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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

Orthopedic Dentistry and Orthodontics Department

«APPROVE»

Vice-rector for Academic Affairs


I.E. Poverinov

« 13 » 04 2022

**Working programs of the discipline (module)
«Материаловедение в ортопедической практике / Materials Science
in Orthopedic Practice»**

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 – 3

Term – 5

Total academic hours/credit points – 144/4

The year of beginning the training – 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:

Head of the department, Doctor of Medical Sciences Yu. N. Urukov

Associate Professor, Candidate of Medical Sciences N.S. Fedorova

The working program was approved at the meeting of the Orthopedic Dentistry and
Orthodontics Department,

25.03.2022, protocol № 17

Head of the department Yu. N. Urukov

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 - The purpose of the discipline (module) is to form students' basic ideas about the composition, structure, properties and technology of using dental materials, as well as the patterns of changes in the properties of materials under the influence of physical, mechanical, chemical and biological factors associated with the conditions of their use in dental practice .

The objectives of the discipline - Tasks of the discipline (module) - Formation of skills in organizing measures for labor protection and safety when working with instruments and reagents. The study of the relationship between the chemical nature of materials and their properties that are important for use in various fields of dentistry. Study of methods for preclinical (in vitro) evaluation of physical, mechanical, chemical, technological properties of materials. Study of methods for assessing the biocompatibility and bioinertness of materials. The study of the main classification of dental materials according to their purpose, the classification of dental materials by chemical nature. Study of terminology in the field of dental materials science.

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

The discipline «Материаловедение в ортопедической практике / Materials Science in Orthopedic Practice» относится к обязательной части учебного плана 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):

Фармакология / Pharmacology

Биология / Biology

Основы материаловедения в стоматологии / Fundamentals of Materials Science in Dentistry

Производственная практика (клиническая практика по стоматологии общей практики) / On-the-job training (clinical practice in general dentistry)

Иммунология / Immunology

Гистология, эмбриология, цитология / Histology, Embryology, Cytology

Патологическая анатомия / Pathological Anatomy

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:

Терапевтическая стоматология / Therapeutic Dentistry
 Хирургическая стоматология / Surgical Dentistry
 Детская стоматология / Pediatric Dentistry
 Ортодонтия и детское протезирование / Orthodontia and Pediatric Prosthetics
 Ортопедическая стоматология / Orthopaedic Dentistry
 Челюстно-лицевая хирургия / Maxillofacial Surgery
 Подготовка к сдаче и сдача государственного экзамена / Preparation for passing and passing the state exam
 Судебная медицина / Forensic Medicine

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)
ОПК-6 Способен назначать, осуществлять контроль эффективности и безопасности немедикаментозного и медикаментозного лечения при решении профессиональных задач / He/she is able to prescribe, monitor the effectiveness and safety of non-drug and pharmacological therapy in solving professional problems	ОПК-6.1 Способен определить показания и противопоказания при назначении медикаментозного, немедикаментозного и иных методов лечения / He/she is able to determine the indications and contraindications when prescribing medication, non-drug and other methods of treatment	Know: 1. Topographic anatomy of the head, maxillofacial region, features of blood supply, innervation and lymphatic system, structure of teeth, embryology of the dentoalveolar region, main violations of embryogenesis; 2. Groups of drugs, their pharmacokinetics, pharmacodynamics, drug compatibility; Rules for writing prescriptions for basic dosage forms; dosage forms, routes of administration of drugs, types of their action and interaction; main drug groups and pharmacotherapeutic actions of drugs by groups; side effects, types of reactions and complications of drug therapy. methods of using medical devices, chemicals and drugs for plaque control; 3. General and functional methods of treatment of patients with maxillofacial pathology; Be able to: 1. Determine the indications and contraindications for the appointment of drug and non-drug and other methods of

		<p>treatment;</p> <ol style="list-style-type: none"> 2. Write out dosage forms in the form of a prescription using reference literature; 3. Find information about medicines in accessible databases, electronic library systems, use search engines; 4. Navigate in the nomenclature of medicines; 5. Analyze the effect of drugs on the basis of their pharmacological properties; 6. Evaluate the possibilities of using medicines for the treatment, rehabilitation and prevention of diseases and pathological conditions; <p>Own:</p> <ol style="list-style-type: none"> 1. Skills of working with traditional and electronic sources of pharmacological information; the conceptual apparatus of the discipline. 1. Prescribing drug therapy for diseases in accordance with existing medical indications, taking into account the pharmacodynamics and pharmacokinetics of drugs; 2. Appointment of non-drug therapy in accordance with medical indications;
<p>ОПК-6 Способен назначать, осуществлять контроль эффективности и безопасности немедикаментозного и медикаментозного лечения при решении профессиональных задач / He/she is able to prescribe, monitor the effectiveness and safety of non-drug and pharmacological therapy in solving professional problems</p>	<p>ОПК-6.2 Способен оценить риски связанные с использованием медикаментозного, немедикаментозного и иных методов лечения / He/she is able to assess the risks associated with the use of medicamentous therapy, drug-free modalities and other methods of treatment</p>	<p>Know:</p> <ol style="list-style-type: none"> 1. Morphological changes in the dentition during orthopedic and orthodontic treatment; 2. Clinical picture, symptoms of pathology in the oral cavity, medical indications for the use of various methods of treatment; 3. Clinical picture, main methods of treatment (medical indications, contraindications, complications) of diseases of the teeth, periodontium, oral mucosa, lips; 4. Clinical picture, main methods of treatment (medical indications, contraindications, complications) of diseases of the bone tissue of the jaws, peripheral nervous system of the maxillofacial

		<p>region, temporomandibular joint;</p> <p>5. Clinical picture, main methods of orthopedic treatment of hard tissue pathology, periodontal disease, pathological abrasion, pathology of the temporomandibular joint;</p> <p>6. Clinical picture, main methods of treatment (medical indications, contraindications, complications) of diseases of the salivary glands, congenital, acquired anomalies of teeth, dentition, alveolar processes, jaws, face;</p> <p>7. Clinical picture, symptoms of major diseases and borderline conditions of the maxillofacial region in adults and children, their treatment;</p> <p>8. Methods of treatment of dental and facial anomalies in children and adults;</p> <p>9. Principles, techniques and methods of anesthesia in dentistry;</p> <p>10. Principles of device and rules for the operation of medical devices (dental equipment);</p> <p>11. Modern medical products (equipment, tools and materials) used in dentistry;</p> <p>Be able to:</p> <p>1. Prescribe drug therapy for diseases in accordance with existing medical indications, taking into account the pharmacodynamics and pharmacokinetics of drugs;</p> <p>2. Prescribe non-drug therapy in accordance with medical indications;</p> <p>Own:</p> <p>1. Drawing up a comprehensive treatment plan;</p> <p>2. Evaluation of possible side effects from taking medications;</p> <p>3. A specialized technique for the treatment of caries, non-carious diseases of the teeth, pulpitis, periodontitis, diseases of the oral mucosa, with the exception of precancers;</p>
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		<p>4. Rules for the care of patients with injuries of the maxillofacial region, persons with disabilities at home;</p> <p>5. Advising the patient on the methods of treatment of dental diseases;</p> <p>6. Selection of medical devices (including dental materials) for the treatment of dental diseases;</p> <p>7. Orthopedic treatment of persons with defects in teeth, dentition within the limits of temporary prosthetics, prosthetics of single defects in the dentition, prostheses up to three units (excluding prosthetics on dental implants);</p> <p>8. Gradual sanitation of the oral cavity (excluding sanitation of children under anesthesia);</p> <p>9 Treatment of milk and permanent teeth;</p> <p>10. Justification of the most appropriate treatment tactics;</p>
<p>ОПК-6 Способен назначать, осуществлять контроль эффективности и безопасности немедикаментозного и медикаментозного лечения при решении профессиональных задач / He/she is able to prescribe, monitor the effectiveness and safety of non-drug and pharmacological therapy in solving professional problems</p>	<p>ОПК-6.3 Способен оценить эффективность медикаментозного, немедикаментозного и иных методов лечения / He/she is able to assess the effectiveness of pharmacological therapy, non-drug and other methods of treatment</p>	<p>Know:</p> <p>1. Clinical picture, main methods of treatment (medical indications, contraindications, complications) of diseases of the teeth, periodontium, oral mucosa, lips;</p> <p>2. Morphological changes in the dentition during orthopedic and orthodontic treatment;</p> <p>3. Clinical picture, main methods of treatment (medical indications, contraindications, complications) of diseases of the bone tissue of the jaws, peripheral nervous system of the maxillofacial region, temporomandibular joint;</p> <p>4. The clinical picture, the main methods of orthopedic treatment of hard tissue pathology, periodontal disease, pathological abrasion, pathology of the temporomandibular joint;</p> <p>5. Clinical picture, main methods of treatment (medical indications, contraindications, complications) of diseases of the salivary glands, congenital, acquired anomalies of</p>

	<p>teeth, dentition, alveolar processes, jaws, face;</p> <p>6. Clinical picture, symptoms of major diseases and borderline conditions of the maxillofacial region in adults and children, their treatment;</p> <p>7. Methods of treatment of dental and facial anomalies in children and adults;</p> <p>8. Principles of device and rules for the operation of medical devices (dental equipment);</p> <p>9. Modern medical products (equipment, tools and materials) used in dentistry;</p> <p>Be able to:</p> <ol style="list-style-type: none"> 1. Evaluate the effectiveness and safety of drug treatments; 2. Evaluate the effectiveness and safety of non-drug treatments; 3. Analyze the effect of drugs on the basis of their pharmacological effects; 4. Analyze the effect of non-drug methods of treatment in terms of the totality of their properties; <p>Own:</p> <ol style="list-style-type: none"> 1. Selection of drugs for the treatment of dental diseases; 2. Formation of a treatment plan for a patient with dental diseases; 3. Treatment of diseases of the teeth, periodontium, bone tissue of the jaws, peripheral nervous system of the maxillofacial region, temporomandibular joint, salivary glands; 4. Monitoring the progress of the patient's treatment; 5. Treatment of diseases of the mucous membrane of the oral cavity, lips, with the exception of a specialized appointment for the treatment of precancers of the mucous membrane of the oral cavity and lips; 6. Evaluation of possible side effects from taking medications; 7. Drawing up a comprehensive treatment plan; 8. A specialized technique for the
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		<p>treatment of caries, non-cariou diseases of the teeth, pulpitis, periodontitis, periodontitis, diseases of the oral mucosa, with the exception of precancers;</p> <p>9. Selection of medical devices (including dental materials) for the treatment of dental diseases;</p> <p>10. Orthopedic treatment of persons with defects in teeth, dentition within the limits of temporary prosthetics, prosthetics of single defects in the dentition, prostheses up to three units (excluding prosthetics on dental implants);</p> <p>11. Substantiation of the most appropriate treatment tactics;</p>
<p>ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и патологические процессы в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems</p>	<p>ОПК-9.1 Способен распознавать морфофункциональные, физиологические состояния и патологические процессы в организме человека / He/she is able to recognize morphofunctional, physiological states and pathological processes in the human body</p>	<p>Know:</p> <ol style="list-style-type: none"> 1. Know the basics of general and medical human biochemistry, how chemical reactions occur in cells (metabolism) and in the body as a whole (metabolism), as well as spatial organization, regulation, energy supply to cells at the molecular level in normal and changes that occur in pathology and ways to correct changes in metabolism in pathology. 2. List of methods of laboratory and instrumental studies for assessing the patient's condition, the main medical indications for conducting studies and interpreting the results. <p>Be able to:</p> <ol style="list-style-type: none"> 1. Interpret clinical analysis data for the diagnosis of a disease, select the optimal biochemical and other methods for assessing the patient's condition, as well as evaluate the significance of biochemical research methods and correctly formulate and plan research tasks in theoretical and practical biochemistry. 2. Identify clinical signs of conditions requiring emergency medical care. <p>Own:</p> <ol style="list-style-type: none"> 1. Modern research methods, the

		skills of taking biological material for clinical and biochemical research, as well as information about the functioning and regulation of the main human biochemical processes.
ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и патологические процессы в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems	ОПК-9.2 Способен анализировать морфофункциональные, физиологические состояния и патологические процессы в организме человека / He/she is able to analyze morphofunctional, physiological states and pathological processes in the human body	Know: 1. Etiology, pathogenesis and pathomorphology, clinical picture, differential diagnosis, course features, complications and outcomes of diseases of the organs and tissues of the mouth. Be able to: 1. To analyze the data of clinical and biochemical analysis for the diagnosis of diseases of the organs and tissues of the mouth and for diseases in an emergency form. Own: 1. Algorithms for providing medical care for diseases of the organs and tissues of the mouth and for diseases in an emergency.
ОПК-9 Способен оценивать морфофункциональные, физиологические состояния и патологические процессы в организме человека для решения профессиональных задач / He/she is able to evaluate morphofunctional, physiological states and pathological processes in the human body to solve professional problems	ОПК-9.3 Способен диагностировать морфофункциональные, физиологические состояния и патологические процессы организма человека / He/she is able to diagnose morphofunctional, physiological states and pathological processes in the human body	Know: 1. Methods of physical examination of patients (examination, palpation, percussion, auscultation). Be able to: 1. To identify conditions requiring medical care for diseases of the organs and tissues of the mouth and in an emergency form, including clinical signs of a sudden cessation of blood circulation and respiration. Own: 1. Methods of providing medical care for diseases of the organs and tissues of the mouth. 2. Identify conditions requiring emergency medical care, including clinical signs of a sudden cessation of blood circulation and breathing.

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
Section 1. Introduction to the discipline. General sections of materials science.	General sections of materials science.	ОПК-6, ОПК-9	ОПК-6.1, ОПК-6.2, ОПК-6.3, ОПК-9.1, ОПК-9.2, ОПК-9.3
Section 2. Structural dental materials.	Topic 2. Metals and alloys in dentistry. General characteristics, metallic bonds, structural features, the concept of dislocations and deformations in metals.		
	Topic 3. Processes of transition of metals from molten to solid state. Classification of alloys.		
	Topic 4. The phenomenon of corrosion. Classification of corrosion of metals. Methods for assessing corrosion resistance. Advantages and disadvantages of metals as restorative materials in dentistry.		
	Topic 5. Polymeric materials for the manufacture of dentures. Classification of basic materials, principal composition and curing mechanism of cold curing acrylic materials.		

<p>Section 2. Structural dental materials.</p>	<p>Topic 6. The process of radical polymerization in obtaining a powder of basic materials and a polymerizate from a polymer - monomer composition.</p> <p>Topic 7. Dental ceramics. Basic ideas about the composition, properties and technological processes of <u>obtaining</u>.</p> <p>Topic 8. Dental ceramics in combined designs of dentures. Solid ceramic. Prospects for the development of dental ceramics. Sitally. <u>Classification. Properties.</u></p>	<p>ОПК-6, ОПК-9</p>	<p>ОПК-6.1, ОПК-6.2, ОПК-6.3, ОПК-9.1, ОПК-9.2, ОПК-9.3</p>
<p>Section 3. Auxiliary dental materials.</p>	<p>Topic 9. Auxiliary materials in orthopedic dentistry. Classification of auxiliary materials. Classification and general characteristics of gypsum impression materials in dentistry. Principal chemical composition and hardening <u>mechanism</u>.</p> <p>Topic 10. Alginate impression materials. Elastomers. General information about the composition and properties.</p> <p>Topic 11. Waxes. General information about the composition and properties.</p>		
<p>Individual contact work.</p>	<p>Individual contact work.</p>		
<p>Clinical dental materials.</p>	<p>Dental materials for restoration of teeth in the clinic of therapeutic dentistry. General requirements, classification. Dental amalgam.</p> <p>Dental cements. Scope in dentistry. Classification. inorganic cements. Polycarboxylate cement. Glass polyalkenate</p>	<p>ОПК-6, ОПК-9</p>	<p>ОПК-6.1, ОПК-6.2, ОПК-6.3, ОПК-9.1, ОПК-9.2, ОПК-9.3</p>

	cements. Materials for filling the root canals of the tooth.		
Clinical dental materials.	Adhesion. General characteristics of adhesive systems. Classification of adhesive systems. Properties.	ОПК-6, ОПК-9	ОПК-6.1, ОПК-6.2, ОПК-6.3, ОПК-9.1, ОПК-9.2, ОПК-9.3
	Materials for oral hygiene.		

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)	
		5	total
1. Face-to-face work:		32,3	32,3
In-class learning in total, including:		32	32
Лабораторные занятия (Лаб)		32	32
Индивидуальная контактная работа (ИКР)		0,3	0,3
2. Independent work of the student:		57,7	57,7
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		
	Section 1. Introduction to the discipline. General sections of materials science.						
1	General sections of materials science.			4			4
	Section 2. Structural dental materials.						

2	Topic 2. Metals and alloys in dentistry. General characteristics, metallic bonds, structural features, the concept of dislocations and deformations in metals.			2			2
3	Topic 3. Processes of transition of metals from molten to solid state. Classification of alloys.			4			4
4	Topic 4. The phenomenon of corrosion. Classification of corrosion of metals. Methods for assessing corrosion resistance. Advantages and disadvantages of metals as restorative materials in dentistry.			2			2
5	Topic 5. Polymeric materials for the manufacture of dentures. Classification of basic materials, principal composition and curing mechanism of cold curing acrylic materials.			2			2
6	Topic 6. The process of radical polymerization in obtaining a powder of basic materials and a polymerizate from a polymer - monomer composition.			2			2
7	Topic 7. Dental ceramics. Basic ideas about the composition, properties and technological processes of obtaining.			4			4
8	Topic 8. Dental ceramics in combined designs of dentures. Solid ceramic. Prospects for the development of dental ceramics. Sitaly. Classification. Properties.			4			4
	Section 3. Auxiliary dental materials.						
9	Topic 9. Auxiliary materials in orthopedic dentistry. Classification of auxiliary materials. Classification and general characteristics of gypsum impression materials in dentistry. Principal chemical composition and hardening mechanism.			4			4

10	Topic 10. Alginate impression materials. Elastomers. General information about the composition and properties.			2			2
11	Topic 11. Waxes. General information about the composition and properties.			2			2
	Individual contact work.						
12	Individual contact work.				0,3		0,3
	Clinical dental materials.						
13	Dental materials for restoration of teeth in the clinic of therapeutic dentistry. General requirements, classification. Dental amalgam.					15	15
14	Dental cements. Scope in dentistry. Classification. inorganic cements. Polycarboxylate cement. Glass polyalkenate cements. Materials for filling the root canals of the tooth.					15	15
15	Adhesion. General characteristics of adhesive systems. Classification of adhesive systems. Properties.					15	15
16	Materials for oral hygiene.					12,7	12,7
Total academic hours				32	0,3	57,7	144

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

Раздел 1. Section 1. Introduction to the discipline. General sections of materials science.

Тема 1. General sections of materials science.

Лабораторное занятие. General sections of materials science. The historical aspect of dental materials science as an applied science of dental materials. Classification of dental materials.

Раздел 2. Section 2. Structural dental materials.

Тема 2. Topic 2. Metals and alloys in dentistry. General characteristics, metallic bonds, structural features, the concept of dislocations and deformations in metals.

Лабораторное занятие. Laboratory work 1.

Metals and alloys in dentistry. General characteristics, metallic bonds, structural features, the concept of dislocations and deformations in metals.

Тема 3. Topic 3. Processes of transition of metals from molten to solid state. Classification of alloys.

Лабораторное занятие. Laboratory work 2.

Processes of transition of metals from molten to solid state. Classification of alloys.

Тема 4. Topic 4. The phenomenon of corrosion. Classification of corrosion of metals. Methods for assessing corrosion resistance. Advantages and disadvantages of metals as restorative materials in dentistry.

Лабораторное занятие. Laboratory work 3.

The phenomenon of corrosion. Classification of corrosion of metals. Methods for assessing corrosion resistance. Advantages and disadvantages of metals as restorative materials in dentistry.

Тема 5. Topic 5. Polymeric materials for the manufacture of dentures. Classification of basic materials, principal composition and curing mechanism of cold curing acrylic materials.

Лабораторное занятие.

Laboratory work 4.

Polymeric materials for the manufacture of dental prostheses. Classification of basic materials, principal composition and curing mechanism of cold curing acrylic materials.

Тема 6. Topic 6. The process of radical polymerization in obtaining a powder of basic materials and a polymerizate from a polymer - monomer composition.

Лабораторное занятие. Laboratory work 5.

The process of radical polymerization in obtaining a powder of base materials and a polymerizate from a polymer - monomer composition.

Тема 7. Topic 7. Dental ceramics. Basic ideas about the composition, properties and technological processes of obtaining.

Лабораторное занятие. Laboratory work 6. Dental ceramics. Basic ideas about the composition, properties and technological processes of obtaining.

Тема 8. Topic 8. Dental ceramics in combined designs of dentures. Solid ceramic. Prospects for the development of dental ceramics. Sitally. Classification. Properties.

Лабораторное занятие. Laboratory work 7.

Dental ceramics in combined designs of dentures. Solid ceramic. Prospects for the development of dental ceramics. Sitally. Classification. Properties.

Раздел 3. Section 3. Auxiliary dental materials.

Тема 9. Topic 9. Auxiliary materials in orthopedic dentistry. Classification of auxiliary materials. Classification and general characteristics of gypsum impression materials in dentistry. Principal chemical composition and hardening mechanism.

Лабораторное занятие. Laboratory work 8.

Auxiliary materials in prosthetic dentistry. Classification of auxiliary materials. Classification and general characteristics of gypsum impression materials in dentistry. Principal chemical composition and hardening mechanism.

Тема 10. Topic 10. Alginate impression materials. Elastomers. General information about the composition and properties.

Лабораторное занятие.

Laboratory work 9.

Alginate impression materials. Elastomers. General information about the

composition and properties.

Тема 11. Topic 11. Waxes. General information about the composition and properties.

Лабораторное занятие.

Laboratory work 10.

Waxes. General information about the composition and properties.

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:

Составными элементами образовательных технологий являются:

- лекции - для изложения нового материала, с целью повышения качества восприятия информации, используются классические и визуальные лекции, которые предполагают использование современных инетрактивных средств (электронные доски, проекторы).

- лабораторные занятия (компьютерные симуляции) - для закрепления теоретических знаний и развития клинического мышления проводятся занятия в фантомном классе и зубо-технической лаборатории, с дискуссионным обсуждением и разбором ситуационных задач. К проведению лабораторных занятий по предмету ортопедическая стоматология в обязательном порядке привлекается сертифицированный специалист - зубной техник лаборант, для демонстрации технических этапов изготовления ортопедических стоматологических конструкций.

- самостоятельная работа обучающихся используется в качестве опережающего этапа к проведению лабораторных занятий и предполагает наличие теоретических знаний у обучающихся, полученных самостоятельно, закрепление которых происходит в процессе проведения лабораторных занятий.

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

Сдача зачета не предусмотрена.

6.2. Sample list of questions for the examination

1. The historical aspect of dental materials science.
2. Metals: structure and properties.
3. Requirements for impression materials. Technique of obtaining impressions.
4. The main content, tasks of dental materials science.
5. Deformation: elastic and plastic. Dislocations. Importance in orthopedic dentistry.
6. General characteristics and significance of auxiliary materials. Classification of auxiliary materials according to their purpose.
7. Alloys: definition. The processes of transition of metals from the molten to the solid state.
8. Classification and general characteristics and significance of auxiliary materials. Classification of auxiliary materials according to their purpose.
9. Formation of a mechanical mixture. Application in dental prosthetic technique.
10. Gypsum, application in dental prosthetic technique, classification of gypsum in accordance with the international standard.

11. Formation of a solid solution. Application in dental prosthetic technique. PC-9, OPK-11;
12. The chemical composition of gypsum. Technology of industrial production of gypsum of various classes.
13. Formation of chemical compounds at technological stages in the manufacture of stainless steel prostheses.
14. Basic properties of gypsum. Technology of gypsum application.
15. Classification of alloys according to ISO, 1989.
16. Thermoplastic impression materials. Composition and properties. Requirements for thermoplastic impression materials.
17. Requirements for alloys used in orthopedic dentistry.
18. Conditions affecting the setting speed and strength of gypsum.
19. Requirements for metal frames of fixed prostheses.
20. Technology of production of plaster models.

6.3. Suggested themes of term papers (projects)

Написание курсовой работы не предусмотрено.

6.4. Suggested themes of term projects

Написание курсового проекта не предусмотрено.

6.5. Suggested topics of calculation and graphic works

Написание расчетно-графической работы не предусмотрено.

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.chvsu.ru/>

7.1. Regulatory documents, standards and rules

Normative-legal acts in the field of education.

1. Federal Law of December 29, 2012 N 273-FZ "On Education in the Russian Federation" http://www.consultant.ru/document/cons_doc_LAW_140174/
2. Decree 852 of June 1, 2021 "On licensing medical activities"
3. Order 110n dated February 18, 2021 "On Amendments to Order 560n dated June 9, 2020 "On Approval of the Rules for Conducting X-Ray Examinations"
4. Order No. 205n dated March 15, 2021 "On Approval of the Procedure for Selecting an Advanced Training Program by a Medical Worker in an Organization Carrying out Educational Activities for Referral to Additional Professional Education at the expense of the normalized insurance reserve of the Federal Compulsory Medical Insurance Fund, the normalized insurance reserve of the territorial compulsory medical insurance fund medical insurance"
5. Order No. 109n of February 18, 2021 "On Amendments to the Procedure for Providing Medical Care to the Adult Population for Dental Diseases, approved by Order of the Ministry of Health of the Russian Federation of July 31, 2020 No. 786n"
6. Order 58n of February 8, 2021 "On the specifics of the admission of individuals to carry out medical activities and (or) pharmaceutical activities without a specialist certificate or certificate of accreditation of a specialist and (or) in specialties not provided for by a specialist certificate or certificate of accreditation of a specialist in 2021 »
7. Professional standard "Dentist"
8. Order 469n dated July 31, 2020 "On approval of the professional standard "Dental Hygienist"
9. Order 786n dated July 31, 2020 "On approval of the procedure for providing medical care to adults with dental diseases"
10. Letter of the Ministry of Health 10-0 / I / 2-13985 dated September 24, 2020 "On the need to organize work in an online format"
- 11 Order No. 984 of August 12, 2020 "On approval of the educational standard of higher education - specialist in the specialty 31.05.03 Dentistry"

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	Научная библиотека ЧувГУ [Электронный ресурс].	Режим доступа: http://library.chuvsu.ru
2	Электронно-библиотечная система IPRBooks [Электронный ресурс]	Режим доступа: http://www.iprbookshop.ru
3	Электронная библиотечная система «Юрайт»: электронная библиотека для вузов и ссузов [Электронный ресурс]	Режим доступа: https://www.biblio-online.ru
4	ЭБС «Издательство «Лань» [Электронный ресурс]	Режим доступа: https://e.lanbook.com/

5	Российская государственная библиотека [Электронный ресурс]	Режим доступа: http://www.rsl.ru
6	Российская национальная библиотека [Электронный ресурс]	Режим доступа: http://www.nlr.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		Помещение для самостоятельной работы обучающихся. Оборудование: компьютерная техника с подключением к сети Интернет и доступом к электронной информационно-образовательной среде ФГБОУ ВО «Чувашский государственный университет имени И.Н. Ульянова»

2	<p>Учебные аудитории для занятий лекционного типа, семинарского типа.</p> <p>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)</p>
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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 purpose of independent work of students is to master fundamental knowledge, professional skills, experience in creative, research activities.

The main forms of organization of independent work of students are: classroom

independent work under the guidance and supervision of a teacher (at lectures, practical, laboratory classes, etc. and consultations); extracurricular independent work under the guidance and control of the teacher (at consultations, during research work), extracurricular independent work - the planned educational, teaching and research, research work of students, performed outside the classroom on the instructions and with the methodological guidance of the teacher, but without his direct participation.

When performing independent work, students should rely mainly on the knowledge and skills gained in lectures, practical, laboratory classes, group and individual classes. This provides the necessary basis for further in-depth study of other disciplines. However, this knowledge needs to be activated.

The forms of independent work of students, provided for by the discipline, include:

- Preparation for practical, laboratory classes, group and individual classes.
- Independent study of educational issues.
- Preparation for the test / exam.

For self-preparation for practical, laboratory, group and individual classes, study of educational issues, preparation for tests and exams, the following sources are recommended:

- lecture notes and materials of practical, laboratory, group and individual lessons;
- educational (scientific) literature of the relevant profile;
- Internet resources.

At the beginning of the course, the teacher informs students about the forms, types and content of independent work, explains the requirements for the results of independent work, as well as the forms and methods of control and evaluation criteria.

According to the questions proposed by the teacher, the student studies the content of the recommended sections, chapters, paragraphs, textbooks, manuals and monographs; statistical collections; reviews; articles in periodicals. Normative legal acts are studied using the legal bases "Consultant - Plus" or "Garant", as well as Internet resources. The forms of control of such individual work are surveys in practical, group and individual classes, checking notes, conclusions.

Individual tasks of a creative orientation involve:

- preparation of analytical individual work on the subject proposed by the teacher. The completed task is evaluated taking into account the quality of the analysis, identification of factors, causes, conditions for changes, trends; substantiating conclusions; proposals put forward by the author;
- preparation for a discussion, for a business game, etc.;
- a critical review of articles from the list recommended by the teacher, etc.

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

Guidelines for preparing for laboratory classes:

The main goal of laboratory classes is to test theoretical knowledge and teach manual skills. In the course of completing tasks, students develop practical skills in handling dental instruments, installations, equipment, which can be part of professional practical training, as well as research skills (observe, compare, analyze, establish dependencies, draw conclusions and generalizations, present the results).

Forms of organization of students in laboratory classes: frontal, group and individual.

With the frontal form of organizing classes, all students solve the same case problem at the same time.

In the group form of organizing classes, the same case-task is solved by a group of 2-5 people.

With an individual form of organizing classes, each student solves an individual task.

Grades for laboratory classes are taken into account as an indicator of the current progress of the student.

Guidelines for preparing for the exam

The exam aims to evaluate the work of a student for a certain course: the received theoretical knowledge and practical skills, the development of logical and creative thinking, the acquisition of independent work skills, the ability to analyze the knowledge gained and put into practice the solution of practical problems.

The exam is held in writing on tickets approved by the head of the department. The examination ticket includes a situational task and a manual skill. In the process of preparing for the exam, a pre-exam consultation was organized for all study groups. The result of the exam is expressed as "excellent", "good", "satisfactory".

In order to clarify the assessment, the examiner can ask no more than one or two additional questions that do not go beyond the requirements of the work program. An additional question is a question that is not related to the subject matter of the ticket questions. An additional question, as well as the main questions of the ticket, requires a detailed answer. In addition, the teacher can ask a number of clarifying and leading questions related to the subject of the main questions of the ticket. The number of clarifying and leading questions is not limited.

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

A practical lesson is one of the forms of educational work, which is focused on consolidating the studied theoretical material, its deeper assimilation and the formation of the ability to apply theoretical knowledge for practical, applied purposes. Particular attention in practical classes is paid to the development of educational or professional skills. Such skills are formed in the process of performing specific tasks - exercises, tasks, etc. under the guidance and control of the teacher.

The main goal of practical training is the formation of skills and the acquisition of practical experience aimed at the formation of competencies. The content of practical classes is solving various kinds of problems, including professional ones (analysis of production situations, solving situational production problems, demonstrating the development of professional functions during experiments, etc.), performing calculations, calculations, studying the dynamics of various indicators, working with software software, work with legal documents, instructional materials, reference books, etc.

To prepare for a practical lesson, the student needs to study the theoretical material on this topic, remember the basic definitions and terms, and analyze the lecture material. To consolidate the material covered, the student also needs to do homework in accordance with the assignment received in the previous practical lesson. In case of difficulties in its implementation, it is recommended to seek help from the teacher at the time allotted for consultations.

Stages of preparation for a practical lesson:

- study of the theoretical material received at the lecture and in the process of independent work;
- study and analysis of the recommended literature;
- taking notes of what was read during the study of the recommended literature;
- doing homework;
- self-examination on control questions of the topic;
- formulation of opinions and preparation of questions for a practical lesson that arose during independent work.

Practical classes develop students' skills of independent work to solve specific problems.

11.2. Methodological instructive regulations for preparing for an examination

The exam aims to assess the development of competencies by students for a certain course: the theoretical knowledge gained, their strength, the development of logical and

creative thinking, the acquisition of independent work skills, the ability to analyze and synthesize the knowledge gained and put into practice the solution of practical problems.

The exam is conducted on tickets approved by the head of the department. The examination paper includes two questions and a task(s). The wording of the questions coincides with the wording of the list of questions brought to the attention of students one month before the examination session. In the process of preparing for the exam, a pre-examination consultation is held for all study groups. The result of the exam is expressed as "excellent", "good", "satisfactory".

In order to clarify the assessment, the examiner may ask several additional questions that do not go beyond the requirements of the work program of the discipline (module). An additional question is a question that is not related to the subject matter of the ticket questions. An additional question, as well as the main questions of the ticket, requires a detailed answer. In addition, the teacher can ask a number of clarifying and leading questions related to the subject of the main questions of the exam ticket. The number of clarifying and leading questions is not limited.

A student is allowed to take the exam if he/she has completed in full the tasks provided for in the work program of the discipline (module). In case of missing any types of training sessions for good or bad reasons, the student independently performs and submits for verification in writing the general or individual tasks determined by the teacher. The theoretical course examination takes place in oral or written form (determined by the teacher) on the basis of a list of questions that reflect the content of the current work program of the academic discipline. Students are encouraged to:

- prepare for the exam by carefully reading all the exam questions;
- draw up a plan for answering each question, highlighting the key points of the material;
- Having studied several questions, discuss them with classmates.

The answer must be reasoned. The results of the exam are assessed as "excellent", "good", "satisfactory" or "unsatisfactory"

11.3. Methodological instructive regulations for preparing for a test

The Reporting is not provided.

11.4. Methodological instructive regulations for performing computational and graphical

The Writing settlement and graphic work is not provided.

11.5. Methodological instructive regulations for performing a control work

The Writing a test paper is not provided.

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

Написание курсовой работы не предусмотрено.

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 №	