamental concepts of malignant lymphomas;• To know the particularities of the examination of the patient with malignant lymphoma;• To know the methods of instrumental and laboratory research of patients with malignant lymphomas;• To demonstrate skills of analysis and systematization of knowledge of different forms of malignant lymphomas;• To formulate conclusions. | 1.The fundamental concepts of haematological malignancies.2.Hodgkin's Lymphoma.Clinical and morphologicalclassification.The clinical picture. Diagnosis and differential diagnosis.. Principles of treatment.3.Non-Hodglin lymphomas.Morphological classification. The clinical picture. Diagnosis and differential diagnosis. |
| **Theme 4. Hemorrhagic diatheses** |
| • To define the fundamental concepts of hemorrhagic diatheses;• To know the particularities of the examination of the patient with haemorrhagic diathesis;• To know the methods of instrumental and laboratory research of patients with hemorrhagic diatheses;• To demonstrate skills of analysis and systematization of knowledge of various forms of haemorrhagic diatheses;• To formulate conclusions. | 1.The fundamental concepts of hemorrhagic diatheses.2.Hemorrhagic diathesis due to the disorder of primary hemostasis.3.Thrombocytopenic Purpura. Rendu-Osler disease.4.Hemorrhagic diathesis due to the disorder of secondary hemostasis.5.Haemophilia. Von Willebrand disease. |

1. **PROFESSIONAL (specific (Sc)) and TRANSVERSAL (Tc) COMPETENCES AND STUDY OUTCOMES**
* **Professional (specific)competences(Sc)**

Professional skills (specific)

• CS1. Knowledge and use of concepts, principles and theories of hematology in the professional activity;

• CS2. Knowledge of specific features of the examination of patients with different benign and malignant hemopathies;

• CS3. Knowledge of methods of laboratory and instrumental investigation in hematology;

• CS4. Deep knowledge and practical application of the principles of treatment of patients with malignant and benign hemopathies.

* **Transversal competences (tc)**

• CT1. The application of the rules of rigorous and effective work, manifestation of a responsible attitude towards scientific and teaching activity, harnessing one’s own optimal and creative potential in specific situations, respecting the principles and rules of professional ethics;

• CT2. Ensuring and organization of effective teamwork;

• CT3. Identification of opportunities of continuing education and effictive implementation of all resources and learning techniques for one’s own development.

* **Study outcomes**

**At the end of the course the student will be able to:**

1. To define the theoretical foundations of normal and pathologic haematology;

2. To know the etiology, pathogenesis, epidemiology of diseases of the haematopoietic system;

3. To identify specific features of clinical and laboratory examination of patients with pathology of the haematopoietic system;

4. To detect the symptoms and clinical syndromes of the diseases of the hematopoietic system;

5. To define diagnostic criteria and to identify nosological hematological types of blood;

6. To know the principles of treatment and prophylaxis of diseases of the hematopoietic system;

7. History-taking of the hematological patient and interpretation of the data of physical examination;

8. To use the methods of the diagnosis of anemias;

9. To make the diagnosis and to provide medical assistance to patients with various

forms of anemia;

10. To master the methods of investigation (puncture of the lymph nodes, sternal puncture)

of patients with hematologic malignancies;

11. To interpret the blood counts and myelogram in various forms of hematologic malignancies;

12. To conduct the differential diagnosis of lymphadenopathy and splenomegaly;

13. To use the algorithm of identification of the major groups of hemorrhagic diathesis;

14. To argue the plan of laboratory investigations of the patient with hemorrhagic diathesis;

 15. To interpret the coagulogram in different coagulopathies;

16. To provide emergency aid in hemolytic crises and bleedings caused by the primary and secondary hemostasis disorders.

**Note. Study findings**(are deduced from the professional competencies and formative valences of the informational content of the discipline).

1. **STUDENT'S self-training**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | Expected product | Implementation strategies | Assessment criteria | Implementation terms |
| 1. | Work with information sources | Careful reading of lecture or the textbook material on the theme.Reading the questions on the theme, that requires a reflection on the subject. Refer to the list of additional information sources on the theme. Choose the source of additional information on the theme.Reading of the text entirely, carefully and writing down the essential content.Making generalizations and conclusions related to the importance of the theme/subject. | The ability to extract the essential; skills to interpret; the volume of work | throughout the semester |
| 2. | Working with the workbook | To analyze the information and the images on the theme based on the material from lectures andtextbook. Consistent solving the tasks. Drawing conclusions at the end of each lesson. The verification of the aims of the lesson in question and assessment of their achievement.Searching for additional information, usinge-mail addresses and additional bibliography. | The volume of work,solving situational problems, the ability to draw conclusions | throughout the semester |
| 3. | Applicationof various learning techniques |  | The volume of work,the degree ofpenetration into the essence ofvarious themes,the level of scientificargumentation, quality of conclusions,elements ofcreativity,demonstrationunderstandingthe problem, formation of personal attitude | throughout the semester |
| 4. | Working with materials online | Self-assessment online, study of materials online on the WEBSITE of the department, expressing one’s own opinions through the forum and chat | The number and duration of entries on the SITE, the results ofself-assessment | throughout the semester |
| 5. | Preparation and presentation of research  | Choice of the theme for research, makig plan the research plan, provision of the terms of realization. Setting PowerPoint project / theme components, purpose, results, conclusions, practical applications, bibliography. Reviews of.peers. Reviews.of professors and lecturers | Volume of work, the degree ofpenetration into the essence of the theme of the project, the level of scientific argumentation, the quality ofconclusions,elements ofcreativity,personal attitude formation, coherence of exposure and scientific correctness, graphic presentation, presentation method. | throughout the semester |

1. **METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-assessment**

◼***Teaching and learning methods used***

Different methods and didactic processes are applied in teaching Hematology. They oriented towards the efficient acquisition of knowledge and achievement of the objectives of the didactic process. In theoretical classess, along with traditional methods (lesson-exposure, lesson-conversation, synthesis lesson), modern methods (lesson-debate, lesson-conference) are also used. Practical forms of individual, frontal, group work. In order to acquire deep knowledge of material, different semiotic systems (scientific language, graphical and computerized language) and didactic materials (tables, diagrams, photophotographs, transparencies) are used. In classes and extracurricular activities Information Communication Technologies - Power Point presentations are used.

◼***Applied teaching strategies / technologies****(specific to the discipline)*

• **Observation** – Identification of characteristic elements of structures or haematological phenomena, description of these elements or phenomena.

•**Analysis**– Imaginary decomposition of the whole into component parts. Highlighting the essential elements. Studying each element as a part of the whole.

• **Schema / figure analysis** – Choice of the required information. Recognition based on the knowledge and information of structures indicated in the drawing. Analysis of the functions / role of recognized structures.

• **Comparison -** Analysis of the first object / process in a group and determination of its essential features. Analysis of the second object / process and the determination of its essential features. Comparing objects / processes and highlighting common features. Comparing objects / processes and determining differences. Establishing the criteria for decommissioning. Drawing conclusions.Methods of assessment(including the method of final mark calculation)

 • **Classification**– Identification of the structures / processes to be classified. Determining the criteria on which classification is to be made. Distribution of structures / processes by groups according to established criteria.

• **Schematic drawing**– Selection of elements, which must be included in the scheme. Playback of the Elements Selected by Different Symbols / Colors and indicating their relationships. Wording of an appropriate title and legend of the symbols used.

• **Modeling** - Identify and select the elements needed for modeling

phenomenon. The imaging (graphical, schematic) of the phenomenon studied.

Presentation of the phenomenon using the developed model. Drawing conclusions,deduced from arguments or findings.

**• Other applied teaching strategies / technologies (specific to the discipline)**:

"Multi-voting"; " Round table"; "Group Interview"; "Case Study"; "Creative Controversy".

◼**Methods of assessment(including the method of final mark calculation):**

**Current:totalisation or individual / personal checkup by:**

1. Applying of the docimological test
2. Settlement (resolution) of problems / exercises
3. Analysis of the clinial case studies
4. Creative controversy of the discussed subjects
5. Checking workshops

**Final:**

The course of study of Hematology stipulates two tests:

 Test No. 1: Hematology (test on the theory)

 Test No. 2: Practical test

Students with the average annual mark below 5.0, as well as students who have not recovered absences from the practical classes are not admitted to the examination in Hematology..

The examination in Hematology is a combined test, consisting ofcomputer-based test ("Test Editor" version of N.Testemiţanu USMF) and oral test.

Thecomputer-based test consists of 500 questions on the course of Hematology, of which 40% are single tests, and 60% - multiple-choice tests. The student has 2 hours to do the test. The test is graded from 0 to 10.

The practical test is done with the participation of patients. Each student manages a patient with hematopoietic pathology within 30 minutes. Later, he reports the examiner, the patient’s anamnesis, objective data, makes a preliminary diagnosis, draws the plan of investigations and treatment. The test is graded with notes from 0 to 10.

The exam subjects are approved at the discipline meeting and are communicated to the students at least one month before the session.

The final grade consists of 4 components: annual average score (coefficient 0.3), practical test (coefficient 0.2), computer-based test (coefficient 0.2) and oral test (coefficient 0.3).

The knowledge is assessed with marks from 10 to 1 with two decimal places, as follows:

**The scale of assessment**

The students’ knowledge is assessed with marks from 10 to l with 2 decimal places. Grades from "5" to "10", obtained in the result of the evaluation of the course unit, allow the obtaining of credits provided for them according to the curriculum. The final grade results from the sum of marks of current assessments and the final examination, being rounded up to whole number for the benefit of the student. The student who gets a mark less than “5”at the current assessment is not admitted to the final assessment.

**Method of mark rounding at different assessment stages**

|  |  |  |
| --- | --- | --- |
| Intermediate marks scale (annual average, marks from the examination stages) | National Assessment System | ECTSEquivalent |
| **1.00-3.00** | **2** | **F** |
| **3.01-4.99** | **4** | **FX** |
| **5.00** | **5** | **E** |
| **5.01-5.50** | **5,5** |
| **5.51-6.0** | **6** |
| **6.01-6.50** | **6,5** | **D** |
| **6.51-7.00** | **7** |
| **7.01-7.50** | **7,5** | **C** |
| **7.51-8.00** | **8** |
| **8.01-8.50** | **8,5** | **B** |
| **8.51-8.00** | **9** |
| **9.01-9.50** | **9.5** | **A** |
| **9.51-10.0** | **10** |

The average annual mark and the marks of all stages of final examination (computer assisted, test, oral) - are expressed in numbers according to the mark scale (according to the table), and the final mark obtained is expressed in number with two decimal places, which is transferred to student’s record-book.

*The absence from theexamination without good ground is recorded as "absent" and is equivalent to 0 (zero). The student has the right to have two re-examinations.*

1. **RECOMMENDED literature:**

***A. Compulsory:***

1. Hoffbrand A.V., Higgs D.R., Keeling D.M., Mehta A.B. Postgraduate Haematology, 7th Edition. Wiley Blackwell, 2016: 934 p.
2. Kaushansky K., Lichtman M., Beutler E. et al. Williams Hematology, 8th Edition. The McGraw-Hill Companies, Inc., 2010.
3. Musteata Vasile, Corcimaru Ion. Course of Lectures on Hematology and Military Therapy. Chisinau, 2004: 177 p.
4. Pillot Giancarlo, Chantler Marcia, Magiera Holly et al. The Washington Manual. Hematology and Oncology Subspecialty Consult. Lippincott, Williams & Wilkins, 2004: 279 p.
5. Williams M.E., Kahn M.J. American Society of Hematology Self-Assessment Program. Blackwell Publishing, 2005: 451 p.

***B. Additional***

* 1. Bain Barbara J. Picture Tests in Hematology. Colour Guide. Churchill Livingstone,

 1998: 116 p.

* 1. Hoffbrand A.V., Pettit J.E., Moss P.A. et al. Essential Hematology. Blackwell Science Ink.: 4th edition, 2001: 349 p.
	2. Larry Hematology, for the House Officer Waterbury. Hematology (House Officer series) by Lippincot, Williams & Wilkins: 4th edition, 1996: 179 p.
	3. Mehta Atul B., Hoffbrand A. Victor. Hematology at a Glance. Blackwell Science /ink.: 1st edition, 2000: 122 p.
	4. Wood Marie E. and Brunn Paul A. Jn. Hematology / Oncology. Secrets 2/e. Hanley & Belfus, 1999: 400 p.