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Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
RUDN University
Institute of Medicine

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

COURSE SYLLABUS

Science of Dental materials

course title

Recommended by the Didactic Council for the Education Field of:

31.05.03 Dentistry

field of studies / speciality code and title

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

Dentistry

higher education programme profile/specialisation title

2025

1. COURSE GOAL(s)

The goal of the course ”Science of Dental Materials” is to equip students with the main knowledge and skills necessary to work with dental materials.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) is aimed at the development of the following competences /competences in part: GPC – 6, GPC–8

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

Competence code	**Competence descriptor**	**Competence formation indicators** (within this course)
GPC-6.	Ability to prescribe, monitor the effectiveness and safety of drug and non-drug treatment in solving professional problems.	GC-6.2. Selects medical instruments (including dental materials) to provide a comprehensive treatment plan for dental problems. Keep track of how the patient's treatment is doing.
GPC-8.	Ability to solve professional problems using basic physico-chemical, mathematics, and natural scientific concepts and procedures.	GC-8.1. Applies fundamental physical and chemical knowledge to solve professional problems.

3. COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course 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***
GPC - 6.	Ability to prescribe, monitor the effectiveness and safety of drug and non-drug treatment in solving professional problems.	Introduction to the specialty. Ethical and deontological principles in dentistry. Medical computer science. History of medicine.	ALL dental clinical disciplines.
GPC - 8.	Ability to solve professional problems using basic physico-chemical, mathematics, and natural scientific concepts and procedures.	Introduction to the specialty. Ethical and deontological principles in dentistry. Medical computer science. History of medicine.	ALL dental clinical disciplines

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course is 4 credits (144 academic hours).

*Table 4.1. Types of academic activities during the periods of higher education programme mastering (**full-time training**)**

Type of academic activities		Total academic hours	Semesters/training modules	
			2	
Contact academic hours		90	90	
including:				
Lectures (LC)		18	18	
Lab work (LW)		72	72	
Seminars (workshops/tutorials) (S)				
Self-studies		51	51	
Evaluation and assessment (exam/passing/failing grade)		3	3	
Course workload	academic hours	144	144	
	credits	4	4	

5. THE COURSE MODULES AND CONTENTS

Table 5.1. The content of the discipline and types of academic activities

Course module title	Course module contents (topics)	Academic activities types
1.Module Materials science in prosthetic dentistry	Dental materials science as a practical science of materials used in the work of a dentist. Classification and physicochemical properties of materials used in dentistry. Basic dental materials, metals, ceramics, and polymers and their physical and chemical properties.	LC, LW
	Basic and auxiliary materials in prosthetic dentistry. Dental impression materials. Classification, composition, physicochemical properties. Requirements. Standard impression spoons.	LC, LW
	Gypsum, physicochemical properties, composition. Standardization according to GOST (microscopy (alpha, beta)). Method of working. Features of hardening with inhibitors and catalysts.	LC, LW
	Dental wax. Requirements, classification, physicochemical properties, composition. Standardization according to GOST.	LC, LW

	Polymeric materials, their use in dentistry, classification, physicochemical properties, composition. The technology of work with plastic, safety.	LC, LW
	Metals and alloys used in prosthetic dentistry. Classification, physicochemical properties.	LC, LW
	Dental porcelain. Ceramics. Classification, physicochemical properties, composition. Application in dentistry.	LC, LW
	Colloquium 1.	LC, LW
	Classification of materials used in restorative dentistry. Classification of filling materials, quality standards, physicochemical and biological properties, composition. Requirements for filling material.Mineral cement, materials used for temporary fillings and liners, physicochemical properties. Methods of preparation.	LC, LW
	Classification of mineral cement, physicochemical properties. Methods of preparation.	LC, LW
	Classification of polymer cement, Physico-chemical properties. Methods of preparation.	LC, LW
	Chemical and light cured composite filling materials. Classification, physicochemical properties, composition.	LC, LW
	Adhesive system (generations of adhesive systems). physicochemical properties and composition.	LC, LW
	Metals and their alloys used for dental fillings. Classification, physicochemical properties, composition. Method of amalgam preparation. Safety and hygiene requirements when working with amalgam.	LC, LW
	Root canal filling materials. Classification of sealer and fillers, indication for use.	LC, LW
3.Module Materials science in surgical dentistry.	Materials in surgical dentistry. Materials for surgical sutures. Surgical needles. Requirements. Dental implants, materials used to manufacture them.	LC, LW
	Colloquium 2.	Test and interview
	Final colloquium.	Test and interview

* - to be filled in only for **full** -time training: *LC - lectures; LW - lab work; S - seminars.*

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)
Lecture	For lectures (lecture hall № 204 faculty of Russian RF language, equipped with a set of specialized furniture; whiteboard; a set of devices includes portable multimedia projector.	set of specialized furniture. Technical support: – multimedia projector, – Internet access. Software: *– Microsoft Windows, MS Office / Office 365, MS Teams*
Lab-work	*Classrooms are located in : Agrarian and Technological Institute and Faculty of Humanities and Social Sciences.* *In ATI: classroom 249, 250, 251, 252 (phantom class) and 253.* In HSS: classroom, 232- *235 (phantom class).*	Set of specialized furniture. Technical support: Dental Simulation Units. projector DVPH Optoma H114. Automated workplace LenovoTrinkCentre M71z. Laptop Asus X756UV Intel. Projector Acer P1285. Screen Elite Screens Spectrum Electric100V. Laptop ASUS X751LDV. All-in-one Dell Optiplex 3030. Personal computer TMO3300 i3 254. Polymerization lamps "Woodpecker". Control units with micromotor handpiece. Multimedia Projector Sony VPL-

		C6. Electric screen Projecta PSECO001 Elpro electrol 160x160см. DUMMIES of the patient's head for phantom works in a complete set. Electrically operated dental chair with programmable position. Doctor's blocks in the configuration. Monitor 17" BenQ сч.1472. Tripod screen Projecta, 180x180. controlled dental unit with 2 handpieces and air syringe handpieces «ДАРТА 1440». Maxilla and mandible models with articulator. Cabinet for storage of sterile tools. Instruments used in conservative, prosthetic, and surgical dentistry. Supplies: gypsum, wax, casting masses, filling materials, etc. *Information stands and expositions*: – information stands in Russian language and English. – visual aids, posters, dummies.
Self-studies	*Places for self-studies medical institute, ATI, HSS, RF, as well as the halls of the Scientific Library in the Main Building of RUDN University.*	

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main readings:

1. John F. NcCabe, A. W. (2008). Applied Dental Materials. Blackwell Munksgaard.

2. Phillips'. Science of Dental Materials. 12. б.м. : pageburst, 2013. ISBN: 978-1-4377-2418-9.

Internet-(based) sources:

1. Electronic libraries with access for RUDN students:

- Electronic library system РУДН – ЭБС РУДН http://lib.rudn.ru/MegaPro/Web
- ELS « University Library Online » http://www.biblioclub.ru
- ELS Yurayt http://www.biblio-online.ru
- ELS «Student's Consultant » www.studentlibrary.ru
- ELS «Lan» http://e.lanbook.com/
- ELS « Troitsky most»

2. Databases and search engines:

- electronic fund of legal and regulatory and technical documentation http://docs.cntd.ru/
- the Yandex search engine https://www.yandex.ru/
- the Google search engine https://www.google.ru/
- abstract database SCOPUS http://www.elsevierscience.ru/products/scopus/

Learning toolkits for self- studies in the RUDN LMS TUIS

1. A course of lectures and presentations on the discipline "Materials science".

№	Lecture topics	Hours
1.	Dental materials science. Characteristics of materials used in dentistry. Basic dental materials, metals, ceramics, polymers.	**2**
2.	Dental impression materials. Gypsum, physico–chemical properties. Dental wax.	**2**
3.	Polymer materials, their application in dentistry, classification, physico-chemical properties, composition. The technology of working with plastic, safety precautions.	**2**
4.	Metals and alloys used in dentistry. Dental porcelain. Sitallas.	**2**
5.	Classification of materials used in therapeutic dentistry. Classification. Cements: mineral and phenolic.	**2**
6.	Polymer cements. Materials for temporary sealing, insulating and therapeutic pads.	**2**
7.	Composite sealing materials of light curing. Classification. physico-chemical properties, composition. Adhesive system. Polymer sealing materials (compomers, ormokers). Metals and their alloys used for dental fillings.	**2**
8.	Materials used for filling root canals. Classification of silers and fillers, indications for use.	**2**
9.	Materials in surgical dentistry. Materials for surgical sutures. Surgical needles. Dental implants, materials used for their manufacture.	**2**
	In total:	**18**

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

1. The set of lectures on the course “Science of Dental Materials”

2. The laboratory workshop (if any) on the course “Science of Dental Materials”

3. The guidelines for writing a course paper / project (if any) on the course “Science of Dental Materials”.

* 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 EVALUATIONOF STUDENTS’ COMPETENCES LEVEL UPON COURSE COMPLETION

Evaluation materials and point-rating system* for assessing the level of competence formation (GPC – 6, GPC–8) based on the results of mastering the discipline «Science of Dental Materials» are presented in the Appendix to this Work Program of the discipline.

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

DEVELOPERS:

Senior Lecturer of the Department of Propedeutics of dental diseases		A.S. Manvelyan
position, department	signature	name and surname
Assistant of the Department of Propedeutics of dental diseases		Z.A. Guryeva
position, department	signature	name and surname

HEAD OF EDUCATIONAL DEPARTMENT:

of Dental Propedeutics, Deputy Director of Institute of Medicine for the field of Dentistry, Professor		S.N. Razumova
name of department	signature	name and surname

HEAD

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Deputy Director of Institute of Medicine for the field of Dentistry, Professor		S.N.Razumova
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