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**Federal State Autonomous Educational Institution of Higher Education  
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA  
RUDN University**

**Institute of Medicine**

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educational division (faculty/institute/academy) as higher education programme developer

## **COURSE SYLLABUS**

**3D Technologies in Dentistry**

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course title

**Recommended by the Didactic Council for the Education Field of:**

**31.05.03 Dentistry**

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field of studies / speciality code and title

**The course instruction is implemented within the professional education programme  
of higher education:**

**Dentistry**

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higher education programme profile/specialisation title

### 1. COURSE GOAL(s)

The goal of the course “3D technologies in dentistry” is to equip students with the knowledge and necessary skills for usage of cone-beam computed tomography on the dental admission in their professional activities.

### 2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) “3D technologies in dentistry” is aimed at the development of the following competences /competences in part: PC-5.5, PC-5.6, GPC-1.3.

*Table 2.1. List of competences that students acquire through the course study*

Competence code	Competence descriptor	Competence formation indicators (within this course)
PC-5	Being able to examine patients to determine a diagnosis when solving professional tasks	PC-5.5. Referral of a patient for an instrumental examination if there are medical indications in accordance with the current procedure for the provision of medical care, clinical recommendations (treatment protocols) for the provision of dental care, considering standards.
		PC-5.6. Referral of a patient for a consultation with specialist doctors if there are medical indications in accordance with the current procedure for the provision of clinical medical care
GPC-1	Being able to make an examination of a patient in order to determine a diagnosis.	GPC-1.3. Detecting if patients have dentoalveolar, facial anomalies, deformities and prerequisites for their development, defects in the crowns of teeth and dentition on the basis of the patient examination; laboratory, instrumental, and additional examinations in order to make a preliminary/final diagnosis.

### 3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course “3D technologies in dentistry” refers to the core/variable/elective\* component of (B1) block of the higher educational programme curriculum.

\* - Underline whatever applicable.

Within the higher education programme students also master other (modules) and / or internships that contribute to the achievement of the expected learning outcomes as results of the course study.

*Table 3.1. The list of the higher education programme components/disciplines that contribute to the achievement of the expected learning outcomes as the course study results*

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
PC-5	Being able to examine patients to determine a diagnosis when solving professional tasks	Science of Dental Materials Hygiene	Propaedeutics of Dental diseases Radiology Prosthodontics Prevention and Public Dental Health Oral Surgery

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
GPC-1	Being able to make an examination of a patient in order to determine a diagnosis.	Science of Dental Materials Hygiene	Propaedeutics of Dental diseases Radiology Prosthodontics Prevention and Public Dental Health Oral Surgery

#### 4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course “3D technologies in dentistry” is 3 credits (108 academic hours).

*Table 4.1. Types of academic activities during the periods of higher education programme mastering*

Type of academic activities	Total academic hours	Semesters/training modules
		4
<i>Contact academic hours</i>	108	108
<i>including:</i>		
Lectures (LC)		
Lab work (LW)	72	72
Seminars (workshops/tutorials) (S)		
<i>Self-studies</i>	36	36
<i>Evaluation and assessment (exam/passing/failing grade)</i>	9	9
<b>Course workload</b>	academic hours	<b>108</b>
	credits	<b>3</b>

\* To be filled in regarding the higher education programme correspondence training mode.

#### 5. COURSE CONTENTS

*Table 5.1. Course contents and academic activities types*

Course module title	Course module contents (topics)	Academic activities types
Module 1. Survey methods in dentistry. Basic and advanced.	Examination of the patient. Basic methods (visual inspection and inspection of the oral cavity). Two-dimensional and three-dimensional methods of radiation survey in dentistry	LW, Ss
Radiation diagnostics in dentistry. Types of research - Intraoral radiography of teeth and jaws, panoramic zonography. Principles of image acquisition. Indication methods.	Intraoral dental radiography. Isometric far-focus method and X-ray of the teeth. Advantages and disadvantages. Orthopantomography panoramic zonography teeth or jaws.	LW, Ss

<b>Course module title</b>	<b>Course module contents (topics)</b>	<b>Academic activities types</b>
Disadvantages		
Radiation diagnostics in dentistry. Types of research - cone-beam computed tomography. Principles of obtaining an image. Indication method. Disadvantages.	Invention of the CT scanner. Types of scanners. Principles of obtaining an image. Concepts and terms related to computed tomography.	LW, Ss
Radiation safety during radiation examination during dental treatment. Types of imaging programs for computed tomography. Application features.	What is a sievert. Effective equivalent dose. absorbed dose. What are dosimeters. Rules for conducting x-ray studies in dentistry.	LW, Ss
Radiological anatomy on CBCT data. Features visualization of anatomical structures in the maxillofacial region.	Scanning zone. X-ray anatomy of the paranasal sinuses, temporomandibular joint, the upper and lower jaws.	LW, Ss
The algorithm works with Ez3D2009 program. Construction of the image for evaluation dental pathology.	Software includes Ez3D2009. Algorithms for constructing dental images, panoramic zonograms, implantation planning	LW, Ss
Workshop: Working with Ez3D2009 program.	Development of manual skills of building a tooth tomography, panoramic zonogram, implantation planning	LW, Ss
First milestone certification	Intermediate control of knowledge and skills	LW, Ss
The use of CBCT on the dental admission. Evaluation of channel-root of the tooth system, periodontal, maxillary sinuses.	X-ray semiotics of the main dental diseases (caries, pulpitis, periodontitis, periodontal disease, endotherapy errors). The study of the structure of the canal-root system of the tooth	LW, Ss
The use of CBCT on the dental admission. Abnormalities of the teeth and jaws. Inflammatory processes in the maxillofacial area, neoplasms and their manifestations.	X-ray semiotics major dental diseases (anomalies teeth and jaws, sinus disease).	LW, Ss
The algorithm of the program Galileos. Construction of the image for evaluation dental pathology.	The software includes Galileos. Algorithms for constructing dental images, panoramic zonogram, implantation planning	LW, Ss
Workshop: How to use	Practicing manual skills in constructing tooth	LW, Ss

Course module title	Course module contents (topics)	Academic activities types
Galileos	tomography, panoramic zonogram, implantation planning	
The algorithm works with Romexis Viewer software. Image building for evaluation of dental pathology.	The software includes Romexis Viewer. Algorithms for constructing dental images, panoramic zonogram, implantation planning	LW, Ss
The algorithm of the program On Demand 3d. Image building for evaluation of dental pathology.	The software includes On Demand 3d. Algorithms for constructing dental images, panoramic zonogram, implantation planning	LW, Ss
Workshop: Working with OnDemand3d program.	Practicing manual skills in constructing tooth tomography, panoramic zonogram, implantation planning	LW, Ss
Practical conference.	Reports on the topics of the course	LW, Ss
Second milestone certification	Intermediate control of knowledge and skills	LW, Ss

## 6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

*Table 6.1. Classroom equipment and technology support requirements*

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
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 Hiradent 654-3 -1 pc. ED 240 ovens with RS422 (Binder) (9010-0101) (LLC Diaem) - 1pc. RC-2ZT Phantom Frasco GmbH head trainer Germany (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.
Seminar	Classroom for laboratory work,	Classroom, Equipped with a set of

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
	individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.	specialized furniture, white board; 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
Computer Lab	Classroom for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.	Classroom, Equipped with a set of specialized furniture, white board; 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 Professional Plus 2007, Corporate Licensing Program (Microsoft Subscription) Enrollment for Education Solutions № 86626883or 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

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
		5)2-2536154 , 2016 6)2-2707122 , 2016 7)2-2695658 , 2016 8)2-2707144 , 2016

## 7. RESOURCES RECOMMENDED FOR COURSE STUDY

### *Main readings:*

1. Whaites Eric. Essentials of dental radiography and radiology [Текст] / E. Whaites, N. Drage. - 5th ed. ; book on English language. - London ; New York : Churchill Livingstone : Elsevier, 2013.
2. Oral and Maxillofacial Surgery, Radiology, Pathology and Oral Medicine. Volume One. – book on English language. - London : Elsevier, 2008. - 272 p

### *Additional readings:*

1. Mok DWH. Essential Radiology in Head Injure [Текст] : A diagnostic atlas of skull trauma / D. Mok, L. Kreel. - Great Britain : Heinemann Professional Publishing, 1988. - 213 p.

### 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/>

### *Training toolkit for self- studies to master the course \*:*

1. The set of lectures on the course “3D Technologies in Dentistry”

\* The training toolkit for self- studies to master the course is placed on the course page in the university telecommunication training and information system under the set procedure.

## 8. ASSESSMENT TOOLKIT AND GRADING SYSTEM\* FOR EVALUATION OF STUDENTS' COMPETENCES LEVEL UPON COURSE COMPLETION

The assessment toolkit and the grading system\* to evaluate the competences formation level (competences in part) upon the course study completion are specified in the Appendix to the course syllabus.

\* The assessment toolkit and the grading system are formed on the basis of the requirements of the relevant local normative act of RUDN University (regulations / order).

### DEVELOPERS:

Associate professor of  
Department of general and  
clinical dentistry

position, department

E.N.Gvozdikova

signature

name and surname

Head of Department of general  
and clinical dentistry

position, department

A.M.Avanesov

signature

name and surname

### HEAD OF EDUCATIONAL DEPARTMENT:

of general  
and clinical dentistry

name of department

A.M.Avanesov

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### HEAD OF HIGHER EDUCATION PROGRAMME:

First deputy director of Medical  
Institute for academic affairs

position, department

S.N.Razumova

signature

name and surname