



ADEMIC STANDARD OF THE DISCIPLINE OPERATIVE DENTISTRY AND ENDODONTICS

1. EDUCATIONAL GOAL

The discipline's goal is to provide basic knowledge and practical skills for Dental Medicine students. In Operative Dentistry and Endodontics the students receive theoretical knowledge and practical skills that enables them to work in a ambulatory dental office, and are related to prophylaxis, diagnostics and treatment of the diseases of the hard dental tissues (dental caries, non-carious lesions), pulp and periodontal pathology, including emergency endodontics for patients above 18 years old.

2. EDUCATIONAL CONTENT

2.1 Curriculum

Discipline	Exams	Hours			Hours, divided in years and semesters					
	Semester	Overall	Lectures	Practicals	V	VI	VII	VIII	IX	X
Conservative dentistry	VI, X	540	120	420	2/4	2/4	1/4	1/4	1/6	1/6

2.2 Program of the lectures and practical exercises.

LECTURE PROGRAMME III course, V semester

No	TOPIC	HOURS
1.	Dental caries.	2 h.
2.	Class I tooth preparation for unaesthetic restorative materials.	2 h.
3.	Class II tooth preparation for amalgam and cast metal restorations.	2 h.
4.	Class I and class II tooth preparation for aesthetic materials (direct and indirect).	2 h.
5.	Class III and class IV tooth preparation for aesthetic materials and veneers.	2 h.
6.	Class V tooth preparation for direct and indirect materials.	2 h.
7.	The second basic principle in operative treatment of dental caries – Medicatio Cavi dentis.	2 h.
8.	The third basic principle in operative treatment of dental caries – Obturation Cavi dentis.	2 h.
9.	Dental amalgam. Fabrication of amalgam restorations.	2 h.
10.	Glass-ionomer materials. Types, characteristics. Fabrication of glass-ionomer restoration.	2 h.
11.	Dental resin-composites materials – types, characteristics. Indications, contraindications.	2 h.

12.	Dental adhesive systems – application and classification.	2 h.
13.	Fabrication of direct composite material obturations.	2 h.
14.	Indirect cast metal ceramic and composite restorations. CAD/CAM systems.	2 h.
15.	Cavity preparation and restoration strength of vital teeth with great destructions. Veneers.	2 h.
	TOTAL:	30 h.

LECTURE PROGRAMME

III course, VI semester

№	TOPIC	HOURS
1.	Endodontics: subject, goal, and objectives. Anatomy of pulp cavity.	2 h.
2.	Endodontic treatment – goals, biological and mechanical principles. Rubber dam.	2 h.
3.	Endodontic access.	2 h.
4.	Hand endodontic instruments for cleaning and shaping of the root canal.	2 h.
5.	Contents of cavum pulpaе and root canals. Hand instruments (Barbed broaches).	2 h.
6.	Root canal working length.	2 h.
7.	Machine driven instruments for cleaning and shaping of the root canal system – types, indications. Working technique.	2 h.
8.	Techniques for root canal preparation.	2 h.
9.	Characteristics of the prepared root canal and root canal medication.	2 h.
10.	Root canal obturation – definition, goals, means, methods.	2 h.
11.	Root canal filling materials – pastes that harden inside the root canal – classifications.	2 h.
12.	Obturation of the root canal system with gutta-percha and adhesive systems.	2 h.
13.	Restoration of endodontically treated teeth.	2 h.
14.	Errors and complications in process of endodontic treatment – Part I.	2 h.
15.	Errors and complications in process of endodontic treatment – Part II.	2 h.
	TOTAL:	30 h.

**PROGRAMME
OPERATIVE DENTISTRY AND ENDODONTICS PRECLINICAL COURSE
III course, V semester
EXERCISES**

№	TOPIC	HOURS
1.	Dental caries.	4 h.
2.	Class I tooth preparation for amalgam.	4 h.
3.	Class II tooth preparation for amalgam.	4 h.
4.	Class I and class II tooth preparation for unaesthetic restorative materials.	4 h.
5.	Class I and class II tooth preparation for aesthetic restorative materials (direct and indirect).	4 h.
6.	Preparation class III cavity for aesthetic materials.	4 h.
7.	Preparation of class IV cavity for aesthetic materials for direct and indirect restorations.	4 h.
8.	Preparation of class V cavity for direct and indirect restorations.	4 h.
9.	Mid-term test on the first basic principle of caries treatment: Præparatio cavi dentis. Indirect cast metal inlays for restoring vital.	4 h.
10.	The second basic principle of caries treatment: Medication cavi dentis. Varnshes, liners, bases.	4 h.
11.	The second basic principle of caries treatment: obturation Cavi dentis. Dental amalgam. Fabrication of amalgam restorations.	4 h.
12.	Fabrication of aesthetic materials resstorations – adhesive systems, direct obturations of composite materials and lass ionomers.	4 h.
13.	Fabrication of composite restorations – indirect composite restorations.	4 h.
14.	Final test on the three basic principles of caries treatment – præparaton cavi dentis, medication cavi dentis, obturation cavi dentis.	4 h.
15.	Acceptance of the finished practical work and verification of the semester.	4 h.
	TOTAL:	60 h.

**PROGRAMME
OPERATIVE DENTISTRY AND ENDODONTICS PRECLINICAL COURSE
III course, VI semester**

EXERCISES

№	TOPIC	HOURS
1.	Endodontics: subject, goal, and objectives.	4 h.
2.	Endodontic treatment – goals, biological and mechanical principles. Rubber dam.	4 h.
3.	Endodontic access.	4 h.
4.	Accessing cavum pulpae.	4 h.

	Finding the orifices.	
5.	Hand and machine driven endodontic instruments.	4 h.
6.	Contents of the root canals and instruments for their removal.	4 h.
7.	Root canal working length – definition.	4 h.
8.	Hand endodontic instruments for cleaning and shaping of the root canal. Working technique.	4 h.
9.	Machine driven instruments for cleaning and shaping of the root canal systems – types, indications. Working technique.	4 h.
10.	Test on endodontic access, working length, instruments, and techniques for root canal preparation. Characteristics of the prepared root canal and root canal medication.	4 h.
11.	Root canal obturation – definition, goals, means, methods.	4 h.
12.	Root canal filling materials – pastes that harden inside the root canal – classification.	4 h.
13.	Obturation of the root canal system with gutta-percha and adhesive systems.	4 h.
14.	Final test on endodontic treatment.	4 h.
15.	Handing in of the finished practical work and verification of the semester.	4 h.
	TOTAL:	60 h.

**LECTURE PROGRAMME
IV course, VII semester**

№	TOPIC	HOURS
1.	Infection control in dental practice – its importance, modes of transmission of infections, ways of spreading the infection. Precautions that can be taken for the protection of the dentists, the patient's and the environment. Ways of controlling the spread of infections. Special features of the infection control in Operative Dentistry and Endodontics.	1 h.
2.	Ergonomics of the workplace. Occupational diseases and their prophylaxis. Teamwork.	1 h.
3.	Dental caries – fundamentals, incidence of caries in adults, etiological factors: dental biofilm with cariogenic bacteria, carbohydrate foods, enamel resistance, saliva, pathogenesis (theories, hypotheses, conceptions). Pathomorphological changes in the hard-dental tissues and pulp during caries progression.	1 h.
4.	The main symptoms of dental caries (increased sensitivity, colour change, loss of integrity of the tooth, loss of function). Caries classification based on the extent of the caries, on its localization and on its progression. Methods for examining clinically visible caries lesions.	1 h.
5.	Dental caries – clinical features, diagnostics, differential diagnosis.	1 h.
6.	Early caries detection – methods. Non-operative treatment of dental caries (motivational strategies in oral hygiene, changes in the patient's diet, increasing enamel resistance, saliva testing).	1 h.
7.	Non-operative treatment methods – ozone therapy, air abrasion, laser, sealants, chemical-mechanical caries debridement. Minimally invasive preparations	1 h.

	(enameloplasty).	
8.	Pain management in operative dentistry. Pain perception and reaction – reflex arc, gate control theory of Melzack and Wall. Management of the pain through: 1/ The central nervous system (psychoprophylaxis, hypnosis, audioanalgesia, acupuncture, premedication and general anaesthesia). 2/ Local anaesthesia (infiltrative anaesthesia, nerve block anaesthesia, intralogamentary anaesthesia, endosseous anaesthesia). 3/ Local block of the pain impulse (atraumatic work, contact anaesthesia, electroodontanalgesia, TENS-method).	1 h.
9.	Dentin caries – Caries media, Caries profunda. Areas of caries progress in the dentin. Medico-biological basis of the treatment of the dentin wound in deep caries lesions – characteristics of the dentin wound, types of dentin located over the pulp, clinical differentiation. Medicaments and materials for the treatment of deep caries lesions – pharmacodynamics of the basic medicaments and materials, explanation of the one-step and two-step treatment of deep caries lesions.	1 h.
10.	Root caries (of the cementum, adult caries). Cementum – structure, function. Risk factors for the development of root caries. Diagnostics, types, and development stages of root caries. Clinical features. Differential diagnosis. Treatment – special features, problems and risks, materials, and medicaments. Prophylaxis.	1 h.
11.	Secondary caries – definition, frequency, localization, clinical features, and diagnostics. Etiology, treatment, and prophylaxis.	1 h.
12.	Clinical features, diagnostics, and treatment of rampant caries. Medical approach when treating rampant caries. Clinical protocol for rampant caries treatment.	1 h.
13.	Amalgam and cast-metal restorations – biomechanical problems. Characteristics of the cavity preparation – determining the borderlines of the cavity, resistance, and retention form, replacing a restoration, preparation forms with tuber defense, secondary retention form (dentin pins, amalgam pins, collars). Choosing the correct type of amalgam – instruments. Connected amalgam restorations. Restoration of occlusion. Restoration of the proximal contacts, connection with the marginal gingiva in class II amalgam restoration. Advantages and disadvantages.	1 h.
14.	Composite and glass-ionomer restorations – biomechanical problems. Cavity preparation for composite materials – characteristics of the preparation form – preparation for adhesive bonding. Glass-ionomer restorations – indications, working technique. Adhesion to enamel and dentin. Adhesive systems. Direct and indirect composite restorations. Advantages and disadvantages.	1 h.
15.	Errors and complications in the diagnosis and treatment of dental caries.	1 h.
	TOTAL:	15 h.

**LECTURE PROGRAMME
IV course, VIII semester**

No	TOPIC	HOURS
1.	Anatomy and physiology of dental pulp tissue – histology, functions, and basic pathological processes in dental pulp.	1 h.
2.	Etiology and pathogenesis of inflammatory and non-inflammatory pulp pathology – mechanisms of pulpal inflammation, histopathology, characteristics of pulpal pain.	1 h.
3.	Symptoms and classifications of pulp pathology – biological, physiological, and histological features of pulpal pain, critical analyses of classifications.	1 h.

4.	Diagnostic procedures of pulp pathology – chief complaints, clinical methods, clinical tests, paraclinical methods, interpretation of diagnostics data.	1 h.
5.	Acute pulpitis – classification, subjective and objective signs and symptoms, diagnosis, differential diagnosis, therapeutic guideline.	1 h.
6.	Chronic pulpitis – classification, subjective and objective signs and symptoms, diagnosis, differential diagnosis, therapeutic guideline.	1 h.
7.	Reversible and irreversible pulpitis – critical analyses of classifications, local and general factors for reversibility of pulpal inflammation, therapeutic guideline.	1 h.
8.	Vital pulp therapy – indirect pulp treatment – indications and contraindications, treatment technique, pharmacological properties of pulp-capping materials, evaluation of treatment outcomes and prognosis.	1 h.
9.	Vital pulp therapy – direct pulp capping – indications and contraindications, treatment technique, pharmacological properties of pulp-capping materials, evaluation of treatment outcomes and prognosis.	1 h.
10.	Vital pulp therapy – partial pulpotomy (pulp amputation) – indications and contraindications, treatment technique, pharmacological properties of pulp-capping materials. Evaluation of treatment outcomes and prognosis.	1 h.
11.	Non-vital pulp therapy – pulpectomy (vital pulp extirpation). Essence, indications and contraindications, treatment techniques, anesthetic techniques in different teeth groups, complications, and therapeutic decisions.	1 h.
12.	Non-vital pulp therapy – pulpectomy (arsenic devitalization, mortal pulp extirpation). Essence, indications and contraindications, critical analyses, techniques. Arsenic medicaments – Mechanisms for devitalization, working technique: time for exposure, amount, placement, and removal rules.	1 h.
13.	Anatomy and physiology of periodontium – basic structural elements, function, blood supply, innervation, lymphatic drainage. Pulpal-periodontal connections. Classifications. Methods in diagnostics of periodontitis.	1 h.
14.	Acute serous periodontitis – classification, subjective and objective signs and symptoms, diagnosis, differential diagnosis, therapeutic guideline	1 h.
15.	Acute purulent periodontitis – classification, subjective and objective signs and symptoms, diagnosis, differential diagnosis, therapeutic guideline	1 h.
	TOTAL:	15 h.

PRACTICAL LESSONS PROGRAMME
IV course, VII semester

№	TOPIC	HOURS
1.	Introduction to the equipment in the clinical rooms. Safety instructions. Patients' registration. Demonstration of a patient's first visit. Clinical practice.	4 h.
2.	Infection control in dentistry. Demonstration of the personal protective equipment. Disinfection of the working field. Sterilization of the instruments. Clinical practice.	4 h.

3.	Ergonomics. Guidelines for improving posture and ergonomics when working on different teeth groups – demonstration. Role of the dental assistant during treatment. Clinical practice.	4 h.
4.	Dental caries. Discussion of the main risk factors in dental caries. Demonstration of the risk factors – poor oral hygiene (visualization of the dental plaque), poorly contoured dental restorations, compromised general health, social status. Clinical practice.	4 h.
5.	Main symptoms of tooth decay. Demonstration of the main symptoms of tooth decay. Clinical practice.	4 h.
6.	Dental caries – clinical features, diagnostics, differential diagnosis. Demonstration of dental caries cases with different clinical features. Clinical practice.	4 h.
7.	Early caries detection – methods. Demonstration of different methods for early caries detection.	4 h.
8.	Pain management in Operative Dentistry. Clinical demonstration of the various techniques for pain management during caries treatment. Clinical practice.	4 h.
9.	Colloquium: Dental caries – etiology, main symptoms, diagnostics, clinical symptoms (syllabus). Clinical practice.	4 h.
10.	Dentin caries – caries media, caries profunda. Demonstration of clinical cases. Clinical practice.	4 h.
11.	Root caries (of the cementum, adult caries). Demonstration of clinical cases.	4 h.
12.	Secondary caries. Demonstration of clinical cases. Clinical practice.	4 h.
13.	Clinical features, diagnostics and treatment of rampant caries. Demonstration of clinical cases. Clinical practice.	4 h.
14.	Biomechanical problems when using different obturation materials. Demonstration of clinical cases. Clinical practice.	4 h.
15.	Discussion of the finished clinical cases. Verification of the semester.	4 h.
	TOTAL:	60 h.

PRACTICAL LESSONS PROGRAMME
IV course, VIII semester

No	TOPIC	HOURS
1.	Safety instructions for working in the clinical rooms.	4 h.
2.	Anatomy and physiology of the pulp – Demonstration of the special features of their anatomy in different tooth groups – on	4 h.

	models and photographs. Clinical practice.	
3.	Etiology and pathogenesis of the inflammatory diseases of the pulp - demonstration of basic factors that cause inflammation of the pulp – on patients and photographs. Clinical practice.	4 h.
4.	Diseases of the pulp – methods for examination – obtaining the medical and dental history of the patient, clinical and paraclinical methods for examination. Demonstration. Analysis of the results. Clinical practice.	4 h.
5.	Non-inflammatory pathological processes of the pulp – atrophy, dystrophy, calcium metaplasia, circulatory disorders - demonstration on photographs. Directions for treatment. Clinical practice.	4 h.
6.	Acute pulpitis. Discussion of the clinical symptoms and directions for treatment. Clinical practice.	4 h.
7.	Chronic pulpitis. Discussion of the clinical symptoms and directions for treatment. Clinical practice.	4 h.
8.	Reversible and irreversible pulpitis. Discussion of the clinical symptoms and directions for treatment. Clinical practice.	4 h.
9.	Colloquium: Etiology and clinical symptoms of the inflammatory diseases of the pulp (syllabus). Clinical practice.	4 h.
10.	Biological methods for the treatment of the inflamed pulp – indirect pulp capping – demonstration. Analysis of the medicaments used in the different methods. Clinical practice.	4 h.
11.	Biological methods for the treatment of the inflamed pulp –direct pulp capping and vital amputation – demonstration. Analysis of the medicaments used in the different methods. Clinical practice.	4 h.
12.	Vital extirpation. Essence and critical analyses of methods. Anesthetic techniques for extirpation of vital pulp. Indications, contraindications, therapeutic techniques, Complications, Prognosis. Clinical practice.	4 h.
13.	Arsenic devitalization of dental pulp (Mortal extirpation). Essence and critical analyses of methods. Specifics in application of arsenic medicaments: Mechanisms, time of exposure, amount. Indications, contraindications, therapeutic techniques, Complications, Prognosis. Clinical practice.	4 h.
14.	Anatomy and physiology of the periodontium. Demonstration on photographs of the anatomy of the periodontium in different tooth groups. Clinical practice. Acute serous periodontitis – discussion of the etiological factors and their importance to the treatment pain. Clinical practice.	4 h.

15.	Periododontitis acuta purulenta – Discussion of treatment plan according to the stage of the Inflammatory process. Clinical practice. Verification of the semester.	4 h.
	TOTAL:	60 h.

LECTURE PROGRAMME
V course, IX semester

Nº	TOPIC	HOURS
1.	Necrosis, necrobiosis, gangrene of the pulp. Definition, etiology, pathogenesis, pathomorphology, clinical presentation, diagnostics, differential diagnosis, treatment plan.	1 h.
2.	Chronic apical periodontitis – Periodontitis chronica fibrosa and Periodontitis chronica granulomatosa localisata. Etiology, pathogenesis, clinical presentation, differential diagnosis, treatment plan, prognosis.	1 h.
3.	Periodontitis chronica granulomatosa progressive (diffusa) sine (cum) fistula. Histopathology, clinical presentation, differential diagnosis, treatment plan, prognosis.	1 h.
4.	Chronic apical periodontitis – treatment plan. Indications, contraindications, major treatment principles, one-visit one-phase therapy, two-visit (multi-visit) one phase therapy, multi-visit two-phase therapy. Complication.	1 h.
5.	Evaluation of endodontic outcomes. Definition of success and failure. Methods for evaluation of endodontic outcomes. Success rates. Predictors of success and failure. Causes of failed root canal treatments.	1 h.
6.	Endodontic microbiology. Microbial causation of apical periodontitis. Routes of root canal infection. Types of endodontic infections. The endodontic microbiota.	1 h.
7.	Combined endo-perio lesions. Classification, clinical presentation, diagnostics. Treatment plan.	1 h.
8.	Endodontic retreatment – Part I. Definition, aim, advantages and disadvantages, major reasons for retreatment. Steps and phases of the treatment plan.	1 h.
9.	Endodontic retreatment – Part II. Types of endodontic retreatment. Systems and techniques for the removal of root canal obstructions. Complications.	1 h.
10.	Elective endodontic surgery. Indications and contraindications. Contemporary methods for endodontic surgery.	1 h.
11.	Elective endodontic surgery. Apical curettage, apexectomy, root amputation, hemisection, bicuspidation, trans-root implants. Surgical step and procedures. Postoperative treatment, possible complications, prognosis.	1 h.
12.	Emergency endodontic treatment. Indications. Treatment plan. Nosological entities.	1 h.

13.	Difficult differential diagnosis in endodontics. Difficult differential diagnosis in endodontics with the involvement of neighbouring regions. Differential diagnosis – sinusitis, rhinitis, neuritis, neuralgia, aerodontalgia, atypical facial pain, traumatic occlusion.	1 h.
14.	Treatment errors in pulpitis and periodontitis. Differentiation between normal anatomical structures – foramen mentale, follicular cysts. Differentiation between other diseases in the neighbouring regions – sinusitis, rhinitis, neuralgia, denticles.	1 h.
15.	Treatment errors in pulpitis and periodontitis. Errors during endodontic treatment that endanger the treated tooth. Prophylaxis and treatment. Errors that endanger patients' life – prophylaxis of the possible complications.	1 h.
	TOTAL:	15 h.

LECTURE PROGRAMME
V course, X semester

No	TOPIC	HOURS
1.	Treatment planning in endodontics. Scope of endodontic treatment; factors that determine the number of visits; initial treatment; definitive treatment; treatment options; manipulations in the scope of the general dentistry; endodontic treatment impeding factors. Recognizing when cases should be referred.	1 h.
2.	Restoration of endodontically treated teeth. Characteristics of endodontically treated teeth – extensive loss of hard dental tissues, reduced elasticity, reduced tooth stability, decreased microhardness. Treatment choices for the restoration of endodontically treated teeth according to the loss of coronal tissues. Radicular post – types, cementation technique, instruments, errors, and complications.	1 h.
3.	Restoration of vital teeth with extensive loss of coronal hard dental tissues. Complex cavities with cups reduction. Dentinal (parapulpal) posts – indications, errors, and complications. Dentinal chambers, pins, locks, skirts. Connected amalgam restorations. Onlay fabrication – cavity preparation, critical analysis, prognosis. Veneers – indications, contraindications.	1 h.
4.	Vertical fractures of the crown and the root – incidence, categories, craze lines, fractured cups, cracked tooth, split tooth, vertical root fracture.	1 h.
5.	Non-carries lesions of the hard-dental tissues. Chemical, thermal, mechanical – diagnostics, DD, clinical presentation, treatment plan.	1 h.
6.	Non-carries lesions of the hard-dental tissues. Abrasion, attrition, erosion, wedge-shaped defects, abfractions. Epidemiology. Clinical presentation. Diagnostics. Differential diagnostics. Treatment plan.	1 h.
7.	Dentin hypersensitivity. Definition, etiology. Development phases. Mechanisms. Diagnostics. Treatment plan. Desensitizing agents. Prevention.	1 h.
8.	Dental caries prophylaxis – Major factors, related to caries progression, stages of caries prevention. Primary, secondary, and tertiary prophylaxis: aim, major guidelines, treatment options, medicaments. Caries risk assessment.	1 h.
9.	The healing process after biological treatment of the pulp.	1 h.

	Indirect pulp capping, direct pulp capping, vital amputation. Criteria for the assessment of the results – Clinical, EPT, x-ray.	
10.	The healing process after pulpitis treatment. The apical wound after vital and non-vital extirpation. Critical analysis, prognosis.	1 h.
11.	The healing process after periodontitis treatment. Criteria for the assessment of the results – clinical, EPT, x-ray.	1 h.
12.	Root resorption. Classification, clinical symptoms, histopathology, treatment plan, prognosis.	1 h.
13.	Bleaching of vital teeth. Reasons for the colour changes. Methods – definition, techniques, complications.	1 h.
14.	Bleaching of non-vital teeth. Reasons for the colour changes, techniques, contraindications, and complications. Assessment criteria and control of the results.	1 h.
15.	Geriatric endodontics. Biologic considerations. Pulp response. Periradicular response. Healing. Medically compromised patients. Diagnosis. DD, treatment planning.	1 h.
	TOTAL:	15 h.

CLINICAL PRACTICE PROGRAM
V course, IX semester

№	TOPIC	HOURS
1.	Necrobiosis, necrosis, gangrene of the pulp – clinical presentation and diagnostics. Differential diagnostics. Treatment plan.	6 h.
2.	Chronic apical periodontitis – Periodontitis chronica fibrosa and Periodontitis chronica granulomatosa localisata. Etiology, pathogenesis, clinical presentation, differential diagnosis, treatment plan, prognosis.	6 h.
3.	Periodontitis chronica granulomatosa progressive (diffusa) sine (cum) fistula – clinical presentation and diagnostics – anamnesis, inspection – vasoparesis symptom, Crane’s symptom, Marmasse symptom, x-ray findings. Differential diagnosis. Treatment plan. Prognosis. Periodontitis exacerbate; Cysta radicularis – clinical presentation, differential diagnosis, treatment plan, prognosis.	6 h.
4.	Chronic apical periodontitis – treatment plan. Indication, contraindications, major treatment principles, one-visit one-phase therapy. Two-visit (multi-visit) one phase therapy, multi-visit two-phase therapy. Complications.	6 h.
5.	Endodontic microbiology – the endodontic triad. Microbial causation of apical periodontitis. Routes of root canal infection. Types of endodontic infections. The endodontic microbiota.	6 h.
6.	Combined endo-perio lesions. Anatomical and functional correlations between the endodontium and the periodontium. Classification of endo-perio lesions. Diagnostics. Symptoms, associated with the involvement of the pulp and the periodontium. Clinical presentation. Treatment plan.	6 h.
7.	Endodontic retreatment – systems and techniques for the removal of root canal obstructions. Materials, methods, and medicaments for the treatment of possible complications. Clinical practice.	6 h.

8.	Endodontic retreatment – reasons for initiating a retreatment. Basic principles of retreatment. Contemporary methods for endodontic surgery. Clinical practice.	6 h.
9.	Elective endodontic surgery – indications and contraindications. Contemporary methods for endodontic surgery (lasers, ultrasound). Materials, instruments and techniques for the retrograde root canal obturation. Clinical practice. Colloquium: Chronic periodontitis – clinics and treatment. Endodontic microbiology, endo-perio lesions, endodontic retreatment.	6 h.
10.	Elective endodontic surgical manipulations – apical curettage, apexectomy, root amputation, hemisection, bicuspidation, trans-root implants. Surgical steps and procedures. Postoperative treatment, possible complications, prognosis.	6 h.
11.	Difficult differential diagnosis in endodontics with the involvement of neighbouring regions. Differential diagnosis – sinusitis, rhinitis, neuritis, neuralgia, aerodontalgia, atypical facial pain, traumatic occlusion.	6 h.
12.	Emergency endodontic treatment. Indications. Treatment plan. Antibiotics and anti-inflammatory medicaments – indications. Nosological entities.	6 h.
13.	Pain control in endodontics: clinical behavior in symptomatic pulpitis, periodontitis, cracked tooth syndrome, traumatic pulpitis in coronal fractures. Colloquium: Emergency endodontic treatment – indications. Treatment plan. Difficult differential diagnosis in endodontics, endodontic surgery. Clinical practice.	6 h.
14.	Treatment errors in pulpitis and periodontitis. Foramen mentale, sinuses, follicular cysts. Sinusitis, rhinitis, neuralgia, denticles.	6 h.
15.	Treatment errors in pulpitis and periodontitis. Errors during endodontic treatment that endanger the treated tooth – undiscovered and unprepared root canal, insufficiently obturated root canal, ledges, perforations, fractured instruments, over-instrumentation, root canal overfill, tooth discoloration. Prophylaxis and treatment. Errors that endanger patient's life – anaphylactic shock, swallowing or aspiration of an endodontic instrument, subcutaneous emphysema – prophylaxis of the possible complications.	6 h.
	TOTAL:	90 h.

CLINICAL PRACTICE PROGRAM
V course, X semester

№	TOPIC	HOURS
1.	Treatment planning in endodontics – scope of endodontic treatment; factors that determine the number of visits; initial treatment; definitive treatment; treatment options; manipulations in the scope of the general dentistry; endodontic treatment impeding factors. Recognizing when cases should be referred.	6 h.
2.	Restoration of endodontically treated teeth. Characteristics of endodontically treated teeth – extensive loss of hard dental tissues, reduced elasticity, reduced tooth stability, decreased microhardness. Treatment choices for the restoration of endodontically treated teeth according to the loss of coronal tissues. Radicular posts – types, cementation technique, instruments, errors, and complications.	6 h.
3.	Restoration of vital teeth with extensive loss of coronal tissues. Complex cavities with cusps reduction. Dentinal (parapulpal) posts – indications, errors, and complications. Dentinal chambers, pins, locks, skirts. Connected amalgam restorations. Onlay fabrication – cavity preparation, critical analysis, prognosis.	6 h.

	Veneers – indications, contraindications.	
4.	Vertical Fractures of the crown and the root – incidence, categories, craze lines, fractured cusp, cracked tooth, split tooth, vertical root fracture.	6 h.
5.	Non-caries lesions of the hard-dental tissues – chemical, thermal, mechanical – diagnostics, DD, clinical presentation, treatment plan.	6 h.
6.	Non-caries lesions of the hard-dental tissues – abrasion, attrition, erosion, wedge-shaped defects, abfraction. Epidemiology. Clinical presentation. Diagnostics. Differential diagnostics. Treatment plan.	6 h.
7.	Colloquium: Non-caries lesions the hard-dental tissues. Fractures in endodontically treated teeth. Restoration of endodontically treated teeth. Restoration of vital teeth with extensive loss of coronal tissues.	6 h.
8.	Dentin hypersensitivity – definition, etiology. Development phases. Mechanisms. Diagnostics. Treatment plan. Desensitizing agents. Prevention.	6 h.
9.	Dental caries prophylaxis – major factors, related to caries progression, stages of caries prevention. Primary, secondary, and tertiary prophylaxis: aim, major guidelines, treatment options, medicaments. Caries risk assessment.	6 h.
10.	The healing process after biological treatment of pulpitis – indirect pulp capping direct pulp capping, vital amputation. Criteria for the assessment of the results – clinical, EPT, x-ray.	6 h.
11.	The healing process after vital and non-vital pulp therapy. The apical wound after vital and non-vital extirpation – critical analysis, prognosis.	6 h.
12.	The healing process after the treatment pulp gangrene, acute and chronic periodontitis. Criteria for the assessment results – clinical. EPT, x-ray.	6 h.
13.	Colloquium: Dentin hypersensitivity. The healing process after vital pulp therapy, the treatment of pulpitis, acute and chronic periodontitivital pulp therapy.	6 h.
14.	Bleaching of non-vital teeth with discolorations – reasons for the colour changes. Methods – definition, techniques, complications. Bleaching of vital teeth. Reasons for the colour changes, techniques, contraindications, and complications. Assessment criteria and control of the results.	6 h.
15.	Geriatric endodontics. Biologic considerations. Pulp response. Periradicular response. Healing. Medically compromised patients. Diagnosis, DD, treatment planning.	6 h.
	TOTAL:	90 h.

3. PREREQUISITIES

Only students who have successfully passed the preclinical exam in Operative Dentistry and Endodontics are allowed to enter the clinical practice.

The main goals and tasks of the discipline OPERATIVE DENTISTRY AND ENDODONTICS are to prepare the students, providing them with optimal knowledge and practical skills in its basic topics.

Upon completion of their education, the students must have knowledge of:

- the etiology, pathogenesis and histomorphology of dental caries;
- basic methods and means for caries prophylaxis;

- contemporary methods for early caries diagnostics;
- contemporary methods for anesthesia of the hard dental tissues;
- contemporary methods for caries treatment;
- contemporary methods for diagnostics and treatment of pulp pathology;
- contemporary methods for diagnostics and treatment of periodontal pathology;
- endodontic emergencies.

4. ACADEMIC RESOURCES

The department must provide the necessary number of assistant professors, according to the regulations for the teachers' workload of assistant professors in the Faculty of Dental Medicine, MU Plovdiv. The assistant professors must have excellent theoretical and practical training and a specialty in Operative Dentistry and Endodontics. They must be active participants in the department's scientific program, according to the latest achievements in the discipline.

5. MATERIAL RESOURCES

The department must have the necessary number of rooms, equipped with phantom heads and dental units, special instruments, dental materials, apparatuses, computer configurations and multimedia.

6. LECTURES

Lectures are prepared and given in the form of multimedia presentations. They are provided to students in the electronic environment of Office 365, SharePoint, Faculty of Dental Medicine, Department of Operative Dentistry and Endodontics.

7. PRACTICAL EXERCISES

PRECLINICAL COURSE

The preclinical course takes place in rooms, equipped with phantom heads, in groups of 5-8 students total. For each practical, tests are provided. That way the students' knowledge on the current topics can be assessed. Under the assistant's supervision, the students obtain knowledge of the basic rules and techniques for cavity preparation, the variety of instruments and apparatuses. The students learn about the basic characteristics of the materials and medicaments used, their management and application. In endodontics, they study the basic principles of root canal preparation and obturation.

CLINICAL COURSE

The practical exercises take place in clinical rooms, in groups of 5-8 students. For each practical, tests are provided. That way the students' knowledge on the current topics can be assessed. Under the assistant's supervision, the students perform prevention and treatments of the diseases of hard dental tissues, pulp and periodontium, in both early and advanced stages of disease progression. The aim is prevention of severe complications and maintenance of oral health and masticatory function of adults.

8. INFORMATIONAL RESOURCES. BIBLIOGRAPHY. INTERNET SITES.

The assistant professor is under the obligation of providing lectures and practical exercises, in paper as well as in electronic format.

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9. COLLOQUIUMS

The students are dynamically and intensely given assignments during the semester. Monitoring of the student's theoretical knowledge is done through tests and seminars. The students are provided with information about their achieved scores, which can help in their further preparation on the discussed topics.

The control over the practical skills of students is carried out by implementing practical norms. For students in preclinical training, the mandatory practical work is on phantom models and extracted teeth, described in the curriculum for 5 and 6 semesters. For students in clinical training, the mandatory practical work is in a points system (1p. for one restored surface in the treatment of dental caries and 3p. for endodontic treatment of one root canal), described in the curriculum for 7, 8, 9 and 10 semesters.

The results of the assessment of theoretical knowledge and practical skills come as components in the validation of the semester. In the case of unfulfilled practical norm by the student, the semester is not signed and completed.

10. WORKING INDEPENDENTLY AND STUDENTS' COMMITMENT

The independent work of the students is under the control and supervision of the assistant professor.

Each student solely and independently completes the assigned tasks. The self-assessment tests are published in a separate book and uploaded on the university's site.

11. STUDENTS - ASSISTANT PROFESSORS COLLABORATION

The assistant professor is actively engaged in the students' education and preparation during the practical exercises, as well as in:

- providing consultation hours
- organizing student study groups
- students participation in research teams, projects, etc.

12. EXAMS

The current assessments provided for the curriculum in the specialty are given for:

- Ongoing assessment by colloquiums conducted during the semester;
- Ongoing assessment of the student's overall experience during the semester;
- The pre-clinical exam of the discipline after the end of 6th semester is multi-component and includes an examination test (successful at a limit of 70%), a written exam and an oral exam.
- The clinical exam of the discipline after the end of 10th semester is multi-component and includes a practical and theoretical exam. The practical exam is conducted after the end of 10th semesters for 8 astronomical hours, divided into two consecutive days. In case of failed practical examination, the student is not allowed to attend to a theoretical exam. The theoretical exam is conducted on a different day and includes an examination test (successful at a limit of 70%), a written exam and an oral exam.

13. ASSESSMENT STANDARDS

Clear assessment standards have been developed.

- Excellent (6) - the mark is given for excellent knowledge of the material and good knowledge of the informational sources. The student must have thorough knowledge of the basic and supplementary skills. The student must be exact and precise when presenting a topic, with excellent language competence. The student must have independent, critical thinking and draw their own conclusions.
- Very good (5) - the mark is given for very good knowledge of the material and good knowledge of the informational sources. The student must have good knowledge of the basic and supplementary skills. The student must have good language competence. The student experiences some difficulty when finding solutions by themselves.
- Good (4) - the mark is given for good knowledge of the material, as well as of the basic and supplementary skills. The student lacks thorough knowledge when interpreting the material and cannot make reasoned decisions by themselves.

- Average (3) - basic knowledge of the studied material, poor language competence. The student has basic knowledge for solving easy problems.
- Poor (2) - does not meet any of the criteria listed above.

Upon entering the preclinical and clinical courses, the students must be familiarized with the assessment standards, the procedures for mid-term assessment and the opportunities for providing feedback.

14. FINAL ASSESSMENT AND MARK:

The final assessment is a multicomponent sum of:

- assessment during the semester
- Practical exam (component of a clinical exam after the end of 10th semester)
- examination tests
- written examination
- oral examination

If the student has received a poor mark (2) for one of the components, the final mark of the exam is also poor (2).

15. DOCUMENTATION, PRESERVATION OF RESULTS AND CONTROL OF THE ASSESSMENT ACTIVITY

- The students evaluated shall have the right and obligation to be informed of the regulation, procedures and results of the assessment
- It is allowed adjustments to the assessments in cases of identified technical deficiencies or errors in the student book, exam report or batch in the general ledger only by the habilitated examiner of the discipline.
- Disputes and claims on the part of students are made in writing to the examination jury, which should give an argued answer on the issue.

The exam papers are stored in the technical assistant's office and are available to the students for reference, according to the academic standards. The period during which students have access to the exam papers, is 3 (three) working days after the exam date.

The discipline Operative Dentistry and Endodontics have standards, that are available to the students in the beginning of their education. This requirement is met in accordance with the Law for Higher Education, art. 56, par. 1: "The teachers are required to develop and announce in an appropriate manner a description of the lecture course, led by them, including the topics and their sequence, recommended literature, assessment procedures and examination formats".

Compiled by the Head of Department:
/Prof. Neshka Manchorova, PhD/

The academic standard for Operative Dentistry and Endodontics is approved and ratified by a Decision of the Department Council № 3/25.03.2021.