

**MINISTRY OF HEALTH OF UKRAINE  
Odesa national medical university  
Department of surgical dentistry**

**APPROVE**

Vice-rector for scientific and pedagogical work  
Eduard Burmachivsky  
September 01, 2023 p.



**WORK PROGRAM**

**of the elective discipline**

**«Digital technologies in dental implantology ( CAD CAM)»**

**Level of higher education: second (master's)**

**Field of knowledge 22 "Health care"**

**Specialty 221 "Dentistry"**

**Educational and professional program: "Dentistry"**

**Odesa 2023**

The work program is based on the educational and professional program "Dentistry" for the training of specialists of the second (master's) level of higher education in the specialty 221 "Dentistry" of the field of knowledge 22 "Health Care", approved by the Academic Council of ONMedU (Minutes No. 8 of June 29, 2023).

Developers:

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The work program was approved at the meeting of the Department of Surgical Dentistry

Protocol № 1 from 31.08.2023.

Head of the Department \_\_\_\_\_ Anatolii Gulyuk

Agreed with the guarantor of the EPP \_\_\_\_\_ Anatolii Gulyuk

Approved by the subject cycle methodical commission for dental disciplines of ONMedU

Protocol № \_\_\_\_ from 2023

Head of the Subject cycle methodical commission for dental disciplines of ONMedU  
\_\_\_\_\_ Volodymyr Kryklias

Reviewed and approved at the meeting of the department

Protocol № \_\_\_\_ from " \_\_\_\_ " \_\_\_\_\_ 20\_\_ p.

Head of the Department \_\_\_\_\_  
(signature) (name)

Reviewed and approved at the meeting of the department

Protocol № \_\_\_\_ from " \_\_\_\_ " \_\_\_\_\_ 20\_\_ p.

Head of the Department \_\_\_\_\_  
(signature) (first name) (last name)

## 1. The description of the discipline:

indicators	Field of knowledge, specialty, specialization, level of higher education	Characteristics of the academic discipline
Total number:	Branch of knowledge	Full-time form of education
Credit: 3	22 "Health care"	Selective discipline
Hours: 90	Specialty 221 "the Stomatology"	Year of preparation 5
		Teaching (0 years)
		Seminar (0 years)
		Practical (30 years)
		Laboratory (0 years)
		Simulation dentistry (h)
		Independent work (60 years)
		individual tasks (0 years)
		Form of final control – test
	Level of higher education second (master)	

## 2. The purpose and objectives of the discipline, competence, program results of training

**Metadisiplines** - the formation of the foundations of clinical thinking of the doctor, mastering the skills of examination and logical justification of the diagnosis, differential diagnosis of diseases of the jaw - the facial system of the orthopedic profile, drawing up a plan for the treatment of patients, mastering the basic manual skills during orthopedic treatment. issues of morphology of oral tissues in the presence of defects in dentition, physiological and reparative regeneration and architectonics of jaw bone - facial area, technical and technological features of various types of dental implants, dental prosthetics with support for dental implants in typical clinical situations, prevention and treatment of complications, associated with the use of dental implants

### Tasks:

- study of the issues of the modern stage of development of dental implantology;
- mastering of algorithms of diagnostics, planning and forecasting of results of implant treatment;
- study of surgical methods of implantological treatment;
- study of ways to prevent complications of implant treatment.

The process of studying the discipline is aimed at the formation of such competencies: .

**General (GC):**

**GC 1.** The ability to abstract thinking, analysis and synthesis.

**GC 2 .** Knowledge and understanding of the subject area and understanding of professional activities.

**GC3 .** Ability to apply knowledge in practical activities.

**GC7 .**ability to search, process and analyze information from different sources.

**GC 9 .** Ability to identify, put and solve problems.

The ability to be critical and self-critical.

**GC 11** ability to work in a team.

**Special (professional) competence of the specialty (SC):**

SC 1. Ability to collect medical information about the patient and analyze clinical data.

SC2 . Ability to interpret the result of laboratory and instrumental studies.

SC3 . Ability to diagnose: Determine the previous, clinical, final,.

SC5. Ability to design the process of medical care: To determine the approaches, plan, types and principles of treatment of diseases of organs and tissues of the oral cavity and maxillofacial area.

SC8 . Ability to perform medical and dental manipulations.

SC12 . Ability to organize and conduct screening examination in dentistry.

SC14 . Ability to maintain regulatory medical documentation.

**Program learning outcomes (PLO)**

**PLO 1.** identify and identify leading clinical symptoms and syndromes (list 1); according to standard methods, using preliminary data of the patient's history, data of the patient's examination, knowledge of the person, his organs and systems, to establish a probable nosological or syndromic preliminary clinical diagnosis of dental disease (according to the list 2)

**PLO 2.**to collect information about the general condition of the patient, to evaluate the psychomotor and physical development of the patient, the state of the maxillofacial area, based on the results of laboratory and instrumental studies, to assess the information about the diagnosis (list 5).

**PLO 3.**appoint and analyze additional (mandatory and optional) examination methods (laboratory, X-ray, functional and/or instrumental) on the list of 5, patients with diseases of organs and tissues of the oral cavity and maxillofacial area for differential diagnosis of diseases (list 2).

**PLO 4.** Determine the final clinical diagnosis following the relevant ethical and legal norms, by making a reasonable decision and logical analysis of the obtained subjective and objective clinical data, additional examination, differential diagnosis under the supervision of a doctor-manager in the conditions of a medical institution (on the list 2.1).

**PLO 8.**determine the approach, plan, type and principle of treatment of dental disease (list 2) by making an informed decision on existing algorithms and standard schemes.

**PLO 10.** Determine the tactics of dental patient in somatic pathology (list 3) by making an informed decision on existing algorithms and standard schemes.

**PLO 11.**carry out treatment of basic dental diseases according to existing algorithms and standard schemes under the supervision of a doctor-manager in the conditions of a medical institution (according to the list 2.1).

**PLO 21**perform medical manipulations on the basis of a preliminary and/or final clinical diagnosis (on lists 2, 2.2) for different segments of the population under different conditions (on the list 6).

**PLO 22.**perform medical dental manipulations on the basis of a preliminary and/or final clinical diagnosis (on the lists 2.2.1) for different segments of the population and under different conditions (on the list 7).

As a result of studying the discipline, the applicant for higher education must

**to know**

- History of dental implantation. Stages of implantology in Ukraine.
- Features of examination of patients before planning dental implantation.
- Modern methods of radiation diagnostics when planning dental implantation. Justification of the choice of method of radiation diagnostics.
- The main methods of local and general anesthesia, sedation in the practice of a dentist (indications, contraindications, features of the conduct).
- Indications and contraindications to implantological intervention.
- Classification of implants and dental implantation.
- Types of materials from which implants are made and requirements for them.
- Modern systems for dental implantation.
- Features of dental implantation on the upper and lower jaw.
- Single- and two-het implantation.
- Immediate and delayed loading of implants with a prosthetic design.
- Navigation technologies in dental implantation.
- Method of planning and manufacturing navigation templates to establish methods for assessing the stability of the implant in the dynamics of engraftment.
- Features of implantation in persons with somatic pathology and in the elderly.
- Principles and tasks of pre-planning preparation.
- Methods of surgical interventions on soft tissues of oral dental implants.
- Modern classifications of quantitative and qualitative parameters of bone tissue of jaws.
- Growth factors, their impact on the regeneration of hard and soft tissues of the oral cavity.
- Classification of adentia and quality of bone tissue.
- Classification of atrophy of alveolar processes
- Features of the structure of toothless jaws and jaws with partial loss of teeth
- cavities (operations of vestibuloplasty; frenuloplasty; excision of pathological tracts and scars, etc.).
- Methods of surgical interventions on hard tissues of the oral cavity (vertical and horizontal augmenting of the alveolar process, reposition of the lower alveolar nerve, sinus lift, etc.).
- Removal of teeth according to orthopedic indications. Modern methods of removing teeth and their roots.
- Application of auto-, allo-, xenotransplantation in pre-implantation preparation of the oral cavity.
- Pharmacotherapy of dental implantation.
- Complications of dental implantation.
- Principles of deontology and medical ethics in dentistry and SCHH.

**to be able:**

- To collect the anamnesis and to examine the patient with partial or complete adenopathy.
- Make a plan for additional research methods and be able to interpret their results.
- Complete the appropriate medical documentation.
- Perform on the phantom operation removal of individual groups of teeth on the upper and lower
- Make a plan for dental implantation in a patient depending on the specific clinical situation.
- •Explain and demonstrate at phantom the surgical stage of the implantation operation, including pre-implantation training (if necessary).

### 3.the content of the academic discipline:

Basic information on the method of manufacturing structures using CAD/ Cam systems. The choice of the design of dentures. Planning prosthetics on implants in typical clinical situations. Key factors for the layout of the orthopedic structure. Features of prosthetics on implants. Features of diagnosis and the main provisions of orthopedic treatment of patients. Objective methods of research using modern diagnostic equipment. X-ray: X-ray, tomography, panoramic x-ray and pantomography. Application of artificial contrast. Computer and magnetic resonance imaging, ultrasound diagnostics, remote and contact thermography.

**Theme 1.** Historical aspects of dental implantation. Diagnosis and scope of examination of patients. Treatment plan using implants. Indications and contraindications for implant placement. Principles of implant placement

**Theme 2.** Anatomical and topographic features of the maxillofacial area (blood supply, innervation). Pre- and post-operative examination of the patient. Planning of treatment. Surgical aspects of dental implantation. Stages of treatment. Biomechanics of implants. Implant requirements to improve osteointegration

**Theme 3.** Surgical stage of dental implantation and technique

**Theme 4...** Orthopedic stage of implant treatment. Features of the use of a certain orthopedic design in patients with different types of defects in dentition

**5.** modern technologies of direct tooth restoration. Materials, methods of modeling. Ways to reproduce optical effects

**Theme 6.** Technology of indirect aesthetic restoration of teeth in orthopedic dentistry. Veneers, rules of preparation, manufacturing technology. Baezmetal orthopedic structures.

**Theme 7.** Modern technologies of preparation of hard tissues of teeth. Requirements for the preparation of teeth under the tabs, followed by the manufacture of CAD-Cam restorations. Technologies and rules for obtaining an optical fingerprint from the patient's dentition.

### Structure of selective discipline

	Name	Everything	Lectures	Practical classes	SRS
Theme 1.	Historical aspects of dental implantation. Diagnosis and scope of examination of patients. Treatment plan using implants. Indications and contraindications for implant placement. Principles of implant placement	12	0	4	8
Theme 2.	Anatomical and topographic features of the maxillofacial area (blood supply, innervation). Pre- and post-operative examination of the patient. Planning of treatment. Surgical aspects of dental implantation. Stages of treatment. Implant requirements to improve osteointegration	12	0	4	8
Theme 3.	Surgical stage of dental implantation and technique	12	0	4	8
Theme 4.	Orthopedic stage of implant treatment. Features of the use of a certain orthopedic design in patients with different types of defects in dentition	12	0	4	8
Theme 5.	Modern technologies of direct tooth restoration. Materials, methods of modeling. Ways to reproduce optical effects	12	0	4	8
Theme 6	Technology of indirect aesthetic restoration of teeth in orthopedic dentistry. Veneers, rules of	16	0	6	10

	preparation, manufacturing technology.				
Theme 7	Modern technologies of preparation of hard tissues of teeth. Requirements for the preparation of teeth under the tabs, followed by the manufacture of CAD-Cam restorations.	14	0	4	10
	Together	90	0	30	60

## 5. What are the main topics of lectures

Lectures are not provided.

### 5.3. What are the main topics of the study

№ theme s	Theme name	Number of hours
1	Theme 1. Practical training 1. Planning prosthetics on implants in typical clinical situations. Key factors for the layout of the orthopedic structure	4
2	Theme 2. Practical training 2. Indications and contraindications to dental implantation. The choice of the design of dentures Biomechanics of implants.	4
3	Theme 3. Practical training 3. Modern technologies of direct tooth restoration. Materials, methods of modeling. Ways to reproduce optical effects	4
4	Theme 4. Practical training 4. Technology of indirect aesthetic restoration of teeth in orthopedic dentistry. Veneers, rules of preparation, manufacturing technology. Non-metallic orthopedic structures.	4
5	Theme 5. Practical training 5. Removable prosthetics on implants, its comparative characteristics with the methods of prosthetics on natural teeth.	6
6	Theme 6. Practical training 6. Non-metallic orthopedic structures.	4
7	Theme 7. Practical training 7. Technologies and rules for obtaining an optical fingerprint from the patient's dentition.	4

## 6. What are the main topics of the study

№	Theme name	Number
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s/p.		hours
1	Preparation for practical classes - theoretical training and practical skills	8
2	Morphological features of bone tissue. The reaction of bone tissue to mechanical damage. Morphological features of healing the mucous membrane and the occitis	8
3	Computed tomography, 3D modeling at the stage of examination and planning of dental implantation	8
4	Materials for the manufacture of implants	8
5	Prints and prints of materials when prosthetics on implants.	8
6	Non-removable prostheses cemented on implants. Non-removable prostheses with screw fixation.	10
7	Removable dentures.	10
Only hours of independent work applicant higher education A.		60

## 7. Methods of teaching

**Practical classes:** Conversation, role-playing games, solving clinical situational problems, practicing the skills of the patient's examination, practicing the skills of performing manipulations on the list of 5, instructing and practicing skills on simulation models.

**Independent work:** Independent work with recommended basic and additional literature, with electronic information resources, independent work with the bank of test tasks step-2, independent mastering of algorithms for communication with patients.

## 8. Forms of control and evaluation methods (including criteria for evaluating learning outcomes)

**Current control:** Oral questioning, testing, evaluation of practical skills, solution of situational clinical tasks.

**Final control:** Test.

### Assessment of current educational activities in a practical lesson:

- Assessment of theoretical knowledge on the subject of the lesson:
  - methods: survey, solution of situational clinical problem
  - the maximum score is 5, the minimum score is 3, the unsatisfactory score is 2.
- Assessment of practical skills and manipulations on the topic of the lesson:
  - methods: assessment of the correctness of the implementation of practical skills
  - the maximum score is 5, the minimum score is 3, the unsatisfactory score is 2.

The evaluation for one practical lesson is arithmetic average for all components and can only have a whole amount (5, 4, 3, 2), which is rounded by the method of statistics.

### Criteria for current assessment in a practical lesson

Evaluation	Evaluation criteria
"5" is great	The applicant discovered a comprehensive, systematic, deep knowledge of educational and program material, the ability to freely perform the tasks provided by the program, learned the basic and familiar with the auxiliary literature recommended by the program. As a rule, the assessment "excellent" is exhibited to applicants of higher education, who have learned the relationship between the basic concepts of the discipline and their importance for the profession that he wants to acquire, who have



	shown creative abilities in understanding, applying and using educational and program material; The applicant is fluent in the material, takes an active part in the discussion and solution of the situational clinical task, confidently interprets the data of clinical, laboratory and instrumental studies, expresses his opinion on the topic of the lesson, demonstrates clinical thinking.
"4" is good.	The applicant discovered complete knowledge of the educational and program material, successfully performs the tasks provided in the program, which he learned the basic literature, which is recommended in the program. As a rule, the assessment of "good" is exhibited to applicants of higher education, who have shown the systematic nature of knowledge in the discipline, capable of their self-replenishment and renewal in the course of further educational work and professional activities;
"3" is "good".	The applicant discovered the knowledge of the basic educational program material in the amount necessary for further study and future work by profession, which copes with the tasks provided by the program, as a rule, the assessment is "satisfactory" put to higher education applicants, who have assumed error in answering exams and performing examination tasks, but have the necessary knowledge to eliminate them under the guidance of the teacher;
"2" is not good.	The applicant found gaps in the knowledge of the main educational and software material, which made fundamental mistakes in the implementation of the program tasks. As a rule, the assessment "unsatisfactory" refers to applicants of higher education, who can not continue their studies or begin professional activities after graduation without auxiliary classes in the relevant discipline.

The test is presented to the applicant, who has completed all the tasks of the working program of the academic discipline, took an active part in practical classes, has an average current assessment of at least 3.0 and has no academic debt.

The test is carried out: At the last lesson before the beginning of the examination session - with a belt system of training, at the last lesson - with a cycle system of training. The score is the arithmetic mean for all the components on the traditional four-point scale and has a value rounded by the method of statistics with two decimal digits after the comma.

#### **Assessment of current educational activities in a practical lesson:**

1. Assessment of theoretical knowledge on the subject of the lesson:
  - methods: survey, solution of situational clinical problem
  - the maximum score is 5, the minimum score is 3, the unsatisfactory score is 2.
1. Assessment of practical skills and manipulations on the topic of the lesson:
  - methods: assessment of the correctness of the implementation of practical skills
  - the maximum score is 5, the minimum score is 3, the unsatisfactory score is 2.

The evaluation for one practical lesson is arithmetic average for all components and can only have a whole amount (5, 4, 3, 2), which is rounded by the method of statistics.

#### **9. The distribution of points that receive higher education applicants**

The average score obtained for the academic discipline for applicants who have successfully mastered the working program of the academic discipline is converted from the traditional four-point scale to points on a 200-point scale, as shown in the table:

**Table of conversion of the traditional assessment into the multi-scale**

<b>The traditional four-point scale</b>	<b>The 200-point scale</b>
Excellent ("5")	185 – 200
Good («4»)	151 – 184

The satisfactory(3)	120 – 150
Unsatisfied (2)	Below 120

The Bagatobalnaya scale (200-point scale) characterizes the actual success of each applicant for the assimilation of the educational component. Conversion of traditional assessment (average score for the academic discipline) to 200-point is performed by the information and technical department of the University.

According to the received points on a 200-point scale, the achievement of applicants is estimated on the rating scale of ESTS. Further ranking on the rating scale of ESTS allows to evaluate the achievements of applicants from the educational component, who are studying on one course of one specialty, in accordance with their points.

The ECTS scale is a relatively comparable rating, which establishes the applicant's belonging to the group of the best or worst among the reference group of fellow students (faculty, specialty). The score "A" on the ECTS scale can not be equal to the score "excellent", and the score "B" – the assessment "good", etc. When converting from a rich scale, the limits of grades "a", "B", "C", "D", "E" on the ECTS scale do not coincide with the limits of grades "5", "4", "3" on the traditional scale. Applicants who have received the marks "FX" and "F" ("2") are not included in the list of ranking applicants. The "FX" score is presented to applicants who have scored a minimum number of points for current educational activities, but who are not enrolled in the final control. The grade "F" is presented to applicants who attended all classes in the discipline, but did not score an average score (3.00) for current educational activities and are not admitted to the final control.

Applicants who study on one course (one specialty), based on the number of points earned from the discipline, are ranked on the scale of ESTS as follows:

**Conversion of the traditional assessment of the discipline and the amount of points on the ECTS scale**

Assessment of ECTS scale	Statistical indicator
AH	The best 10% of applicants
V.	The next 25% of applicants
S.	The next 30% of applicants
D.	The next 25% of applicants
UH, UH	The next 10% of applicants

**10. What are the most practical methods of the study**

- The working program of the discipline
- SILABUS
- Methodological developments for practical classes
- Methodological recommendations for independent work of higher education applicants
- Multimedia presentations
- Clinical tasks
- Electronic bank of test tasks for units of discipline

**12. Recommended literature**

Main List

1. Стоматологія : підручник : У 2 кн. — Кн. 1. / М.М. Рожко, З.Б. Попович, В.Д. Куроєдова та ін.; за ред. проф. М.М. Рожка. — К. : ВСВ «Медицина», 2013. — 872 с.
2. Стоматологія : у 2 кн. : підручник. Кн. 2 / М.М. Рожко, І.І. Кириленко, О.Г. Денисенко та ін. ; за ред. М.М. Рожка. — 2-е вид. — К. : ВСВ «Медицина», 2018. — 992 с.
3. Челюстно-лицевая хирургия и хирургическая стоматология : учебник : в 2 кн. Кн. 1 / А. А. Тимофеев. – К. : ВСИ «Медицина», 2020. – 992 с.

Additional :

1. Пропедевтика ортопедичної стоматології : підручник / П.С. Фліс, Г.П. Леоненко, І.А. Шинчуковський та ін. ; за ред. П.С. Фліса. — 2-е вид. — К. : ВСВ «Медицина», 2020. — 328 с.
2. Моделювання анатомічної форми зубів: підручник / П.С. Фліс, Т.М. Банних, А.М. Бібік, С.Б. Костенко. - К.: ВСВ "Медицина", 2019. -352 с.
3. Odell's Clinical Problem Solving in Dentistry / A. Banerjee, S. Thavaraj; Elsevir Limited, fourth edition, 2020.-448 p.
4. Surgical Manual of Implant Dentistry: Step-by-Step Procedures / D. Buser.- Quintessence Publishing Co, 2020. - 297 p.

Internet recourses:

1. Державний Експертний Центр МОЗ України <http://www.dec.gov.ua/index.php/ua/>
2. Національна наукова медична бібліотека України <http://library.gov.ua/>
4. Національна бібліотека України імені В.І. Вернадського <http://www.nbuv.gov.ua/>
5. <https://www.studentlibrary.ru/book/ISBN9785970442081>

