MINISTRY OF EDUCATION AND SCIENCE OF RUSSIA

Federal State Budgetary Educational Institution of higher education
«I.N. Ulianov Chuvash State University»
(FSBEI of HE «I.N. Ulianov Chuvash State University»)

Medical Faculty

Department of instrumental diagnostics with a course of phthisiology

«APPROVE»
Vice-rector for Academic Affairs
_____ I. E. Poverinov
«13» 04 2022

Working programs of the discipline (module) «Клиническая лабораторная диагностика / Clinical Laboratory Diagnostics»

Direction of training / specialty 31.05.03 Стоматология / Dentistry
Graduate's qualification Врач-стоматолог / Dental Practitioner

Direction (profile) / specialization «Dentistry»

Form of training – очная / intramural
Course – 4
Term – 8
Total academic hours/credit points – 144/4
The year of beginning the training – 2022

Cheboksary - 2022

The fundamental document for compiling the working program of the discipline (module) Федеральный государственный образовательный стандарт высшего образования - специалитет по специальности 31.05.03 Стоматология (приказ Минобрнауки России от 12.08.2020 г. № 984)

Approved by:
Docent, Candidate of Medical Sciences I.S. Stomenskaya
Head of the department, Candidate of Medical Sciences O.Yu. Kostrova

The working program was approved at the meeting of the Department of instrumental diagnostics with a course of phthisiology,
25.03.2022, protocol № 7
Head of the department O.Yu. Kostrova

Approved by
Dean of the Medical Faculty V.N. Diomidova
Acting Head of the Educational and Methodological Department E.A. Shirmanova

1. The purpose and objectives of training in the discipline (module)

The purpose of the discipline - Teaching students how to interpret laboratory data to the fullest extent possible, based on an understanding of the etiology and pathogenesis of disease, preventing complications from the underlying disease during dental treatment, and familiarising them with the possibilities of modern laboratory technology.

The objectives of the discipline - 1. To familiarise students with modern laboratory diagnostic techniques;

2. To teach students the correct approach to the study of a particular metabolism, individual syndromes and nosological forms, based on knowledge of biochemistry, normal and pathological physiology, therapy;

Teach students how to administer tests and laboratory tests in a logical and appropriate manner;

4. To teach proper interpretation of laboratory data for diagnosis, characterization of the form, severity of the course and prognosis of the disease, selection of etiological and pathogenetic therapy.

2. The place of practical training in the structure of the educational program of higher education

The discipline «Клиническая лабораторная диагностика / Clinical Laboratory Diagnostics» относится к части учебного плана формируемой участниками образовательных отношений refers to the mandatory part in the curriculum of the educational program of higher education (hereinafter referred to as the EP of HE) in the field of training / specialty 31.05.03 Стоматология, direction (profile) / specialization of the program «Dentistry».

Previous academic disciplines (modules) and (or) practices that form the knowledge, skills and abilities necessary for training in the discipline (module):

Knowledge, skills and abilities formed as a result of training in a discipline (module) are necessary when teaching in the following disciplines (modules) and (or) practices:

3. Planned learning outcomes in the discipline (module), correlated with the planned learning outcomes

Planned learning outcomes in the discipline (module), correlated with the planned learning outcomes

Code and name of the competence	Code and name of the competence achievement	Descriptors for the indicator of competence achievement (learning)
ПК-1 Способен провести обследования пациента с целью установления диагноза / He/she is able to perform a patient's examination in order to make a diagnosis	ПК-1.2 Способен анализировать информацию, полученную при проведении физикального обследования, дополнительных методов исследования, сформулировать предварительный диагноз / He/she is able to analyze the information obtained during the physical examination, additional examination methods, formulate a preliminary diagnosis	
ПК-1 Способен провести обследования пациента с целью установления диагноза / He/she is able to perform a patient's examination in order to make a diagnosis	ПК-1.3 Способен сформулировать диагноз на основании полученной информации / He/she is able to formulate a preliminary diagnosis on the basis of information obtained	

4. Structure, scope and content of the discipline (module)

Educational activities in the discipline (module) are carried out:

- in the form of students' face-to-face work with the teaching staff of the organization and (or) persons involved by the organization to implement the educational programs on other terms (hereinafter - contact work);

- in the form of students' independent work.

Face-to-face work can be classroom-based, extramural, as well as it can be conducted in an electronic information and educational environment (EIEE).

Learning sessions in the discipline (module) and interim assessment of students are conducted in the form of face-to-face work and in the form of students' independent work.

During learning sessions in the discipline (module) face-to-face work includes: lecture -type classes, seminar-type classes and (or) group consultations, and (or) individual work of students with the teaching staff of the organization and (or) persons involved by the organization to implement the educational programs on other terms (including individual consultations).

Legend:

Lec – lectures, Lab – laboratory work, Pr – practical classes, ICW – individual face-to -face work, IW – independent work.

4.1. Content of the discipline (module)

Section name	The section's content	Formed competences	Competence achievement indicator
Introduction	Introduction in clinical laboratory diagnostics.		
Biochemical examenations	A study of carbohydrate metabolism and its disorders.		
	A study of enzyme metabolism and its disorders.		
	A study of pigment metaboilsm and its disorders.		
	A study of protein metabolism and its abnormalities.		
	A study of lipid metabolism and its disorders.		
	A study of water- electrolyte exchange and its disorders.		
	A study of acid-base balance and its disorders.		
Coagulation system examenations	Primary (vascular-platelet) coagulation.		
	Secondary coagulation		
	Thrombophlia. Antiphospholipid syndrom.		
Hormonal examenations	Examination of the functional state of the thyroid and adrenal glands.		
Virological testing	Viral hepatitis		
	Laboratory diagnostics of herpesvirus infection.		
	Laboratory diagnostics of cytomegalovirus infection.		
Common clinical examenations	Oral fluid examination.		
	Study of serous cavity fluid.		
	Study of renal function and its disorders.		
	Sputum examination.		
Common clinical	Examination of		

examenations	cerebrospinal fluid.		
Heamatological examenations	RBC morphology in norm and pathlogy		
	Differential diagnosis of anaemia.		
	Bone marrow punctate examination.		
	Common blood count.		
Immunological examenations	A study of tumour markers.		
Final lesson	Case method, interpretation of analyses. and graphic and calculation work making.		
Individual contact work.	Individual contact work.		
	Individual contact work.		

4.2. Scope of the discipline and types of academic work

Forms of control and types of academic work		Labor intensity of the discipline (module)	
		8	total
1. Face-to-face work:		48,3	48,3
In-class learning in total, including:		48	48
Лекционные занятия (Лек)		16	16
Лабораторные занятия (Лаб)		32	32
Индивидуальная контактная работа (ИКР)		0,3	0,3
2. Independent work of the student:		68,7	68,7
3. Intermediate certification (exam) (экзамен)		Эк	Эк
Total:	academic hours	144	144
	credit units	4	4

№ item	The section's (theme's) name	Face-to face work, including in the electronic information and educational environment, academic hours				IW, academic hours	Total, academic hours
		Lect.	Pr.	Lab.	ICW		
	Introduction						

1	Introduction in clinical laboratory diagnostics.	2					2
	Biochemical examenations						
2	A study of carbohydrate metabolism and its disorders.			2		5,4	7,4
3	A study of enzyme metabolism and its disorders.			2		3	5
4	A study of pigment metaboilsm and its disorders.			2		3	5
5	A study of protein metabolism and its abnormalities.			2			2
6	A study of lipid metabolism and its disorders.			2			2
7	A study of water-electrolyte exchange and its disorders.			2		6	8
8	A study of acid-base balance and its disorders.	2					2
	Coagulation system examenations						
9	Primary (vascular-platelet) coagulation.	2		3			5
10	Secondary coagulation	2		3			5
11	Thrombophlia. Antiphospholipid syndrom.					6	6
	Hormonal examenations						
12	Examination of the functional state of the thyroid and adrenal glands.	2					2
	Virological testing						
13	Viral hepatitis	2					2
14	Laboratory diagnostics of herpesvirus infection.					4	4
15	Laboratory diagnostics of cytomegalovirus infection.					3,6	3,6
	Common clinical examenations						
16	Oral fluid examination.			4			4
17	Study of serous cavity fluid.					9,7	9,7
18	Study of renal function and its disorders.			4		4	8
19	Sputum examination.					5	5
20	Examination of cerebrospinal fluid.					9	9
	Heamatological examenations						
21	RBC morphology in norm and pathlogy	2					2

22	Differential diagnosis of anaemia.	2					2
23	Bone marrow punctate examination.					4	4
24	Common blood count.			2			2
	Immunological examenations						
25	A study of tumour markers.					6	6
	Final lesson						
26	Case method, interpretation of analyses. and graphic and calculation work making.			4			4
	Individual contact work.						
27	Individual contact work.				0,1		0,1
28	Individual contact work.				0,2		0,2
Total academic hours		16		32	0,3	68,7	144

4.3. Summary of the discipline (module), structured by sections (topics)

Раздел 1. Introduction

Тема 1. Introduction in clinical laboratory diagnostics.

Лекционное занятие. Лекция 1. Введение в клиническую лабораторную диагностику.

1. Цели и задачи лабораторной диагностики. Виды медицинских лабораторий.
2. Факторы, влияющие на результаты лабораторных исследований.
3. Этапы лабораторного исследования.
4. История лабораторной диагностики.

Раздел 2. Biochemical examenations

Тема 2. A study of carbohydrate metabolism and its disorders.

Лабораторное занятие. Introduction to laboratory diagnostics. Carbohydrate metabolism. Diabetes mellitus.

Тема 3. A study of enzyme metabolism and its disorders.

Лабораторное занятие. Enzymes in laboratory diagnostics.

Тема 4. A study of pigment metaboilsm and its disorders.

Лабораторное занятие. Pigment metabolism. Jaundice.

Тема 5. A study of protein metabolism and its abnormalities.

Лабораторное занятие. Protein metabolism. Renal failure. Proteinogram

interpretation.

Тема 6. A study of lipid metabolism and its disorders.

Лабораторное занятие. Lipid metabolism. Atherosclerosis. Lipidogram interpretation.

Тема 7. A study of water-electrolyte exchange and its disorders.

Лабораторное занятие. Water-electrolyte metabolism. Dehydration and hyperhydration.

Тема 8. A study of acid-base balance and its disorders.

Лекционное занятие. Lecture 2. Laboratory diagnosis of acid-alkaline balance disorders and water-electrolyte exchange.

1. Normal blood buffer systems and their changes in pathology; role of the kidneys, respiratory system and gastrointestinal tract in the maintenance of acid-alkaline balance of the blood.
2. laboratory indicators of blood acid-alkaline balance.
3. Types, causes and mechanisms of acid-alkaline balance disorders.
4. Metabolic and respiratory acidosis: causes and mechanisms of development, laboratory diagnosis; metabolic and respiratory alkalosis: causes and mechanisms of development, laboratory diagnosis.
5. Electrolyte metabolism disorders: causes of changes in blood levels of sodium, potassium, chlorine, calcium and phosphorus.

Раздел 3. Coagulation system examenations

Тема 9. Primary (vascular-platelet) coagulation.

Лекционное занятие. Lecture 3. Haemorrhagic diathesis.

1. Classification and laboratory diagnostics of thrombocytopenia.
2. Classification and diagnostcis of the main forms of thrombocytopathy (Glanzmann, Bernard-Soulier, Wiskott-Aldrich syndromes, Willebrand disease).
3. Hereditary and acquired coagulopathies (laboratory diagnostics of haemophilia).
4. Vasopathies and their laboratory diagnosis.

Лабораторное занятие. Diagnostics of primary haemostasis disorders.

Тема 10. Secondary coagulation

Лекционное занятие. Lecture 4. Laboratory diagnostics of DIC and thrombophilia.

1. Primary and secondary coagulation
2. Etiology and basic pathogenetic mechanisms of DIC syndrome development.
3. Classification of DIC syndrome.
4. Laboratory diagnostics of DIC syndrome, taking into account the stage of the process. Laboratory-diagnostic control of DIC syndrome therapy efficiency.

Лабораторное занятие. Secondary coagulation disoders and their laboratory diagnostics.

Раздел 4. Hormonal examenations

Тема 12. Examination of the functional state of the thyroid and adrenal glands.

Лекционное занятие. Lecture 5. Examination of the functional state of the thyroid and adrenal gland.

1. Classification of hormones.

2. Stages of hormone production and transformation: biosynthesis, secretion, transport, recognition and translation of the hormonal signal into a biological response, dampening of the endocrine signal. Methods to study endocrine gland function.

3. Hormonal analysis in the diagnostics of thyroid diseases. Hypo- and hyperthyriosis.

4. Cortical and medullary adrenal hormones: functions, synthesis and secretion disorders. Final metabolites of adrenal cortical hormones in norm and pathology.

5. Adrenogenital syndrome: forms, laboratory diagnostics.

Раздел 5. Virological testing

Тема 13. Viral hepatitis

Лекционное занятие. Lecture 8. Viral hepatitis.

1.Hepatitis A virus: etiology, pathogenesis, clinical manifestations, laboratory diagnostics.

2. Hepatitis B virus: etiology, pathogenesis, clinical manifestations, laboratory diagnostics.

3. Hepatitis C, D, E viruses: etiology, pathogenesis, clinical manifestations, laboratory diagnostics.

Раздел 6. Common clinical examenations

Тема 16. Oral fluid examination.

Лабораторное занятие. Oral fluid in normal conditions and in pathology

Тема 18. Study of renal function and its disorders.

Лабораторное занятие. The study of common urinalysis. Kidney diseases and their diagnostics.

Раздел 7. Heamatological examenations

Тема 21. RBC morphology in norm and pathlogy

Лекционное занятие. Lecture 6. Erythrocyte morphology in normal patients and haematological diseases.

1. Erythrocyte morphology: size, shape, chromia, causes of changes in anaemia.
2. Reticulocytes in norm and pathology.
3. Siderocytes and sideroblasts in norm and pathology.
4. Erythrocytic indexes.

Тема 22. Differential diagnosis of anaemia.

Лекционное занятие. Lecture 7. Differential diagnosis of anaemia. Iron deficiency anaemia, etiology, clinic, diagnosis.

1. Bone hematopoiesis in anemia.

2. Classification of anemia. 3.

3. Laboratory diagnosis of normochromic anaemia (haemolytic anaemia, anaemia with impaired erythrocyte formation, post haemorrhagic anaemia), hypochromic anaemia (Red blood cell anaemia, sideroblastic anaemia, thalassemia, porphyria), hyperchromic anaemia (vitamin B12-deficiency anaemia, foliac acid deficiency anaemia).

Тема 24. Common blood count.

Лабораторное занятие. Peripheral blood examination. Differential diagnostics of anaemia. Erythrocytosis.

Лабораторное занятие. Bone marrow punctate examenation. Leukemia. Leukemoid reactions. Cytochemical testing of blood cells.

Раздел 9. Final lesson

Тема 26. Case method, interpretation of analyses. and graphic and calculation work making.

Лабораторное занятие. Case method, interpretation of analyses and graphic and calculation work making.

5. Educational technologies

To implement the competence-based approach in the study of the discipline (module), extensive use of active and interactive methods of conducting classes in the educational process is provided:

В учебном процессе кафедры инструментальной диагностики с курсом фтизиатрии используются следующие образовательные технологии:

лекция-визуализация с использованием компьютерных технологий. Лекционный материал сопровождается слайдами, демонстрируемыми по ходу лекции.

лабораторные занятия с применением мультимедийных средств (электронные доски, проекторы – для повышения качества восприятия изучаемого материала) – для развития клинического мышления и активного поиска путей и способов решения затрагиваемой проблемы (кейс-метод и другие интерактивные методы).

На лабораторных занятиях по лабораторной диагностике используются следующие интерактивные методы обучения:

- Кейс-метод – обучающийся демонстрирует умение соотнести теоретические знания с реальной практической ситуацией путем решения ситуационных клинических задач (кейс-задач).

- Дебаты – форма проведения учебного занятия, в рамках которого осуществляется обмен информацией, отражающей полярные точки зрения по одной и той же проблеме, с целью углубления или получения новых знаний, развития аналитико-синтетических и коммуникативных умений, культуры ведения коллективного диалога.

6. Forms of control and types of evaluation materials for the discipline (module)

Intermediate attestation - evaluation of intermediate and final results of training in the discipline (module).

6.1. Sample list of questions for the credit test

There is no provision for credit-test.

6.2. Sample list of questions for the examination

1. Laboratory diagnostics: subject, goals and objectives. Branches of clinical laboratory diagnostics. Types of medical laboratories. Factors affecting the results of laboratory diagnostics.

2. Laboratory indicators of carbohydrate metabolism: the level of glucose, lactic, pyruvic and sialic acids. Reasons for changing these indicators.

3. Hypo- and hyperglycemia: causes and laboratory diagnostics.

4. Laboratory diagnosis of diabetes mellitus.

5. Laboratory diagnosis of coma in diabetes mellitus.

6. Glycogenosis: causes and laboratory diagnostics.

7. Causes of development, clinical manifestations and laboratory diagnosis of hyperlipoproteinemias. Rare types of dyslipoproteinemia and their laboratory diagnostics. Secondary hyperlipoproteinemias.

8. Origin of urea, creatine and creatinine, routes of excretion and causes of changes in their concentration in the blood.

9. Origin of plasma uric acid. Primary and secondary uricemia.

10. Formation and excretion of indican from the body. Causes of changes in its concentration in the blood.

11. Clinical significance of the determination of total blood protein. Causes of hyper- and hypoproteinemias.

12. List the blood plasma proteins related to α1-, α2-, β- and γ-globulins. Causes of changes in these protein fractions.

13. Types of normal Hb and their content in an adult. Hemoglobinopathies (sickle cell anemia, methemoglobinemia, thalassemia): causes of development and their laboratory diagnosis.

14. Membranopathy accompanied by hemolytic anemia (Minkowski-Choffard anemia, nocturnal paroxysmal hemoglobinuria): causes of development and their laboratory diagnostics.

15. Enzymopathies: causes of development, classes of diseases and their laboratory diagnostics.

16. Hepatic jaundice associated with impaired capture of indirect bilirubin: causes of development and laboratory diagnostics.

17. Hepatic jaundice associated with impaired conjugation of indirect bilirubin: causes of development and laboratory diagnostics.

18. Hepatic jaundice associated with impaired bilirubin excretion: causes of development and laboratory diagnostics.

19. Causes of development of subhepatic jaundice and its laboratory diagnostics.

20. Plasma-specific blood enzymes: LCAT, cholinesterase, lysozyme, renin. Their values are normal and pathological.

21. Types of LDH, their origin, normal values. Causes of an increase in total LDH and its fractions.

22. Aminotransferases, creatine phosphokinase: functions, origin, causes of changes in their concentrations in the blood.

23. Alkaline and acid phosphatases, alpha-amylase: functions, origin, causes of changes in their concentrations in the blood.

24. Alpha-amylase: functions, origin, causes of changes in their concentrations in the blood.

25. Laboratory diagnosis of myocardial infarction: determination of LDH and its isoenzymes, CPK, AsAT.

26. Laboratory diagnosis of myocardial infarction: determination of the level of cardiospecific troponin T, myoglobin, gamma-glutamyl transferase.

27. Laboratory signs of poor prognosis of myocardial infarction.

28. Laboratory diagnosis of syndromes of diffuse liver damage.

29. Laboratory diagnosis of viral hepatitis A.

30. Laboratory diagnosis of viral hepatitis B.

31. Laboratory diagnosis of viral hepatitis C, D, E.

32. Metabolic acidosis: causes of development and laboratory diagnostics.

33. Respiratory acidosis: causes of development and laboratory diagnostics.

34. Metabolic alkalosis: causes of development and laboratory diagnostics.

35. Respiratory alkalosis: causes of development and laboratory diagnostics.

36. Classification of disorders of water and electrolyte metabolism. Causes of development and laboratory signs of hypertonic, isotonic and hypotonic dehydration.

37. Classification of disorders of water and electrolyte metabolism. Causes of development and laboratory signs of hypertonic, isotonic and hypotonic overhydration.

38. Distribution of sodium and chlorine levels in the body and their regulation. Causes of changes in their concentrations in the blood.

39. Distribution of potassium levels in the body and its regulation. Causes of changes in its concentration in the blood.

40. Distribution of calcium and phosphorus levels in the body and their regulation. Causes of changes in their concentrations in the blood.

41. Laboratory diagnosis of disorders of primary hemostasis.

42. Laboratory diagnosis of disorders of coagulation hemostasis. Tests that characterize the internal mechanism of coagulation and the reasons for their changes.

43. Laboratory diagnosis of disorders of coagulation hemostasis. Tests characterizing the external coagulation mechanism and the reasons for their changes.

44. Laboratory diagnosis of disorders of coagulation hemostasis. Tests characterizing the final stage of blood coagulation and the reasons for their changes.

45. Paracoagulation tests in the diagnosis of hemostasis disorders. Methods for the study of fibrinolytic and anticoagulant systems of the body.

46. Classification of thrombocytopenia and thrombocytopathies, laboratory diagnostics.

47. Classification of coagulopathy and their laboratory diagnostics.

48. Classification and laboratory diagnosis of DIC.

49. Laboratory diagnosis of hemophilia A, B and C, their differential diagnosis.

50. Laboratory diagnosis of Shenlein-Genoch disease.

51. Thyroid hormones: functions, regulation in normal and pathological conditions. Laboratory diagnosis of hypo- and hyperthyroidism.

52. Hormones of the adrenal cortex: functions, regulation in normal and pathological conditions. Laboratory diagnosis of hypo-, hyper- and dysfunction of the adrenal cortex.

53. General analysis of urine is normal and the reasons for its change (urine color, transparency, reaction, relative density).

54. General analysis of urine is normal and the reasons for its change (determination of protein, glucose, ketone bodies).

55. General analysis of urine is normal and the reasons for its change (microscopy of sediment: epithelium, erythrocytes, leukocytes).

56. General analysis of urine is normal and the reasons for its change (microscopy of the sediment: cylinders, crystals, bacteria).

57. Laboratory methods for studying the ability of the kidneys to osmotic dilution and concentration of urine (Zimnitsky test, dry food test). reasons for their change.

58. Laboratory methods for studying glomerular filtration, tubular reabsorption and renal secretion. reasons for their change.

59. The size, shape and color of erythrocytes are normal and the reasons for their changes.

60. Calculation of erythrocyte indices and the reasons for their changes.

61. Classification of anemia. Hypochromic anemias and their laboratory diagnostics.

62. Classification of anemia. Normochromic anemias and their laboratory diagnostics.

63. Classification of anemia. Hyperchromic anemias and their laboratory diagnostics.

64. Absorption, transport and distribution of iron in the blood. Reasons for the development of IDA. Laboratory diagnostics.

65. Complete blood count: causes of leukocytosis.

66. Complete blood count: causes of leukopenia.

67. Complete blood count: causes of pancytopenia.

68. Complete blood count: causes of thrombocytosis.

69. Complete blood count: reasons for the development of changes in ESR.

70. Complete blood count: causes of leukemoid reactions and their differential diagnosis.

71. Functions and composition of the oral fluid.

72. Methods for collecting oral fluid.

73. Microbiological examination of saliva.

74. Physical and chemical properties of saliva (determination of pH, electrolytes).

75. Macroscopic examination of sputum in children (Kurshman spirals, Koch lenses, Dietrich plugs, fibrin clots, etc.), the reasons for their appearance.

76. Microscopic examination of sputum (cellular elements) the reasons for their appearance.

77. Microscopic examination of sputum (fibrous and crystalline formations), the reasons for their appearance.

78. Bacterioscopic examination of sputum and its methods.

79. Transudates and exudates: causes of formation, types, laboratory diagnostics.

80. Macro-, micro- and bacterioscopic analysis of effusion fluids. reasons for his change.

81. Cytochemical characteristics of blood cells and bone marrow in normal conditions and in leukemia.

82. Study of bone marrow punctate. Diagnosis of leukemia.

83. General clinical study of feces. Coprogram is normal and in diseases of the gastrointestinal tract.

84. Tumor markers: types, diagnostic significance, indications for prescription.

85. Algorithm for the appointment of tumor markers.

86. Cancer embryonic antigen: indications for prescription, reasons for their increase in blood.

87. α-fetoprotein: indications for prescription, reasons for their increase in the blood.

88. Chorionic gonadotropin: indications for prescription, reasons for their increase in the blood.

89. SA-125: indications for prescription, reasons for their increase in blood.

90. SA 19-9: indications for prescription, reasons for their increase in the blood.

91. MCA: indications for prescription, reasons for their increase in the blood.

92. SA 72-4: indications for prescription, reasons for their increase in blood.

93. CYFRA-21-1: indications for prescription, reasons for their increase in the blood.

94. Neuron-specific enolase: indications for prescription, reasons for their increase in blood.

95. PSA: indications for prescription, reasons for their increase in the blood.

96. The use of tumor markers in tumors of the gastrointestinal tract, reproductive organs, lungs and prostate.

6.3. Suggested themes of term papers (projects)

No coursework is provided.

6.4. Suggested themes of term projects

No coursework is provided.

6.5. Suggested topics of calculation and graphic works

1. Glycogenoses: causes and laboratory diagnosis.
2. Mucopolysaccharidoses: causes and laboratory diagnosis.
3. laboratory diagnosis of comatose states in diabetes mellitus.
4. Differential diagnosis of coma in diabetes mellitus.
5. Causes of development, clinical manifestations and laboratory diagnosis of hyperlipoproteidemia.
6. Rare types of dyslipoproteidemias and their laboratory diagnosis.
7. Secondary hyperlipoproteidemias.
8. Laboratory diagnosis of myocardial infarction. Markers of myocardial damage (fatty acid binding protein (FABP), BB isoenzyme glycogen phosphorylase).
9. Diseases of the pancreas: enzymodiagnosis.
10. Skeletal muscle diseases: enzymodiagnosis.
11. Renal diseases: enzymodiagnosis.
12. BB-CFC as a marker of CNS damage.
13. Haemolytic disease in newborns: causes, laboratory diagnosis.
14. Post-transfusion haemolytic anaemia: causes, laboratory diagnosis.
15. Autoimmune hemolytic anemias: classification, main causes of development, laboratory diagnosis.
16. Parasitic anemias: prevalence, causative agents, laboratory diagnosis.
17. Determination of apoA1, apoB100 apoproteins, indications for tests, interpretation.
18. Possibilities of laboratory diagnosis in determining the risk of CHD and its complications.
19. CRP in clinical laboratory diagnostics. Significance of study of individual proteins.
20. Homocysteine, changes in its levels in vascular pathology.
21. Methods of laboratory diagnosis of herpesvirus infection: isolation of HPV on sensitive cell cultures and animals, direct and immune electron microscopy, direct and indirect ELISA, ELISA, molecular biological methods, latex agglutination reaction), auxiliary methods (neutralization reaction, RBC, detection of antibodies to non-structural proteins of HPV-1,2).
22. Methods for laboratory diagnosis of cytomegalovirus infection: virological method, cytological method, serological method, molecular biological method. Diagnostic methods for herpes zoster virus: indirect and direct methods.
23. Physical properties of bile: colour, transparency, density, reaction.
24. Biochemical parameters of bile: bilirubin, cholesterol, cholates.
25. Microscopic examination of bile: white blood cells, red blood cells, epithelial cells, cholesterol crystals, calcium bilirubinate, bile acids, microliths.
26. Bacteriological parameters of bile.
27. Function of blood electrolytes in normal and their disturbance in various pathologies (magnesium, iron, copper). Indications for administration of analysis.
28. Basic functions of oral fluid. Composition and properties of saliva. Collection of saliva. Microbiological examination of saliva. Determination of alcohol in saliva using test strips. Saliva composition in pathological conditions and diseases. 29.
29. Laboratory diagnosis of TEPA. D-dimer, INR. Laboratory monitoring of anticoagulant therapy.
30. Laboratory diagnosis of diseases of the gastrointestinal tract. Markers of pancreatic pathology (α-amylase, lipase, CA-199 of blood; urine diastase; fecal elastase-1).

31. Laboratory tests in diseases of the stomach and intestine (antibodies to Helycobacter Pyl. in blood, PCR for DNA Helycobacter Pyl. in gastric biopsies; oncomarkers CA-242, REA; fecal occult blood test).

32. Markers of biliary tract damage (GGTP, alkaline phosphatase, CA-199).

7. Educational, methodological, informational and software support of the discipline (module)

The electronic catalog and electronic information resources provided by the scientific library of the FSBEI of HE "I. N. Ulianov Chuvash State University" are available at the link http://library.chuvsu.ru/

7.1. Regulatory documents, standards and rules

1. Об образовании в Российской Федерации: Федеральный закон от 29.12.2012 № 273-ФЗ (последняя редакция) [Принят Государственной Думой 21.12.2012 года. Одобрен Советом Федерации 26.12.2012 года]. - URL: http://www.consultant.ru/document/cons_doc_LAW_140174/ (дата обращения: 20.08.2019). – Текст: электронный.

2. Устав ФГБОУ ВО "Чувашский государственный университет имени И.Н. Ульянова" [Утвержден приказом Министерства науки и высшего образования Российской Федерации от 27.12.2018 № 1317] - URL: https://www.chuvsu.ru/sveden/files/ustav_obraz_org_chgu.pdf (дата обращения: 20.08.2019). – Текст: электронный.

3. Положение об организации и осуществлении образовательной деятельности по образовательным программам высшего образования - программам бакалавриата, программам специалитета, программам магистратуры в ФГБОУ ВО «Чувашский государственный университет им. И.Н. Ульянова» [Утвержден ученым советом ФГБОУ ВО «Чувашский государственный университет им. И.Н. Ульянова» от 26.12.2017 протокол № 24]. - URL: https://www.chuvsu.ru/sveden/files/Pologhenie_ob_organizacii_obr.deyat.pdf (дата обращения: 20.08.2019). – Текст: электронный.

4. Об утверждении федерального государственного образовательного стандарта высшего образования по направлению подготовки 31.05.03 Стоматология (уровень специалитета): Приказ Минобрнауки России от 09.02.2016 № 95 (ред. от 08.08.2016) [Зарегистрировано в Минюсте России 01.03.2016 № 41276]. - URL: https://www.chuvsu.ru/sveden/files/Standart_31.05.01_Lechebnoe_delo.pdf (дата обращения: 20.08.2019). – Текст: электронный.

5. Об основах охраны здоровья граждан в Российской Федерации: Федеральный закон от 21.11.2011 № 323-ФЗ (последняя редакция) [Принят Государственной Думой 1.11.2011 года. Одобрен Советом Федерации 9.11.2011 года]. - URL: http://www.consultant.ru/document/cons_doc_LAW_121895/ (дата обращения: 20.08.2019). – Текст: электронный.

7.2. Recommended basic educational and methodological literature

№ item	Name
1	

7.3. Recommended supplementary educational and methodological literature

№ item	Name
1	

7.4. List of resources of the "Internet" information and telecommunication network

№ item	Name	Link to the resource
1	Медицинская литература. Текст: электронный // Научная библиотека ЧувГУ (сайт). - URL: http://library.chuvsu.ru/	http://library.chuvsu.ru/
2	Электронно-библиотечная система IPRBooks URL: http://www.iprbookshop.ru	http://www.iprbookshop.ru
3	Консультант студента. Электронная библиотека медицинского вуза. URL: http://www.studmedlib.ru/	http://www.studmedlib.ru/
4	Медицинская литература. Текст: электронный // Российская государственная библиотека (сайт). - URL: https://www.rsl.ru/	https://www.rsl.ru/
5	Российская национальная библиотекаб - URL: https://www.nlr.ru/	https://www.nlr.ru/
6	Медицинская литература. Текст: электронный //Научная электронная библиотека «Киберленинка» (сайт). - URL: http://cyberleninka.ru/	http://cyberleninka.ru/
7	Федерация лабораторной медицины	https://fedlab.ru/
8	Российская Ассоциация медицинской лабораторной диагностики (РАМЛД)	http://www.ramld.ru/
9	Научно-практическое общество специалистов лабораторной медицины	http://labmedicina.ru/

7.5. Software, professional databases, information and reference systems, electronic educational resources and electronic library systems

Software, professional databases, information and reference systems provided by the Informatization Department of the FSBEI of HE "I.N. Ulianov Chuvash State University" are available for download at the link http://ui.chuvsu.ru //. The Unified Register of Russian programs for electronic computers and databases, including freely distributed ones, is available at the link reestr.minsvyaz.ru/reestr /.

7.5.1. Licensed and freely distributed software

Microsoft Windows operating System and/or Unix-like operating system and/or mobile operating system;

Office software packages:

Microsoft Office and/or LibreOffice

and (or) OpenOffice and (or) analogues;

Browsers, including Yandex.Browser.

List of software:

7.5.2. Lists of professional databases and (or) information reference systems and (or) electronic library systems and (or) electronic educational resources

8. Material and technical support of the discipline

Classrooms for lecture-type classes in the discipline are equipped with a teacher's automated workplace consisting of: a personal computer/laptop, multimedia equipment with a screen and (or) SMART interactive whiteboard/SMART TV.

The premises for students' independent work are equipped with computer equipment enabling to connect to the Internet and provide access to the electronic information and educational environment of the FSBEI of HE "I.N. Ulianov Chuvash State University".

№ item	Lesson type	Brief description and characteristics of the composition of installations, measuring and diagnostic equipment, computer equipment and experimental automation tools
1		Центр аккредитации и симуляционного обучения Оборудование: набор из двух фантомов: фантом катетеризации пузыря у мужчин и женщин. Фантом таза мужчины многофункциональный. Видеотренажер лапароскопический с набором для отработки навыков. Муляж ткани для прошивания красный. Муляж толстой кишки двуслойный. Набор муляжей тканей кожи (10 шт в уп.). Тренажер для отработки базовых хирургических навыков с аксессуарами. Фантом для отработки десмургии. Фантом для отработки процедуры катетеризации центральных вен. Фантом руки и ноги для отработки хирургического шва. Муляж ткани для отработки подкожного шва. Манекен для отработки навыков сердечно-легочной реанимации. Теле-ментор, высокотехнологичный передвижной аппаратно-программный комплекс для симуляционного обучения в медицине. Фантом для внутримышечных инъекций. Фантом руки для отработки внутривенных, внутримышечных и подкожных инъекций. Фантом руки для подкожных инъекций. ВиртуШОК, торс для СЛР, расширенная комплектация с ЭКГ и АНД. Торс для отработки навыков проведения СЛР и вентиляции, Кевин. Столы, стулья, кушетки, расходный материал (шприцы, симуляторы растворов, средства дезинфекции), ноутбуки с переговорными устройствами, встроенные столы, пеленальные столы, медицинские шкафы, учебные пособия и т. д.
2		Учебная аудитория для занятий семинарского типа, текущего контроля и промежуточной аттестации. Оборудование: учебная доска, учебная мебель, вытяжной шкаф, фотометр фотоэлектрический КФК-3-01, переносное мультимедийное оборудование (проектор, экран, ПК или ноутбук)

3	Лек	Учебные аудитории для занятий лекционного типа, семинарского типа. Оборудование: учебная доска, учебная мебель, мультимедийное оборудование (проектор, экран, персональный компьютер или ноутбук с необходимым программным обеспечением для тематических иллюстраций и демонстраций, соответствующих программе дисциплины)

9. Means of adapting the discipline teaching to the needs of persons with physical conditions

If necessary, persons with physical conditions can be offered one of the following options for perceiving information, taking into account their individual psychophysical characteristics:

1) using e-learning and distance learning technologies.

2) using special equipment (enginery) and software in accordance with the students' health restrictions in the Training Centers for Persons with Disabilities and Physical Conditions (hereinafter referred to as special needs) available at the university.

In the course of training, if necessary, the following conditions are provided for persons with visual, hearing and musculoskeletal disorders:

- for persons with visual impairments: educational and methodological materials in printed form in enlarged font; in the form of an electronic document; in the form of an audio file (conversion of educational materials into audio format); in printed form in Braille; individual consultations involving a tactile interpreter; individual assignments and consultations.

- for people with hearing impairments: educational and methodological materials in printed form; in the form of an electronic document; video materials with subtitles; individual consultations involving a sign language interpreter; individual assignments and consultations.

- for persons with disorders of the musculoskeletal system: educational and methodological materials in printed form; in the form of an electronic document; in the form of an audio file; individual assignments and consultations.

10. Guidelines for students to perform independent work

The purpose of the student's independent work (IW) is to consolidate the theoretical knowledge gained and to acquire practical skills in using and performing research of algorithms and data structures when designing application software programs. IW includes independent study of educational issues, preparation for laboratory classes, performing calculation and graphic work, preparation for a test and an exam.

The list of questions and tasks for independent work to prepare for laboratory classes is given in the corresponding methodological instructive regulations in the description of each laboratory work.

The list of questions and tasks for independent work to carry out calculation and graphic work is given in the relevant methodological instructive regulations.

Independent work of students is an integral part of the educational process. The aim of independent work is to train a modern competent specialist and to form abilities and skills for continuous self-education and professional improvement.

Realisation of the goal implies solving the following tasks:

- qualitative mastering of theoretical material on the studied discipline, deepening and expansion of theoretical knowledge in order to apply it at the level of interdisciplinary links;

- systematisation and consolidation of the theoretical knowledge and practical skills acquired

- developing skills in searching for and using normative, legal, reference and special literature, as well as other sources of information;

- Development of cognitive abilities and activity, creative initiative, independence, responsibility and organization;

- Development of independent thinking, self-development, self-education, self-improvement and self-actualization;

- Development of research skills;

- formation of the ability to solve practical problems (in professional activity), using the acquired knowledge, abilities and skills.

Independent work of students on clinical laboratory diagnostics includes extra- auditory independent work on the study of basic and additional educational literature, the use of modern information technologies to search for information on newly implemented laboratory technologies, classroom independent work of students with archival laboratory analyses. This work of students is carried out under the control of the teacher during laboratory classes. For compulsory extracurricular independent work in the work program additionally allocated study hours for the sections of the discipline.

In independent work the student must acquire practical skills and abilities on the possibilities of modern information technology to search for information on newly implemented diagnostic technologies and their use in clinical practice and master the clinical terminology adopted in modern clinical laboratory diagnostics.

The following sources can be recommended for independent preparation for laboratory classes, study of academic issues, preparation for the exam:

- lecture notes and materials of laboratory classes;

- Academic literature of the respective subject area.

The teacher at the beginning of the course informs students about the forms, types and content of independent work, explains the requirements for the results of independent work, as

11. Methodological instructive regulations for students studying the discipline (module)

The discipline "clinical laboratory diagnostics" allows to teach students to apply the skills of selecting an algorithm for the examination of a patient using laboratory methods of disease diagnosis, to properly prepare the patient for the examination and clinically interpret the results obtained. Therefore, trainees should rely mainly on the knowledge and skills acquired in lecture and laboratory classes. This provides the necessary basis for further in- depth study of other disciplines.

11.1. Methodological instructive regulations for preparing for seminar-type classes

A laboratory class is a form of study that focuses on reinforcing the theoretical material studied, deepening the comprehension of it and shaping the ability to apply theoretical knowledge in a practical, applied way. Special attention in laboratory classes is paid to the development of study or professional skills. Such skills are formed in the process of carrying out specific tasks - exercises, tasks, etc. - under the guidance and control of the teacher. The main objective of laboratory classes is to develop skills and practical experience aimed at shaping professional competences (ability to perform certain actions and operations required in professional activities) or general competences (general competences are necessary for successful activities in both professional and extra-professional spheres).

The content of laboratory classes includes solving different kinds of tasks, including professional ones (interpretation of analysis results, solving situational tasks, performing

professional functions in business games, etc.), working with normative documents, instructional materials, reference books and others.

To prepare for the laboratory class, the student should study theoretical material on the topic, memorise basic definitions and rules, analyse task solutions given in lectures. In order to consolidate the material learnt, the student should do his/her homework according to the task received in the previous class. If you have difficulties in doing it, it is recommended that you seek help from the teacher at the time allocated for consultations.

Stages of preparation for the laboratory class:

- studying the theoretical material obtained during the lecture and the self-study;
- homework;
- self-check on the control questions of the topic.

Teachers of the department have developed questions for self-control and questions to prepare for laboratory classes.

11.2. Methodological instructive regulations for preparing for an examination

The aim of the examination is to evaluate the work of a student in a particular course: the theoretical knowledge acquired, its strength, development of logical and creative thinking, acquisition of independent work skills, ability to analyse and synthesise the acquired knowledge and apply in practice the solution of practical problems.

The examination is conducted in written form according to the tickets approved by the head of department. The examination ticket includes two questions and tasks. The wording of the questions coincides with the wording of the list of questions communicated to the students one month before the examination session. Pre-examination counselling is organised for all study groups in preparation for the exam. The result of the examination shall be expressed as "excellent", "good" or "satisfactory".

The examiner may ask a maximum of one or two additional questions that do not exceed the requirements of the syllabus in order to clarify the grade. An additional question is understood as a question that is not related to the topic of the ticket. An additional question, as well as the main questions of the ticket, requires a detailed answer. In addition, the teacher may ask a number of clarifying and leading questions related to the topics of the main questions of the ticket. The number of clarifying and leading questions is unlimited.

11.3. Methodological instructive regulations for preparing for a test

Не предусмотрено.

11.4. Methodological instructive regulations for performing computational and graphical

The aim of the calculation and graphic work is to systematise and consolidate theoretical knowledge and develop practical skills in problem solving, develop skills in analysing statistical data and formulating conclusions on the results obtained.

The objectives of the computational-graphic work are as follows:

- developing the skills of independent work in solving practical tasks;
- selection and systematisation of theoretical material as the basis for solving practical tasks, developing the skills of independent work with educational and methodological literature;
- drawing conclusions on the results obtained.

Structure of the calculation and graphic work:

1. title page.
2. Table of contents.
3. Sections (introduction, etiology, pathogenesis, main clinical manifestations, clinical and laboratory diagnostic criteria).

4. Conclusions.

5. The list of references.

Requirements for work design:

The text is typed in the text editor MicrosoftWord font TimesNewRoman size 12 pt 1.5 spacing or 14 pt 1 spacing. Recommended page margins: left 30 mm, right 15 mm, top and bottom 20 mm.

The calculation and graphic work must be paginated.

The title page is not included in the total numbering of pages.

All illustrations in the paper must be carefully selected and clearly executed. Figures and diagrams should be directly related to the text, without unnecessary images and data that are not explained.

11.5. Methodological instructive regulations for performing a control work

No control work is provided.

11.6. Methodological instructive regulations for performing a course work (project)

No course work is provided.

List of additions and changes

The name and details (if any) of the document attached to the Working Program of the discipline (module) containing the text of updates	Department's decision		Full name of department head:
	Date	Protocol №	