FACULTY OF STOMATOLOGY

STUDY PROGRAM 0911.1 STOMATOLOGY

CHAIR OF STOMATOLOGICAL PROPAEDEUTICS „PAVEL GODOROJA"

APPROVED
at the meeting of the Committee for Quality Assurance and Evaluation of the Curriculum Faculty of Stomatology
Minutes No. 1 of 22.09.2020
Committee president, PhD, DMS, Associate professor
Stepco Elena

APPROVED
at the Council meeting of the Faculty of Stomatology
Minutes No. 2 of 30.09.2020
Dean of Faculty of Stomatology, PhD, DMS, Associate professor
Solomon Oleg

APPROVED
at the meeting of the chair of Stomatological Propaedeutics „Pavel Godoroja"
Minutes nr. 3 of 18.09.2020
Head of chair, PhD, DHMS, Associate professor
Uncuța Diana

CURRICULUM

DISCIPLINE: **PRECLINIC ENDODONTICS**

Integrated studies

Course type: **Compulsory discipline**

Chișinău, 2020

PRELIMINARIES

- ***General presentation of the discipline: the place and role of the discipline in the formation of the specific competences of the vocational/specialty training program.***

"Preclinical Endodontics" is a compartment of dentistry that studies the structure and function of the endodontium, the methods and techniques of manipulation in the pulp cavity in traumas, pathological changes in the pulp and periodontium.

The endodontic space is a pulp-dentinal complex whose basic elements are pulp and dentine adjacent to the dental cavity, joined together functionally and morphologically.
Knowing the morphological particularities of the endodontic space of permanent teeth is a starting point for clinical and complementary examinations and for developing an individualized treatment plan that takes into account possible anatomical variations.

The endodontic space is constituted by the natural cavity inside the tooth, which comprises the pulp chamber at the crown and the root canals inside the roots. Due to the complexity of the endodontic space, with normal or pathological individual anatomical variations, the term "endodontic system" is used in the literature. It should be perceived as an extremely complex three-dimensional system, branched, apparently closed, but in fact in a morphological connection with the periapical and periradicular tissues.

Preclinical endodontics is an indispensable compartment for both dental propaedeutic and other branches of modern dentistry. Training students transition from preclinical stage to clinical stage of dentistry is performed by familiarizing them with the specifics of the simulators room, preclinical endodontics, dental office, dental ambulatory care organization. The basic steps in the preclinical and clinical examination of patients and the clinical and paraclinical options described in this section are directed to the development of clinical thinking of students in order to establish a diagnosis and treatment plan and apical periodontium disorders. At the same time, attention is paid to prevention of inflammatory processes of pulp and periapical tissues in dental Propaedeutic and levels of prevention and control of errors and complications in endodontics. The latter is a fundamental step in the training of specialists. The discipline includes general notions about endodontics, endodontic instruments and manual and rotary and methods of pulpitis treatment, endodontic hand and rotary instruments in endodontic treatment, determining working length in root canals. In this subject the emphasis is on the knowledge about root canal filling materials, classification, physicochemical properties, and root canal filling techniques. Future dentists will meet with endodontic retreatment, endodontic treatment radiological examination of pulp and periodontal lesions, the differential diagnosis of dental caries, errors and complications in endodontics and modern methods of restoration of endodontically treated teeth.

Doctor's conduct within the dentist's office is an important step in the development of future specialists, because endodontic treatment is an indispensable compartment of modern dentistry.

Mission of the curriculum (aim) in vocational training

Preclinical endodontics aims to integrate the knowledge gained by future dentists in endodontic discipline in order to provide effective, harmless dental care in the treatment of dental caries complications according to quality criteria for other endodontic treatment by the European Endodontic Society, 2006.

At the same time, the clinical and paraclinical examination methods described in the preclinical endodontic discipline are intended to develop students' skills and clinical thinking aimed at the accumulation of endodontic skills and abilities in determining the optimal methods of prophylaxis, diagnosis and treatment of pulpar inflammation and periapical tissues and improving quality of life for patients.

- **Discipline teaching languages**: Romanian, Russian and English.
- **Beneficiaries**: students of the second year, the faculty of Dentistry.

I. DISCIPLINE ADMINISTRATION

Discipline code		**S.05.O.052**	
Discipline name		**Preclinical endodontics**	
Responsible for discipline		**Uncuța Diana**, head of chair, PhD, DHMS, associate professor	
Year	**III**	Semester	**V**
Total number of hours, including:			**90**
Lectures	**17**	Practical courses	**17**
Seminars	**34**	Individual work	**22**
Evaluation form	**E**	Number of credits	**3**

II. THE TRAINING OBJECTIVES OF THE DISCIPLINE

- ***At the level of knowledge and understanding:***

✓ define the notion of endodontics, its objectives and tasks;
✓ to know the role of preclinical endodontics in solving dental caries complications and the importance of effective endodontic treatment in the prevention of inflammatory oro-maxillofacial complications;
✓ to know the anatomo-topographic features of the pulp of permanent teeth and to create endodontic access to different groups of teeth;
✓ be familiar with the handheld and device tools in preclinical endodontics and sterilization methods;
✓ be familiar with the rotary tools and devices in the preclinical endodontics;
✓ to know the anatomical and clinical forms of pulp inflammation;
✓ to know the classification of pulp pathology and endo-periodontal syndrome, endo-periodontal communication pathways;
✓ to know the classification of pulp pathology after Baume, Ingle, Grossman, Seltzer and Bender;
✓ to know the essence of direct, direct, pulp capping methods;
✓ to know the essence of vital pulpotomy methods and techniques;
✓ to know materials and substances used to maintain pulp vitality;
✓ to know the principles of endodonticortograd treatment (non-surgical);
✓ to know the essence of methods of amputation and extirpation treatment of the pulp;
✓ to understand how to determine the working length of root canals;
✓ to know the methods of permeability and chemomechanical processing of root canals;
✓ to know the essence of the methods of endodontic lavage, antimicrobial dressing, disinfection and irrigation of the root canals;
✓ to know the materials of root canal obturations, classifications, physico-chemical properties;
✓ to know the methods of root canal filling;
✓ to know the methods of ortograd endodontic retreatment;
✓ to know the types of radiological paraclinical investigations used in dental caries and their complications (pulp and lesions of periapical tissues) and the indications for their performance;
✓ understand the errors and complications in endodontics, as well as the methods of treatment;
✓ to know the modern methods of restoration of teeth treated endodontically.
✓ understand the way of communicating with endodontic patients and establishing their anamnesis;

- ✓ to know how to record the data in the medical record of the patient;
- ✓ to know the particularities and stages of the preclinical and clinical examination of the patient in endodontics;
- ✓ to know the particularities and options of paraclinical examination of the endodontic patient;
- ✓ to know the types of non-radiological paraclinical investigations: the pulp vitality tests and the indications for their performance;
- ✓ to know the notions of prevention of oro-maxilo-facial inflammatory processes due to endodontic treatment failures;
- ✓ to know the principles of aseptic endodontics and methods of sterilization;
- ✓ to know the stages of patient preparation for endodontic treatment;
- ✓ to know the basic stages in the therapeutic behavior in terms of endodontic treatment;
- ✓ to know the methods of prevention of nosocomial infections in preclinical endodontics.

- ***At the application level:***

- ✓ describe the role of preclinical endodontics in solving dental caries complications and prevention of oro-maxillofacial inflammatory complications;
- ✓ define the notion of endodontics, its objectives and its tasks;
- ✓ describe the anatomical-topographic features of the pulp chambers of the permanent teeth and create endodontic access to different groups of teeth;
- ✓ to distinguish manual instruments and devices needed in preclinical endodontics and sterilization methods;
- ✓ to distinguish the rotary instruments and devices in the preclinical endodontics;
- ✓ describe the anatomical-clinical forms of pulp inflammation;
- ✓ to classify the pulp patology and the endo-periodontal syndrome, the endo-periodontal communication pathways;
- ✓ classify the pathogenic pulp patology by Baume, Ingle, Grossman, Seltzer and Bender;
- ✓ apply indirect and direct pulp capping methods;
- ✓ apply methods and techniques of vital pulpotomy;
- ✓ use materials and substances used to maintain pulp vitality;
- ✓ describe the principles of endodonticortograd (non-surgical) treatment;
- ✓ to apply treatment by amputation and extirpation of pulp;
- ✓ be able to determine the working length of root canals;
- ✓ to perform the methods of permeability and chemomechanical processing of the root canals;
- ✓ apply endodontic lavage methods, antimicrobial endodontic dressing, disinfection and irrigation of root canals;
- ✓ to use root canal filling materials, classifications, physicochemical properties;
- ✓ perform different methods of root canal obturation;
- ✓ apply ortograd endodontic restoration methods;
- ✓ describe the types of radiological paraclinical investigations used in dental caries and their complications (pulp and lesions of periapical tissues) and the indications for their performance;
- ✓ differentiate errors and complications in endodontics, as well as treatment methods;
- ✓ apply various modern methods of restoration of endodontic-treated teeth.
- ✓ be able to collect endodontic and anamnesis data (subjective examination);
- ✓ be able to highlight data of major importance for the diagnosis;
- ✓ be able to argue the necessity of the chosen paraclinical examination depending on the case;
- ✓ be able to describe the behavior of the physician and assistant during endodontic treatment;
- ✓ apply the types of non-radiological paraclinical investigations: the pulp vitality tests and the indications for their performance;
- ✓ apply the principles of aseptic endodontics and methods of sterilization of endodontic instruments;
- ✓ apply the way of recording the data in the medical record of the endodontic patient;

- ✓ apply the notions of prevention of oro-maxilo-facial inflammatory processes due to endodontic treatment failures;
- ✓ apply the stages of endodontic and patient preparation to endodontic treatment;
- ✓ apply methods for the prevention of nosocomial infections in preclinical endodontics.

• At the integration level:

- ✓ assess the level of endodontic care;
- ✓ appreciate the type of data collection in dental pulp inflammation depending on the patient (dialogue, investigation, combined);
- ✓ assess the level of satisfaction of the patient according to various criteria;
- ✓ distribute the necessary endodontic instruments according to their purpose;
- ✓ ensure respect for professional ethics and deontology;
- ✓ highlight the patient's problem with the appreciation of the paraclinical examination options necessary to establish a correct diagnosis.

III. PRECONDITIONS AND EXIGENCIES

Knowledge and observance of ethical-moral and professional norms in patient relations. Knowledge of the purpose and tasks of preclinical endodontics. Understanding the anatomical-topographic features of the pulp chambers at different groups of teeth. Knowledge of the organization of endodontic therapeutic assistance within the endodontic office / department (understanding the necessary documentation within the endodontic office / department). Knowledge of methods and stages of clinical and paraclinical examination used in endodontics. Knowledge of aseptic methods in endodontic treatment. Knowing the principles, phases and essence of the vital and devital methods of pulpitis treatment. Understand the use of rotary and manual endodontic instruments. Knowing the methods of determining the working length of the root canals. Understanding the methods of disinfecting and irrigating root canals. Comprehension of the method of endodontic retreatment. Knowing the errors and complications that may occur in endodontic treatment. Understanding modern methods of restoration of endodontic-treated teeth. Knowing the root-filling materials and the root canal filling methods.

IV. THEMES AND ORIENTATIVE DISTRIBUTION OF HOURS

Nr. d/o	THEME	Number of hours			
		Courses	Semi-nars	Pra-ctice	Indivi dual
1.	**Endodontics. General notions. Purpose and tasks of endodontics. The structure of the endodontic space.** Endodontics. General notions. The purpose of endodontics. The tasks of endodontics. Diagnostic methods in endodontics. Criteria favoring the success of endodontic therapy. Pepper chamber ideas. Topographic data of the coronary cavity of the tooth (bottom, ceiling, and walls). Topographic data of root canals (main channel, ramifications). Topographical data of the apical area: radiological apex, anatomical apex, apical constriction (minor apical diameter), foramen apical (major apical diameter), cement-dentinal junction. Types of apicultural constrictions after Петрикас şi Овсепян (1997). Classification of canal morphotypes after Ingle (1976), Vertucci (1984), Weine (1989). Factors generating changes in tooth cavity structure, including those of the age.	1	2	1	1
2.	**Topographic anatomy of cavities of permanent teeth. Group and individual features.**	1	2	1	2

Nr. d/o	THEME	Number of hours			
		Courses	Seminars	Practice	Individual
	The peculiarities of the pulp cavity topography of the maxillary and mandibular central incisors, maxillary and mandibular lateral incisors. The peculiarities of the topography of the cavity pulp and mandibular canine. The peculiarities of the topography of the pulp chamber at the first maxillary and mandibular premolars. The peculiarities of topography of the pulp chamber in the maxillary and mandibular premolars II. The peculiarities of the topography of the pulp chamber in the maxillary and mandibular molars I, II and III. Election points for trepanation and the shape of the access cavity for the upper and lower jaw incisors. Elevation points for shaking and the shape of the access cavity in upper and lower jaws. Elevation points for trepanation and the shape of the access cavity in upper and lower jaws. Elevation points for trepanation and the shape of the access cavity in the upper jaws. Elevation points for trepanation and the shape of the access cavity of the lower jaw molars. Instrument used for endodontic access. Differences in the topography of the pulp chamber at the maxillary and mandibular incisors. Differences in topography of the pulp chamber in maxillary canines and mandibular canines. Differences in topography of the pulp chamber at the maxillary premolars and mandibular premolars. Differences in topography of the pulp chamber at the maxillary molars and mandibular molars.				
3.	**Classification of anatomical and clinical forms of pulpary inflammation. Microbial factor in endodontic pathology. Necrosis and pulp gangrene. Techniques, materials and substances used to maintain pulp vitality. Local anesthesia in endodontics. Direct and indirect pulp capping.** Classification of anatomical and clinical forms of pulmonary inflammation. Classification of pulp pathology after Baume. Classification of pulp pathology after Seltzer and Bender. Classification of pulp pathology after Ingle. Classification of pulp pathology after Grossman. Microbial factor in endodontic pathology. Necrosis and pulp gangrene. Techniques, materials and substances used to maintain pulp vitality. Local anesthesia in endodontics. Indirect pulp capping. Objectives. Indirect pulp capping materials. Indirect pulp capping technique. Direct pulp capping. Indications and contraindications. Conditions ofapplication and direct pulp capping technique.	1	2	1	2
4.	**Amputation methods and vital pulp extirpation. Devital treatment methods of the pulp. Totalization** Essence of amputation and vital extirpation, notion of pulpotomy. Indications and contraindications of vital pulpotomy. Advantages and disadvantages of vital pulpotomy. The technique of vital pulpotomy. Methods of vital pulmonary extirpation. The notion of devitalization of the pulp. The remedies used for pulp devitalization. Mechanism of action of arsenic acid and formaldehyde based pastes. The steps of applying the devitalizing paste. Methods of devital extirpation of the pulp. Essence. Stages of devital pulp extirpation.	1	2	1	1
5.	**Manual endodontic instruments. Methods of sterilization and disinfection. Aseptics in endodontics.** Classification of endodontic instruments by ISO-FDI. Endodontic Instrument Classification by Grossman. Classification of endodontic instruments	1	2	1	2

Nr. d/o	THEME	Number of hours			
		Courses	Seminars	Practice	Individual
	according to the method of use (Nisha Garg, 2014). Classification of endodontic instruments after: instrument designation, method of making, the material from which it is made, instrument flexibility, tool length, coding of endodontic instruments according to size, the shape of the active part and the tip of the instrument, the conicity, the way of acting the instruments. The dimensions of endodontic instruments according to ISO. Color coding of the endodontic instruments. Standardization of endodontic instruments by ISO. Symbols by ISO. Methods of sterilization and disinfection in endodontics. Aseptics in endodontics.				
6.	**The rotor endodontic instrument. Endodontic handpieces.** Stainless -steel rotating instruments. Ni-Ti Rotary Instrument: Continuous Speed, Protaper System, Profile System, ProtaperNext Mover, Wave One System, SAF (Self Adjusting File) System. Endodontic handpieces.	1	2	1	2
7.	**Determination of working length in root canals.** The definition of the working length in the root canal, the length of the tooth. Methods of determining the working length of the root canal. Classification: radiological and non-radiological methods. Calculated length of tooth and root. Touch method. Radiological method. Clinical-radiological method for determining the length of the root canal. Technique. Instruments. The Dieck process. Electronic methods. Advantages, disadvantages. Indications. Instruments. Gear.	1	2	1	1
8.	**The use of manual endodontic instruments in the permeability, enlargement and chemomechanical processing of the root canal.** Handlingendodontic intruments. How to manually enlarge the root canal. Rules for instrumental processing of the root canal. Reaming. Circular bend. Recap. Method of chemical expansion of root canals.Preparations for chemical widening of root canals.Manual widening techniques: step-back technique, step-back technique, passive step-back technique, step-down technique (progressive telescopes), the double flare technique, the apical cylinder technique. Ultrasonic root canal preparation. Radial canal vascularization. Types of vibratory endodontic handpieces.	1	2	1	1
9.	**The use of rotational endodontic instruments in the chemomechanical processing of the root canal. Totalization.** Rules of rotating widening. Ni-Ti Rotary Systems. Types of rotary movements: continuous rotation. Universal ProTaper system, Profile system, ProTaperNext system, WaveOne system. Hybrid technique of widening of root canals. Mutual Movement.	1	2	1	2
10.	**Methods of disinfection and irrigation of root canals.** Irrigation solutions: sodium hypochlorite, EDTA, iodurate solutions, chlorhexidine digluconate, MTAD, citric acid. Irrigation techniques and protocols. Requirements and Functions of Irrigantes. Choice of Irrigation solutions. Ultrasonic irrigation. Modern irrigation solutions. Irrigation methods. Endovac. Intracanalar drugs.	1	2	1	1

Nr. d/o	THEME	Number of hours			
		Courses	Semi-nars	Pra-ctice	Indivi dual
11.	**Root canal filling materials. Classifications. Physical-chemical properties.** Materials for filling. Classification and requirements for radicular obturation materials. Solid materials: gutta-percha. Sealers: zinc oxide and eugenol based, mineral trioxide aggregate based. Epoxy resins for root canal filling.	1	2	1	1
12.	**Filling root canals with different materials.** Radicular filling. The importance of canal filling. The momentum of the channel filling. The apical limit of the canal filling. Radicular filling techniques. Classification.Technics of filling with one cone. Operating stages. Instruments, materials. Cold side condensation technology. Tools, materials. Vertical condensation technology. Operator Times. Instrument, materials. Obturation of root canals with Thermafill technique, Gutacore. Operating stages. Instruments.	1	1	1	1
13.	**Endodontic retreatment. Totalization.** Decision factors. Stages of orthography. Access. Treating or removing coronary obstruction or crowns. Removal of corono-root devices. Removing existing coronary materials from canals. Removal of coronary reconstruction materials from the pulp chamber. Removal of endodontic obturation material. Solvents for sealants.	1	2	1	1
14.	**Imagistic examination in endodontic treatment.** Retroalveolar radiography. Techniques. Radiological highlights on the maxilla and mandible. Radiological pathological dental calculi in dental caries, coronary fractures, radicular, external and internal resorbtions. Digital radiography. Computed tomography (CBCT). The CBCT exam value. Indications of CBCT in endodontics.	1	2	1	2
15.	**Errors and complications in endodontics.** Methods and techniques of treatment. Classification of errors and complications in endodontic treatment. Accidents in root canal enlargement. Fenestration. Apical transport. Fracture of instruments into channels. Treatment of accidents. Incomplete anesthesia. Causes. Conduct. Incorrect endodontic access. Causes. Conduct. Possible errors (the perforation of the floor and the wall of the pulp chamber, the fracture of the wall). Perforation of root canal walls. Causes. Consequences. Conduct. Overfilling the root canal. Causes. Consequences. Conduct. Root fracture. Causes. Conduct. Inhale of foreign bodies. Conduct. Swallowing instruments. Causes. Conduct. Emphysema of the soft parts. Causes. Conduct. Intracanal haemorrhage. Causes. Conduct. Methods of preventing accidents in endodontic therapy.	1	2	1	1
16.	**Modern methods restoration of endodontically treated teeth.** Methods of direct restoration. Simple coronary obturation. Restoring frontal teeth. Restoration of lateral teeth. Objectives. Indications. Contraindications. Armed coronary obturation. Preparing the root space. Restoration of devital teeth with glass fiber posts. Methods of indirect restoration (prosthetic).	1	2	1	1
17.	**Clinical examination in endodontics. Totalization**	**1**	2	1	1

Nr. d/o	THEME	Number of hours			
		Courses	Semi-nars	Pra-ctice	Indivi dual
	Anamnesis. Medical and dental anamnesis. General clinical examination. Clinical loco-regional examination. Exooral and endooral examination. Examining soft parts. Examination of dental arches. Complementary examinations. Thermal vitality tests. Hot test. The cold test. Electrical vitality tests. Mastication test. The exploratory drilling test. Selective anesthesia test. Transillumination. Radiological examination.				
Total		**17**	**34**	**17**	**22**

V. REFERENT OBJECTIVES AND CONTENT UNITES

Objectives	Content units
Endodontics. General notions, purpose and tasks. The structure of the endodontic space. Topographic anatomy of cavities of permanent teeth. Group and Individual Particularities. Classification of anatomical and clinical forms of pulpar inflammation. Techniques, materials and substances used to maintain pulp vitality. Local anesthesia in endodontics. Direct and indirect pulp capping. Vital and non vital amputation and extirpation methods pulp treatment.	
✓ to know the role of the endodont profession; ✓ define the notion of preclinical endodontics; ✓ know the task of endodontics; ✓ to know the notion of endodontic space and its composition; ✓ to know topographic data of the coronary cavity of the tooth and of the root canals; ✓ be aware of topographical data of the apical area; ✓ to know the dental medical documentation in the endodontic office/department; ✓ to know the anatomo-topographic features of the pulp cavities of the permanent teeth; ✓ to know the necessary tools for creating access to the pulp chamber; ✓ to know the election points and the form of access to different groups of teeth; ✓ know the differences in the topography of the pulp chamber at different groups of teeth; ✓ to know the classification of anatomical and clinical forms of pulp inflammation; ✓ Be familiar with the classification of pulp pathology after Baume, Ingle, Seltzer and Bender; ✓ to know the microbial factor in endodontic pathology; ✓ be aware of necrosis and pulp gangrene; ✓ be able to carry out indirect and direct dressing; ✓ to know the notion of vital pulpotomy, vital and devital extirpation; ✓ to know the mechanism of action of arsenic acid and formaldehyde-based pastes;	Endodontics. Purpose and tasks. Diagnostic methods. Criteria favoring the success of endodontic therapy. Data about the pulp chamber. Topographic data of the coronary cavity of the tooth. Topographic data of root canals. Topographic data of the apical area. Types of apical constrictions after Petricas and Osupeian (1997). Classification of canal morphotypes after Ingle (1976), Vertucci (1984), Weine (1989). Factors generating changes in tooth cavity structure, including those of the age. Particularities of pulp cavity topography of central incisors, lateral incisors, canines, premolars and molars. Election points for trepanation and the shape of the access cavity. Instrument used to perform endodontic acces. Differences in the topography of the pulp chamber. Essence of amputation and vital extirpation. Pulpotomy notion. Indications and contraindications. Advantages and disadvantages. Technique. Methods of vital pulpar extirpation. The concept of pulp devitalization. Remedies used. Mechanism of action of arsenic acid and formaldehyde based pastes. The steps of applying the devitalizing paste. Methods of devital pulp extirpation. Essence. Stages of devital pulp extirpation.

Objectives	Content units
Manual and rotary endodontic instrumentation. Methods of sterilization and disinfection. Aseptic in endodontics. Determination of working length in root canals. Use of manual and rotational endodontic instruments in the permeability, enlargement and chemo mechanical processing of the root canal.	
✓ be familiar with the classification of endodontic instruments according to ISO-FDI, after Grossman, after Nisha Garg; ✓ be familiar with the classification of endodontic instruments based on certain criteria; ✓ be able to differentiate manual instruments between them; ✓ be able to differentiate tools based on ISO color and symbols; ✓ to know the methods of sterilization and disinfection in endodontics; ✓ be aware of asepsia in endodontics; ✓ to know rotating instruments; ✓ understand the notion of working length in the root canal, the length of the tooth; ✓ to know the methods of determining the working length; ✓ know how to manually manipulate the tools, manually enlarge the channels; ✓ know the rules for instrumental processing of the root canal; ✓ to know the preparations and the method of chemical expansion of the root canals; ✓ to know and to distinguish the techniques of manual enlargement; ✓ be aware of the ultrasonic and vibratory preparation of the root canal; ✓ know the Ni-Ti milling systems; ✓ to know the ProTaper, Profile, WaveOne systems; ✓ be aware of the hybrid rotation technique of root canals;	Classification of endodontic instruments by ISO-FDI Methods of sterilization and disinfection in endodontics. Aseptics in endodontics. Steel endodontic rotary instruments. Ni-Ti Rotary instruments. Endodontic handpieces. Definition of working length in the root canal. Methods of determining the working length. Classification: radiological and non-radiological methods. Calculated length of tooth and root. Electronic methods. Advantages disadvantages. Indications. Instruments. Gear. The way of manipulating instruments, manually enlarging canals. The method of chemical root canal enlargement. Preparations for the chemical expansion of root canals. Techniques of manual enlargement. Ultrasonic root canal preparation. The vibratory preparation of the root canal. The types of vibratory endodontic handpieces. Rules of rotating widening. Ni-Ti Rotary Milling Systems. Types of rotary movements: continuous rotation. Universal ProTaper system, Profile system, ProTaperNext system, WaveOne system. Hybrid technique widening of root canals. Mutual Movement.
Methods of disinfection and irrigation of root canals. Radicular canal filling materials. Classifications. Physical-chemical properties. Filling root canals with different materials. Endodontic retreatment.	
✓ to know the irrigation solutions; ✓ to know techniques and irrigation protocols; ✓ to know the requirements and functions of the irrigants; ✓ to choose the irrigation solutions; ✓ to know ultrasonic irrigation; ✓ to know modern irrigation solutions, irrigation methods; ✓ to know the intracanal drugs; ✓ to know filling materials, classification and requirements;	Irrigation solutions: sodium hypochlorite, EDTA, iodurate solutions, chlorhexidine digluconate, MTAD, citric acid. Irrigation techniques and protocols. Requirements and functions of irrigantes. Choice of irrigation solutions. Ultrasonic irrigation. Modern irrigation solutions. Irrigation methods. Endovac. Intracanalic drugs. Materials for filling. Classification and requirements for radicular obturation materials.

Objectives	Content units
✓ to know solid materials: gutaperca; ✓ to know epoxy resins for root canal filling; ✓ to know the techniques of ortograde retreatment; ✓ to know the stages of restoration, access, removal of the endodontic obturation material; ✓ to know solvents for sealants.	Solid materials: gutta-percha. Sealants: zinc oxide and eugenol based, mineral trioxide aggregate based. Epoxy resins for root canal filling. Radicular filling. Importance of canal filling. The optimal moment of canal filling. Apical limit of canal filling. Radicural filling techniques. Classification. Sigle-cone filling technique. Instruments, materials. Lateral side cold condensing technique. Instrument, materials. Vertical condensation technique. Tooling, materials. The root filling with Thermafill, Gutacore technique. Instruments. Stages of orthograd retreatment. Access. Removal of endodontic obturation material. Solvents for sealants.
Imagistic examination in endodontic treatment. Errors and complications in endodontics. Methods and techniques of treatment. Modern methods of restoration of endodontically treated teeth. Clinical examination in endodontics.	
✓ to know the retroalveolar radiography, techniques; ✓ to know the normal radiological markings on the maxilla and mandible; ✓ to know the radiological pathological dental marks in dental caries, coronary fractures, radicular, external and internal resorbtions; ✓ be familiar with digital radiography; ✓ to know the conical beam computer tomography (CBCT); ✓ to know the value of CBCT exam; ✓ be familiar with CBCT indications in endodontics; ✓ be familiar with the classification of errors and complications in endodontic treatment; ✓ to know the methods of accident prevention in the endodontics; ✓ to know methods of direct restoration of endodontically treated teeth; ✓ to know simple coronary obturation; ✓ be aware of the restoration of the frontal teeth; ✓ to know the restoration of lateral teeth; ✓ to know armed coronary obturation; ✓ to know methods of indirect (prosthetic) restoration of endodontically treated teeth; ✓ be able to perform the general clinical examination; ✓ be able to perform the loco-regional, exooral and endooral clinical exam; ✓ be able to perform the soft part exam; ✓ be able to perform the dental arcade examination;	Retroalveolar radiography. Techniques. Radiological landmarks on the maxilla and mandible. Radiological pathological in dental caries, coronary fractures, radicular external and internal resorbtions. Digital radiography. Computed tomography (CBCT). The CBCT exam value. Indications of CBCT in endodontics. Classification of errors and complications in endodontic treatment. Methods of accident prevention in endodontic therapies. Methods of direct restoration of endodontically treated teeth. Simple coronary obturation. Restoring frontal teeth. Restoration of lateral teeth. Objectives. Indications. Contraindications. Armed coronary obturation. Methods of indirect (prosthetic) restoration of teeth treated endodontically. General clinical examination. Anamnesis. Medical and dental anamnesis. Clinical loco-regional examination. Exooral and endooral examination. Examining soft parts. Examination of dental arches. Complementary examinations. Thermal vitality tests. Hot test. The cold test. Electrical vitality tests. Mastication test. The exploratory milling test. Selective anesthesia test. Transillumination. Radiological examination.

Objectives	Content units
✓ be able to carry out the complementary examinations; ✓ be able to perform vitality tests; ✓ be able to perform the transillumination; ✓ to know the radiological examination;	

VI. PROFESSIONAL (SPECIFIC (SC)) AND TRANSVERSAL (TC) COMPETENCES AND STUDY OUTCOME

Professional competencies (specific) (SC)

SC1: Knowledge of the theoretical notions of endodontic space, the role, the tasks of endodontics. Knowledge of the topographic data of the tooth cavity, the root canals and the apical area. Knowing the instrumentation needed to create access to the pulp chamber. Knowledge of microbial factor in endodontic pathology. Knowing the essence of the indirect and direct pulp capping method; vital pulpotomy, vital and devital extirpation.

SC2: Knowledge and simulation of endodontic treatment in pulpary pathology. Knowledge and description of classifications of manual and rotational endodontic instruments. Knowing the working length of the root canal. Knowledge of techniques and methods of use of manual and rotational instruments in endodontic treatment with chemomechanical enlargement. Knowledge of methods of aseptic, sterilization and disinfection in endodontics.

SC3: Analysis of laboratory data for laboratory investigations and their description. Analysis of radiological clusters, evaluation and description of normal and pathological anatomical parts based on cone-shaped computerized tomography in endodontics.

SC4: Knowledge of methods of accident prevention in endodontic therapy and knowledge of methods of direct and indirect restoration of endodontically treated teeth. Evaluation of sterilization control methods for materials and instruments used in endodontics.

SC5: Completing the medical records of the patients in the pulpar pathology, performing the clinical examination and elaborating the indications for the type of the paraclinical examination with their argumentation. Determining options for establishing the diagnosis and treatment plan. Description of the stages of processing and sterilization of endodontic instruments according to the indications. Elaboration of the data collection algorithm and work with the patients in the endodontic surgery.

SC6: Demonstration and application of acquired knowledge in the clinical and paraclinical evaluation of the endodontic patient. Selection and argumentation of communication techniques, data collection and patient preparation for endodontic treatment. Promoting the principles of tolerance and understanding of patients.

Transverse competencies (TC)

TC1: Application of professional evaluation standards, professional ethics, and applicable legislation. Promoting logical reasoning, practical applicability, assessment and self-assessment in decision-making.

TC2: Performing activities and exercising the roles specific to team work within the endodontic cabinet / department. Promoting the spirit of initiative, dialogue, cooperation, positive attitude and respect for others, empathy, altruism and continuous improvement of their own activities;

TC3: Systematic assessment of competencies of personal role and expectations, application of self-evaluation of learned processes, acquired skills and professionalism needs, effective use of language skills, knowledge in information technologies, research and communication skills, adapting to the dynamics of policy requirements in health and for personal and professional development.

Study finalizations

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

- To know the basic principles, the functional structure and the organization of the medical assistance in the cabinet / endodontic department in the Republic of Moldova;
- To know the role and functions of endodont in the healthcare organization system;
- To promote healthy lifestyle and health education through speeches, papers, presentations, articles in specialized journals, etc.

VII. STUDENT'S SELF-TRAINING

Nr.	Expected product	Implementation strategies	Assessment criteria	Implementation terms
1.	Working with informational sources	Reading the lecture or the material in the manual on the subject. Reflecting on the topic in the questions. Knowing and selecting additional information sources on the topic. Reading the text carefully and describe the essential content. Wording of generalizations and conclusions regarding the importance of the theme / subject.	The ability to extract the essentials. Interpretative skills. The ability to analyze and communicate the material accumulated on its own.	During the semester
2.	Solving case problems	Solving case problems, with argumentation of conclusions at the end of each practical lessons. Verification of the finalities and appreciation of their achievement. Selection of additional information, using electronic addresses and additional bibliography.	The quality of solving problems of situation and clinical case, the ability to formulate and interpret clinical and paraclinical data. Ability to analyze selected information from national and international professional websites.	During the semester
3.	**Evaluation of perception (basic knowledge) in clinical and paraclinical examination of patients.** **Evaluation of methods of asepsis and antisepsis in endodontic cabinet / section.** Each student will complete the patient's medical record, systematize the stages of the clinical examination and collect the anamnesis. Establish indications for paraclinical investigations, arguing their need.			
3.1.	Recording data and the patient history	Working with the medical chart and systematization of stages of collection of anamnesis and clinical examination.	Assessing the correctness and succession of the analysis.	During the semester
3.2.	Appreciation of indications for radiographic examination	The student should study the peculiarities of the radiographic examination and to argue the necessity to indicate each type of radiographic exam.	Assessing the accuracy of the information described by the student.	During the semester
3.3.	Preparing the project	Students will prepare information on the selected topic from the thematic plan with schematic and graphics rendering in Power Point.	Evaluation of the quality of the selected material, the design of the project and the ability to reproduce the information.	During the semester

VIII. METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-ASSESSMENT

- **Teaching and learning methods used**

In the teaching process of the discipline "Preclinical endodontics" different teaching methods are used, oriented towards the efficient acquisition and achievement of the objectives of the didactic process. The course provides lectures, seminars, practical works and individual work. Courses are held in the third semester by the course owner (titular). The following forms of training are used in the practical work: frontal, individual activity, brainstorming sessions, group discussions, case studies in community pharmacies, case study. As a teaching aid, the specialized manuals are available in the university library, the methodological recommendations of the department's staff, tables, schemes, information sources in electronic format, national and international professional websites, etc. are available. Students receive individual assignments that are presented for group discussions, which subsequently assess the quality of individual work and practical skills. In order to acquire the didactic material and teambuilding, during the semester the students perform a mini-research in the field, the results of which are presented at the seminars and practical lessons organized in the last month of the semester.

Recommended *learning* methods are: *learning* theoretical *material* after lecture and manual; *observation* - identifying the characteristic features of doctor-patient communication; *analysis* - in the use of clinical and paraclinical examination methods of patients, as well as methods and stages of prevention, asepsis and antisepsis; *comparison* - analysis by comparison of the methods of collecting the anamnesis, of the paraclinical examination methods according to their advantages and disadvantages; *elaboration of the algorithm* - selection of the mandatory elements and elaboration of the patient consultation algorithm; *modeling* - identifying and selecting the elements necessary for modeling the situations when consulting patients, formulating the conclusions, argumentation and making the final decision.

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

Face-to-face, individual, brainstorming, group discussion, clinical case analysis, teambuilding, clinical exam simulation, mini-research, comparative analysis.

- ✓ ***Methods of assessment*** *(including the method of final mark calculation)*

Current: Current checks during seminars and practical lessons, 3 totals in writing and / or as test-control. For the individual work done during the semester, the student is evaluated, the grade being included in totals. At the end of the semester, based on the grades from the totals, the average annual score is calculated.

Final: The course ends with an exam. The final grade is calculated at the end of the discipline study - 50%; from test-control - 20% and oral interview - 30%. The average annual mark and the marks of all final stages of testing (test and oral answer) - are expressed in numbers according to the scoring scale (according to the table) and the final mark obtained is expressed in two decimal digits, to be entered in the notes book.

Method of mark rounding at different assessment stages

Intermediate marks scale (annual average, marks from the examination stages)	National Assessment System	ECTS Equivalent
1,00-3,00	**2**	**F**
3,01-4,99	**4**	**FX**
5,00	**5**	**E**
5,01-5,50	**5,5**	
5,51-6,00	**6**	
6,01-6,50	**6,5**	**D**
6,51-7,00	**7**	
7,01-7,50	**7,5**	**C**
7,51-8,00	**8**	
8,01-8,50	**8,5**	**B**
8,51-8,00	**9**	
9,01-9,50	**9,5**	**A**
9,51-10,0	**10**	

Note: *Absence on examination without good reason is recorded as "absent" and is equivalent to 0 (zero). The student has the right to have two re-examinations.*

IX. RECOMMENDED LITERATURE:

A. Compulsory:

1. Lecture materials.
2. Iliescu A**.** Tratat de endodonție. București**,** 2015, 959 p.
3. Garg N., Garg A. Textbook of Endodontics. New Delhi, London, Philadelphia, Panama**,** 2014, 603 p.
4. Nicolau Gh., Terehov A., Năstase C., Nicolaiciuc V. Odontologie practică modernă. Iași, 2010, 448 p.
5. Hargreaves K., Berman L.H. Cohen's Pathways of the Pulp. Missouri**,** 2016, 907 p.
6. Nelson St. Wheeler's Dental Anatomy, Physiology and Occlusion, Ninth Edition. Missouri**,** 2010, 346 p.

B. Additional:

1. Burlacu V., Fala V. Secretele endodonției clinice. Ghid practic. Chișinău, 2007, 132 p.