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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

Medical genetics in dentistry

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

2026

1. COURSE GOAL(s)

The course "Medical Genetics in Dentistry" is part of the specialty program "Dentistry" in the field 31.05.03 "Dentistry" and is studied in the 9th semester of the 5th year. The course is offered by the Department of Pediatric Dentistry and Orthodontics. The course consists of 9 sections and 16 topics and is aimed at studying the relationship between heredity and pathology; the semiotics of hereditary pathology and principles of clinical diagnosis; chromosomal diseases; monogenic diseases; multifactorial diseases; congenital and hereditary dental diseases; congenital malformations of the maxillofacial area; dental diseases of multifactorial nature; prevention of congenital and hereditary dental pathologies.

The purpose of mastering the course is for the student to acquire knowledge about the structure of the human body based on modern achievements in macroscopic and microscopic anatomy and knowledge about the structure of organs and organ systems, their topography and development, as well as to develop professional medical competence in issues of the structural organization of the main processes of the body's vital activity.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) "Medical Genetics in Dentistry" is aimed at the development of the following competences /competences in part: GC-1; GPC-5; GPC-6; PC-1; PC-2; PC-6.

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

Competence code	Competence descriptor	Competence formation indicators (within this course)
GC-1	Being able to implement critical analysis of problem situations based on systems approach, develop an action strategy.	GC-1.1. Analysing the problem situation as a system identifying its components and links between them.
GPC-5	Being able to examine patients to determine a diagnosis when solving professional tasks	GPC-5.1. Gathering anamnesis by analysing the patient's complaints, making a physical examination at a dental appointment. GPC-5.2. Formulating a preliminary diagnosis and drawing up a plan for laboratory and instrumental examinations of a dental patient. GPC-5.3. Compiling medical documentation for a dental patient in accordance with regulatory requirements. GPC-5.8. Conducting differential diagnosis with other diseases/conditions, including the urgent ones. GPC-5.9. Making a diagnosis based on the current international statistical classification of diseases and health problems.
GPC-6	Being able to prescribe non-drug and drug treatment, monitor its efficacy and safety when solving professional tasks	GPC-6.1. Developing a plan for dental disease treatment taking into account the diagnosis, age and clinical picture in accordance with the current procedures for the provision of medical care, clinical guidelines (treatment protocols) on the provision of medical care taking into account the medical care standards. GPC-6.2. Selecting medical products (including

Competence code	Competence descriptor	Competence formation indicators (within this course)
		dental materials) for drawing up a comprehensive plan for dental disease treatment. Following up the treatment of a patient.
PC- 1	Being able to make an examination of a patient in order to determine a diagnosis.	PC-1.1. Making an initial examination and/or reexamination of a patient in order to make a preliminary diagnosis. PC-1.2. Receiving information from patients (their relatives/legal representatives); conducting a questionnaire survey of patients regarding their general health status; identifying concomitant diseases in order to make a preliminary diagnosis. PC-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. PC-1.4. Detecting if patients have risk factors for oncopathology (including various background processes, precancerous conditions) based on laboratory, instrumental and additional examinations in order to make a preliminary/final diagnosis. PC-1.5. Making a preliminary/final diagnosis based on the patient examination; laboratory and instrumental examinations.
PC-2	Being able to prescribe, monitor the efficacy and safety of non-drug and drug treatment	PC-2.6 Providing orthopaedic 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.
PC-6	Being able to analyze and present in public medical information based on evidence-based medicine, participate in scientific research, introduce new methods and techniques aimed at protecting public health	PC-6.1 Searching for medical information based on evidence-based medicine, interpreting data from scientific publications and/or preparing a presentation to make medical information, the results of scientific research public.

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*
GC-1	Being able to implement critical analysis of problem situations based on systems approach, develop an action strategy.	Assistant dentist (therapist); Assistant dentist (orthopedist); Human Anatomy - Head and Neck Anatomy; Pediatric dentistry; Dental prosthetics (simple prosthetics); Immunology, clinical immunology; Mathematics; Orthodontics and pediatric prosthetics; Otorhinolaryngology; Dental prosthetics (complex prosthetics); Prosthetics for complete absence of teeth; Psychology, pedagogy; Physics; Philosophy; Obstetrics; Pathophysiology - Pathophysiology of the head and neck; Chemistry of biogenic elements**; Dental modeling of teeth**; History of Medicine; Bioelements in medicine**; Medical elementology**;	Gnathology and functional diagnosis of the temporomandibular joint; Pediatric maxillofacial surgery; Maxillofacial prosthetics;
GPC-5	Being able to examine patients to determine a diagnosis when solving professional tasks	Assistant dentist (orthopedist); Dental prosthetics (simple prosthetics); Cariesology and diseases of hard dental tissues; Local anesthesia and anesthesiology in dentistry; General surgery; Orthodontics and pediatric prosthetics; Dental prosthetics (complex prosthetics);	Gerontostomatology and diseases of the oral mucosa; Gnathology and functional diagnosis of the temporomandibular joint; Pediatric maxillofacial surgery; Maxillofacial prosthetics; Maxillofacial and gnathic surgery; Implantology and reconstructive surgery of the oral cavity;

		Prosthetics for complete absence of teeth; Surgical diseases; Oral surgery; Maxillofacial and gnathic surgery; Internal medicine; Neurology; Periodontology; Psychiatry and Narcology; Endodontics; Dermatovenerology; Pediatric dentistry; Propaedeutics of dental diseases; Ophthalmology; Emergency conditions in outpatient dental practice; Pathological anatomy - Pathological anatomy of the head and neck; Obstetrics;	
GPC-6	Being able to prescribe non-drug and drug treatment, monitor its efficacy and safety when solving professional tasks	Dermatology; Pediatric dentistry; Dental prosthetics (simple prosthetics); Immunology, clinical immunology; Cariesology and diseases of hard dental tissues; General surgery; Orthodontics and pediatric prosthetics; Dental prosthetics (complex prosthetics); Prosthetics for complete absence of teeth; Surgical diseases; Oral surgery; Maxillofacial and gnathic surgery; Fundamentals of military training. Life safety; Internal illnesses; Neurology; Periodontology; Psychiatry and Narcology; Endodontics; Pharmacology; Materials Science; Obstetrics;	Gnathology and functional diagnosis of the temporomandibular joint; Pediatric maxillofacial surgery; Implantology and reconstructive surgery of the oral cavity; Clinical dentistry; Maxillofacial and gnathic surgery; Maxillofacial prosthetics; Gerontostomatology and diseases of the oral mucosa; Clinical pharmacology;

		Emergency conditions in outpatient dental practice;	
PC-1	Being able to make an examination of a patient in order to determine a diagnosis.	Assistant dentist (therapist); Assistant dentist (surgeon); Assistant dentist (orthopedist); Assistant dentist (hygienist); Orthodontics and pediatric prosthetics; Pathological anatomy - Pathological anatomy of the head and neck; Dental prosthetics (complex prosthetics); Prosthetics for complete absence of teeth; Fundamentals of military training. Life safety; Radiation diagnostics; Cone beam computed tomography in diagnostics, planning and evaluating the effectiveness of a dental decision; Pediatric dentistry; Immunology, clinical immunology; Dental prosthetics (simple prosthetics); Cariesology and diseases of hard dental tissues; Local anesthesia and anesthesiology in dentistry; Otorhinolaryngology; Propaedeutics of dental diseases; Oral surgery; Maxillofacial and gnathic surgery; Obstetrics; Periodontology; Endodontics; Three-dimensional x-ray diagnostic methods in dentistry**; Three-dimensional computer modeling of teeth**; 	Dental assistant (general practice), incl. research work; Oncostomatology and radiation therapy; Maxillofacial prosthetics; Gnathology and functional diagnosis of the temporomandibular joint; Pediatric maxillofacial surgery; Implantology and reconstructive surgery of the oral cavity; Maxillofacial and gnathic surgery; Gerontostomatology and diseases of the oral mucosa; Modern endodontics**; Aesthetic restoration of teeth**;

		Chemistry of biogenic elements**; Ophthalmology; Dental modeling of teeth**; Pathophysiology - Pathophysiology of the head and neck;	
PC-2	Being able to prescribe, monitor the efficacy and safety of non-drug and drug treatment	Pediatric dentistry; Cariesology and diseases of hard dental tissues; Local anesthesia and anesthesiology in dentistry; Orthodontics and pediatric prosthetics; Oral surgery; Maxillofacial and gnathic surgery; Periodontology; Endodontics; Innovative technologies in dentistry; Bioelements in medicine**; Medical elementology**; Propaedeutics of dental diseases; Dental prosthetics (simple prosthetics); Dental prosthetics (complex prosthetics); Prosthetics for complete absence of teeth; Infectious diseases, phthisiology; Organization of general patient care; Assistant dentist (surgeon); Assistant dentist (therapist);	Implantology and reconstructive surgery oral cavity; Maxillofacial and Gnathic Surgery; Gerontostomatology and diseases of the oral mucosa; Modern endodontics**; Clinical pharmacology; Aesthetic restoration of teeth**; Clinical dentistry; Gnathology and functional diagnosis of the temporomandibular joint; Pediatric maxillofacial surgery; Maxillofacial prosthetics; Assistant dentist (general practice), incl. research work;
PC-6	Being able to analyze and present in public medical information based on evidence-based medicine, participate in scientific research, introduce new methods and	Dental prosthetics (simple prosthetics); Immunology, clinical immunology; Dental prosthetics (complex prosthetics); Prosthetics for complete absence of teeth; Pharmacology; Ophthalmology;	Dental assistant (general practice), incl. scientific research work; Gnathology and functional diagnosis of the temporomandibular joint; Pediatric maxillofacial surgery; Maxillofacial prosthetics; Clinical dentistry;

	techniques aimed at protecting public health		
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* To be filled in according to the competence matrix of the higher education programme.

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course "**Medical genetics in dentistry**" is **3** credits (108 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			
		9			
Classroom learning, ac.h.	68	68			
including:					
Lectures (LC)	-	-			
Lab work (LW)	68	68			
Seminars (workshops/tutorials) (S)	-	-			
Self-studies	31	31			
Evaluation and assessment (exam/passing/failing grade)	9	9			
Course workload	ac.h.	108	108		
	credits.	3	3		

* 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
Section 1 Heredity and pathology	1.1 Medical genetics in the structure of medical and biological sciences about humans. Heredity and health. Mutations as an etiological factor of hereditary diseases. Heredity and health. Mutations as an etiological factor of hereditary diseases.	LW
	1.2 Classification of hereditary diseases. Heredity and pathogenesis. Heredity and clinical picture. Heredity and outcomes of diseases. Heredity and pathogenesis.	LW
Section 2 Semiotics of hereditary pathology and principles of clinical diagnostics	2.1 General and special semiotics of hereditary pathology. Morphogenetic variants of development and their significance in the diagnosis of hereditary pathology. Anthropometry.	LW

Course module title	Course module contents (topics)	Academic activities types
	<p>Morphogenetic variants of development and their significance in the diagnosis of hereditary pathology.</p> <p style="text-align: center;">2.2</p> <p>Congenital malformations. A family approach in the diagnosis of hereditary pathology. Congenital malformations.</p> <p style="text-align: center;">2.3</p> <p>Clinical and genealogical method of diagnosing hereditary diseases. Clinical features of hereditary disease manifestations. Graphic representation of a pedigree. Pedigree analysis. Genealogical analysis in monogenic diseases. Genealogical analysis in multifactorial diseases. Analysis of the pedigree. Genealogical analysis in monogenic diseases.</p>	LW
Section 3 Chromosomal diseases	<p style="text-align: center;">3.1</p> <p>Classification of chromosomal diseases. Frequency, pathogenesis, and clinical features of chromosomal diseases. Clinical characteristics of some chromosomal syndromes (trisomy syndromes, partial aneuploidy syndromes). Clinical characteristics of some chromosomal syndromes</p> <p style="text-align: center;">3.2</p> <p>Methods for diagnosing chromosomal diseases. Treatment of chromosomal diseases. Treatment of chromosomal diseases.</p>	LW
Section 4 Monogenic diseases	<p style="text-align: center;">4.1</p> <p>Classification of monogenic diseases. Genetic heterogeneity and clinical polymorphism of monogenic diseases. Genetic heterogeneity and clinical polymorphism of monogenic diseases.</p> <p style="text-align: center;">4.2</p> <p>Methods of laboratory diagnosis of monogenic pathology (biochemical methods, molecular-genetic methods). Laboratory diagnostic methods for monogenic pathology</p>	LW
Section 5 Multifactorial diseases	<p style="text-align: center;">5.1</p> <p>The most common nosological forms. General and specific mechanisms of the implementation of hereditary predisposition. Factors and principles for identifying individuals at increased risk of developing diseases with hereditary predisposition. Ecogenetic diseases. General and specific mechanisms of implementing hereditary predisposition</p>	LW
Section 6 Congenital and hereditary dental diseases	<p style="text-align: center;">6.1</p> <p>General characteristics of tooth structure. Genetic control of normal development and formation of tooth tissues. Genetic factors in the formation of tooth anomalies. Genetic control of the normal development and formation of tooth tissues.</p> <p style="text-align: center;">6.2</p> <p>Classification of developmental anomalies of teeth and the dentoalveolar area. Anomalies of tooth size and shape (macrodontia, microdontia, fused teeth, duplication, tooth invagination, abnormal cusps and enamel pearls, taurodontism). Abnormalities of tooth size and shape</p> <p style="text-align: center;">6.3</p> <p>Hereditary diseases and syndromes with abnormalities in the size and shape of teeth. Anomalies in the number of teeth (tooth agenesis, supernumerary teeth). Hereditary disorders of tooth structure formation. Anomalies of tooth eruption. Hereditary anomalies of bite disorders. Hereditary disorders of tooth structure formation.</p>	LW

Course module title	Course module contents (topics)	Academic activities types
Section 7 Congenital malformations of the maxillofacial region	7.1 Clefts of the lip and palate. The most common monogenic syndromes with cleft lip and palate. Atypical craniofacial clefts. Principles of treatment and rehabilitation of patients with congenital orofacial clefts. Problems of rehabilitation of patients with congenital orofacial clefts. Principles of prevention of orofacial clefts. Principles of treatment and rehabilitation of patients with congenital orofacial clefts.	LW
Section 8 Dental diseases of a multifactorial nature.	8.1 Multifactorial defects of the craniofacial region and the dentoalveolar apparatus, syndromic forms. Common dental diseases of multifactorial nature (genetic aspects of caries, genetic aspects of periodontal diseases). Common dental diseases of multifactorial nature	LW
Section 9 Prevention of congenital and hereditary dental pathology.	9.1 Medical-genetic counseling. Methods of prenatal diagnosis of hereditary diseases. Methods for detecting chromosomal disorders and monogenic diseases. Problems of medical-genetic counseling and treatment of hereditary diseases in dentistry. Methods of prenatal diagnosis of hereditary diseases.	LW

* - 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)
Lab-work	A classroom for conducting laboratory work, individual consultations, ongoing assessment, and interim certification, equipped with a set of specialized furniture and equipment.	Visual aids, computer presentations, projector, charts, models, simulators, posters.
Self-studies	A classroom for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to the EIOS.	

* - The classroom for independent student work **MUST** be specified!

7. RECOMMENDED SOURCES for COURSE STUDIES

Main readings:

1. Medical Genetics in Dentistry: Textbook / L. V. Akulenko, O. M. Zakharova, N. Yu. Safina, T. A. Yamandi. – Moscow: Limited Liability Company Publishing Group "GEOTAR-Media" 2022. – 400 c. – ISBN 978-5-9704-6895-1. – DOI 10.33029/ 9704-6895-1-GEN-2022-1-400. – EDN FOOMOB.
2. Medical and Clinical Genetics for Dentists: Textbook / Edited by O.O. Yanushevich. – Moscow: GEOTAR-Media, 2015
3. Pediatric Dentistry. Surgery: Textbook / Edited by S.V. Dyakova. – Moscow: Medicina, 2009. – 379 p.: col. ill.

Additional readings:

1. Kurchanov, N. A. Human Genetics with Basics of General Genetics: Textbook / N. A. Kurchanov. – St. Petersburg: SpetsLit, 2009. – 192 p.. – ISBN 978-5-299-00411-3. – EDN SUETCV.
2. Chuykin, S. V. Congenital cleft of the upper lip and palate / S. V. Chuykin, L. S. Persin, N. A. Davletshin. – Moscow: Medical Information Agency Publishing House 2008. – 362 c. – ISBN 5-89481-647-5. – EDN QLSASL.
3. Chuykin, S. V. Cleft Lip and Palate / S. V. Chuykin, O. Topolnitsky, L. S. Persin. – Saarbrücken : LAP LAMBERT, 2012. – 584 c. – ISBN 978-3-659-22745-5. – EDN YUOSHB.
4. Rogozhina, Y. S. Surgical tactics for eliminating complex variants of congenital cleft palate / Y. S. Rogozhina, S. I. Blokhina, E. S. Bimbas // Problems of Dentistry. – 2020. – T. 16, № 1. – C. 121-126. – DOI 10.18481/2077-7566-20-16-1-121-126. – EDN CFAPPL.
5. Bone grafting of the alveolar ridge cleft at different age periods / S. V. Yakovlev, O. Z. Topolnitsky, M. A. Pershina [et al.] // Pediatric Dentistry and Prevention. – 2022. – T. 22, № 3(83). – C. 162-169. – DOI 10.33925/1683-3031-2022-22-3-162-169. – EDN WJGTZM.
6. Orthodontic care at the stages of comprehensive treatment of children with congenital cleft of the upper lip and/or palate / F. A. Alimirzoev, A. N. Chudinov, L. G. Gasanova, A. F. Alimirzoev // Bulletin of the Medical Dental Institute. – 2023. – № 3(66). – C. 5-7. – EDN UWCBWF.

Resources of the information and telecommunication network 'Internet':

1. RUDN's electronic library system and external electronic library systems, to which university students have access based on concluded agreements
 - RUDN Electronic Library System – RUDN ELS
<https://mega.rudn.ru/MegaPro/Web>
 - ELS 'University Library Online' <http://www.biblioclub.ru>
 - ELS Yurayt <http://www.biblio-online.ru>
 - ELS 'Student Consultant' www.studentlibrary.ru
 - ELS 'Znaniyum' <https://znaniyum.ru/>
2. Databases and search engines
 - Sage <https://journals.sagepub.com/>
 - Springer Nature Link <https://link.springer.com/>
 - Wiley Journal Database <https://onlinelibrary.wiley.com/>
 - Scientometric database Lens.org <https://www.lens.org>

Educational and methodological materials for students' independent work when mastering the discipline/module:*

1. Lecture course on the discipline 'Medical Genetics in Dentistry'.
2. Methodical guidelines for the execution and design of control and independent work in the discipline 'Medical Genetics in Dentistry'

* - All educational and methodological materials for independent student work are posted in accordance with the current procedure on the course page in TUIS!

DEVELOPERS:

Associate professor, Department
of Pediatric Dentistry and
Orthodontics

Position, educational department

Signature

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name and surname.

Associate professor, Department
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HEAD OF EDUCATIONAL DEPARTMENT:

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educational department

Signature

N.S. Tuturov

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HIGHER EDUCATION PROGRAMME:**

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Affairs, Medical Institute, Head
department, professor of the
Department of propaedeutics of
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Position, educational department

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name and surname.