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**Federal State Autonomous Educational Institution of Higher Education  
Peoples' Friendship University of Russia named after Patrice Lumumba  
RUDN University**

*Medical Institute*

## **COURSE SYLLABUS**

**Course title**

**Three-dimensional Computer Modeling of Teeth**

**Specialization**

**31.05.03 Dentistry**

**Graduate's Degree**

**Dentistry**

## 1. Aims and objectives:

**Purpose** development of discipline: mastering student the theory and practice of application of technology in planning the restoration of defects dentition.

**The objectives** of the discipline are:

- mastering the history of CAD/CAM technology development by students
- mastering the methods of restoration of dental defects by students
- mastering by students of CAD/CAM systems, basic programs
- familiarization of students with the principles of scanning the prosthetic bed
- familiarization of students with the principles of preparation for restoration performed by milling
- mastering by students of practical skills in taking an optical impression from an intraoral camera
- development of practical skills of students on the 3D modeling tab in the proposed inlay/ onlay type program
- development of students' practical skills in the proposed program of 3d modeling of a single crown
- mastering the principles of milling by students

## 2. Learning outcomes

The process of studying the discipline is aimed at the formation of the following competences:

Table 2.1 Competences

Competence code	Competence	Competence indicators
SPC-2	Being able to prescribe, monitor the efficacy and safety of non-drug and drug treatment	SPC-2.6. Providing orthopedic treatment for persons with defects in teeth, dentition within the temporization procedure, rehabilitation of single defects in the dentition, dental prostheses of up to three units (excluding dental implants prosthetics), partial and complete removable laminar denture using modern treatment methods approved for use in medical practice.

## 3. Course in academic program structure

Discipline *CAD\CAM Technologies in Dentistry* refers to the compulsory part of the curriculum.

Table 3.1 List of Higher Education Program disciplines that contribute to expected learning outcomes

№	Competence code	Previous disciplines	Subsequent disciplines
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<b>Specialized Professional competences</b>			
	SPC-2	Science of Dental Materials Propaedeutics of Dental Diseases	Prosthodontics (Complex Prosthetics)

#### 4. Course workload and Academic Activities

Course workload is 3 credit units.

Table 4.1 Types of academic activities during the period of the Higher educational program mastering

<b>Types of academic activities</b>	<b>Academic hours</b>	<b>Semester № 4</b>
Lectures	-	-
Seminars (S)	-	-
Lab work (LW)	<b>72</b>	<b>72</b>
Self studies	<b>36</b>	<b>36</b>
Evaluation and assessment	<b>9</b>	<b>9</b>
Total hours	<b>108</b>	
credits	<b>3</b>	

#### 5. Course Modules and Contents

##### 5.1. Contents

<b>№</b>	<b>Modules</b>	<b>Topics</b>	<b>Types of academic activities</b>
1	Introductory lesson . History of CAD / CAM systems in dentistry.	Historical Sketch of CAD / CAM systems in the dental development in Russia and abroad. The concept of «CAD / CAM» . General system characterization and review of existing CAD / CAM systems in the world.	LW

2.	Structure CAD \ CAM systems. production of fashion designs.	Principles and stages of work CAD / CAM systems. Compare CAD-CAM systems for laboratory fabrication of structures and cabinet systems of open and closed. The materials of construction.	LW
3.	Dissection teeth under orthopedic structures made by milling.	Recovery Methods dentition hard tissue defects. Classification of cavities by Black localization, classification ADO tabs. Formation of cavities, walls, occlusal edges. Preparation under inlay / onlay / overlay inlays, crowns.	LW
4.	Preparation of optical impression (Part 1)	The concept of "optical impression". Overview of 3D scanners and intraoral camera in orthopedic dentistry	LW
5.	Preparation of optical impression (part 2)	Prepare to receive the impression, the basic requirements. matting errors. Stages optical impression removal, obtaining the medial / distal enlarged impression. Quality control of the optical impression. Typical errors when removing optical impression.	LW
6.	Working with the program CAD (part 1)	The main program for example, the company Sirona. Familiarization with the CEREC system user interface (menu: configuration, settings, tools, configuration, calibration).	LW
7	Working with the program CAD (Part 2)	On-screen toolbar (administrative data entry, equatorial line, preparation line, interproximal contacts, building tool models). Construction of a	LW

		crown using a buccal image and an occlusion recorder. Central occlusion recorder. Selecting a dental library of teeth.	
8	I certification milestone	Test control	LW
9	Work program CEREC SW 4 (Part 1)	Tab. Construction of the tabs with the program.	LW
10	Work program CEREC SW 4 (part 2)	Crown. Construction of the crown with the program	LW
11	Work program Mill	Work with the milling program (milling previously modeled structures).	LW
12	Materials for milling prosthetic	Classification of materials for the manufacture of orthopedic structures. Features and indications. Blocks for characterizing aesthetic dentistry during milling.	LW
13	Sintering process	Sintering. Optimal modes. Influence of parameters on accuracy, durability, aesthetics of future work.	LW
14	Individualization of restorations	Polishing or glazing restorations. Individualization of ceramic restorations using ceramic materials and paints.	LW
15	Adhesive inlays and other restorations	Adhesive cementation of restorations. Dual-curing cements. Representatives, their properties and differences. Stages of cementation of various ceramic restorations.	LW
16	Digital Opportunities	Additional possibilities for digital-gingival production of prostheses, protective guides for templates, preparation of teeth, individual spoons.	LW
17	II certification milestone	Testing.	LW
18	Total	Points scored	LW

## 6. Classroom Equipment and technology Support Requirements

**Table 6.1**

**Classroom Equipment and technology Support Requirements**

<b>Classroom for Academic Activity Type</b>	<b>Classroom Equipment</b>	<b>Classroom Equipment and technology Support Requirements</b>
236 Academic Activity type- Lab work	Classroom for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.	Installing the dental chair with Hiraident 654-3 -1 pc. ED 240 ovens with RS422 (Binder) (9010-0101) (LLC Diaem) - 1pc. RC-2ZT Phantom Frasco GmbH head trainer Germany

<b>Classroom for Academic Activity Type</b>	<b>Classroom Equipment</b>	<b>Classroom Equipment and technology Support Requirements</b>
		<p>(10130120/190315/0001935) - 1 pc.  Dental tools (set) - 10 pcs.  Workplace student / teacher as part of the system unit, monitor, keyboard - 1 pcs.  Intraoral Camera (10125230/221108/0006472 Korea.) - 1 pc.  Ultrasonic scaler DTE-7DLED - 4 pcs.</p>
<p>237, 436  Academic Aktiviti type- Seminars</p>	<p>Classroom for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.</p>	<p>Classroom, Equipped with a set of specialized furniture, whetebboard;a set of devices includes portable multimedia projector, laptop,projection screen,stable wireless Internet connection.  Software: Microsoft Windows,MS Office\Office 365,MS TEAMS,Chrome Monitor LED LG 55" 55UF771V Ultra HD, 100Hz, DVB-T2, DVB-C, DVB-S2, USB, WiFi</p>
<p>437  Academic Aktiviti type- Computer Lab</p>	<p>Classroom for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.</p>	<p>Classroom, Equipped with a set of specialized furniture, whetebboard;a set of devices includes portable multimedia projector, laptop,projection screen,stable wireless Internet connection.  Software: Microsoft Windows,MS Office\Office 365,MS TEAMS,Chrome Monitor LED LG 55" 55UF771V Ultra HD, 100Hz, DVB-T2, DVB-C, DVB-S2, USB, WiFi  The workplace of the student / teacher as part of the system unit, monitor, keyboard - 8 pcs., there is an Internet connection.  Software: Windows 8.1 Corporate (Microsoft Office</p>

Classroom for Academic Activity Type	Classroom Equipment	Classroom Equipment and technology Support Requirements
		Professional Plus 2007, Corporate Licensing Program (Microsoft Subscription) Enrollment for Education Solutions № 86626883от 01.04.2018 г.) Sirona Wibv-systems 1001-02- 160-0445 №№ 1)2-3067086, 2016 2)2-2707139 , 2016 3)2-2707136 , 2016 4)2-2707154 , 2016 5)2-2536154 , 2016 6)2-2707122 , 2016 7)2-2695658 , 2016 8)2-2707144 , 2016

## 7. Recommended Sources for Course Studies

### a) Main reading

1. Методологические тексты для семинарских и практических занятий студентов по теме простого протезирования с использованием съемных зубных протезов [Электронный ресурс] = Methodology texts for seminar and practical training of students on the theme of simple prosthetic with removable dentures : Учебно-методическое пособие / И.Ю. Лебедеико [и др.]. - Электронные текстовые данные. - М. : Изд-во РУДН, 2018. - 76 с.

### b) Additional reading:

1. Prosthetic dentistry [Электронный ресурс] = Ортопедическая стоматология : Working notebook for independent work of the students on discipline "Propaedeutics of dental diseases", Specialty "Dentistry"; учебно-методическое пособие на английском языке / Сост. С.Н. Разумова и др. ; под ред. С.Н. Разумовой. - Электронные текстовые данные. - М. : Изд-во РУДН, 2018. - 55 с.

2. Online Resources Portal: Computer technology.

3. [http://ru.wikipedia.org/wiki/portal:Kompyuternye\\_tehnologii](http://ru.wikipedia.org/wiki/portal:Kompyuternye_tehnologii)

4. <https://eduherald.ru/ru/article/view?id=16200>

### c) Internet sources:

Electronic libraries with access for RUDN students:

<http://lib.rudn.ru/MegaPro/Web>

<http://www.biblioclub.ru>

<http://www.biblio-online.ru>

[www.studentlibrary.ru](http://www.studentlibrary.ru)

<http://e.lanbook.com/>

Databases and search engines:

<http://docs.cntd.ru/>

<https://www.yandex.ru/>

<https://www.google.ru/>

<http://www.elsevierscience.ru/products/scopus/>

**Agreed:**

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