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

2025

1. COURSE GOAL(s)

The goal of the course **"Medical Genetics in Dentistry"** is to equip students with the knowledge about the structure of the human body on the basis of modern achievements in macro- and microscopic anatomy and knowledge about the structure of organs and organ systems, their topography and development, as well as the formation of their professional medical competence in matters 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 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

Competence code	Competence descriptor	Competence formation indicators (within this course)
		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,	Assistant dentist (therapist); Assistant dentist (orthopedist); Human Anatomy - Head	Gnathology and functional diagnosis of the temporomandibular joint; Pediatric maxillofacial surgery;

	develop an action strategy.	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**;	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); Prosthetics for complete absence of teeth; Surgical diseases; Oral surgery; Maxillofacial and gnathic surgery; Internal medicine; Neurology; Periodontology; Psychiatry and Narcology;	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;

		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; Emergency conditions in outpatient dental practice;	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;
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	Dental assistant (general practice), incl. research work; Oncostomatology and radiation therapy; Maxillofacial prosthetics; Gnathology and functional diagnosis of the

		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**; Chemistry of biogenic elements**; Ophthalmology; Dental modeling of teeth**; Pathophysiology - Pathophysiology of the head and neck;	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**;
PC-2	Being able to prescribe, monitor	Pediatric dentistry; Cariesology and diseases of hard dental tissues;	Implantology and reconstructive surgery oral cavity;

	the efficacy and safety of non-drug and drug treatment	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);	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 techniques aimed at protecting public health	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;

* 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 hours0.

*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	**Topic 1.1.** Medical genetics in the structure of the biomedical sciences of man. Heredity and health. Mutations as an etiological factor in hereditary diseases.	LW
	Topic 1.2. Classification of hereditary diseases. Heredity and pathogenesis. Heredity and clinical picture. Heredity and disease outcomes	LW
Section 2 Semiotics of hereditary pathology and principles of clinical diagnostics	**Topic 2.1.** General and particular semiotics of hereditary pathology. Morphogenetic variants of development and their significance in the diagnosis of hereditary pathology. Anthropometry.	LW
	Topic 2.2. Congenital malformations. Family approach in the diagnosis of hereditary pathology.	LW
	Topic 2.3. Clinical and genealogical method for the diagnosis of hereditary diseases. Clinical features of the manifestation of hereditary diseases. Graphic representation of a pedigree. Pedigree analysis. Genealogical analysis in monogenic diseases. Genealogical analysis in multifactorial diseases	LW
Section 3 Chromosomal diseases	**Topic 3.1.** Classification of chromosomal diseases. Frequency, pathogenesis and clinical features of chromosomal diseases. Clinical characteristics of some chromosomal	LW

Course module title	Course module contents (topics)	Academic activities types
	syndromes (trisomy syndromes, partial aneuploidy syndromes).	
	Topic 3.2. Methods for diagnosing chromosomal diseases. Treatment of chromosomal diseases	LW
Section 4 Monogenic diseases	**Topic 4.1.** Classification of monogenic diseases. Genetic heterogeneity and clinical polymorphism of monogenic diseases.	LW
	Topic 4.2. Methods for laboratory diagnosis of monogenic pathology (biochemical methods, molecular genetic methods).	LW
Section 5 Multifactorial diseases	**Topic 5.1.** The most common nosological forms. General and private mechanisms for the implementation of hereditary predisposition. Factors and principles for identifying individuals with an increased risk of developing diseases with a hereditary predisposition. Ecogenetic diseases.	LW
Section 6 Congenital and hereditary dental diseases	**Topic 6.1.** General characteristics of the structure of the teeth. Genetic control of normal development and formation of dental tissues. Genetic factors in the formation of dental anomalies.	LW
	Topic 6.2. Classification of anomalies in the development of teeth and dentition. Anomalies in the size and shape of teeth (macrodentia, microdentia, fused teeth, doubling, invagination of teeth, abnormal tubercles and enamel pearls, taurodentism).	LW
	Topic 6.3. Hereditary diseases and syndromes with anomalies in the size and shape of the teeth. Anomalies in the number of teeth (dental agenesis, supernumerary teeth). Hereditary disorders of the formation of the structure of the teeth. Anomalies of teething. Hereditary anomalies of malocclusion.	LW
Section 7 Congenital malformations of the maxillofacial region	**Topic 7.1.** Cleft lip and palate. The most common monogenic syndromes are cleft lip and palate. Atypical clefts of the craniofacial region. 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	LW
Section 8 Dental diseases of	**Topic 8.1.** Multifactorial malformations of the craniofacial region	LW

Course module title	Course module contents (topics)	Academic activities types
multifactorial nature.	and dentition, syndromic forms Common dental diseases of a multifactorial nature (genetic aspects of caries, genetic aspects of periodontal disease)	
Section 9 Prevention of congenital and hereditary dental pathology.	**Topic 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.	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)
Lecture	An auditorium for lecture-type classes, equipped with a set of specialized furniture; board (screen) and technical means of multimedia presentations. (classrooms 245, 249)	Technical means: multimedia projector Laptop, WiFi available Internet access. Software: Microsoft products (OS, office suite, including MS Office / Office 365, Teams)
Lab-work	An auditorium for laboratory work, individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and equipment.	Visual aids, computer presentations, projector, tables, dummies, simulators, posters
Self-studies	Classroom for self-studies of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to the internet.	

7. RECOMMENDED SOURSES for COURSE STUDIES

Main readings:

- Genetics in Dentistry GP Pal, NK Mahato. ISBN 8184489412, 9788184489415 Publisher: Jaypee Brothers Medical Publishers Pvt. Limited, 2010 - 210 pages.
- Genetics in Dentistry Paperback –2014. ISBN-10:3659562947- ISBN-13:978-3659562945- by Sanjeev Laller, Mamta Malik, C. Anand Kumar. Publisher: LAP LAMBERT Academic Publishing. 180 pages

- Pediatric oral and maxillofacial surgery: Publisher: Saunders; 1st edition (April 9, 2004) Language: English. Hardcover: 488 pages. ISBN 978-0-7216-9691-1
- Kutcipal, E. (2013). Pediatric oral and maxillofacial surgery.*Dental Clinics*,*57*(1), 83-98.
- Koch G. et al. (ed.). Pediatric dentistry: a clinical approach. – John Wiley & Sons, 2017.

Additional readings:

- Muhamad, A. H., & Watted, N. (2019). Genetics in pediatric dentistry: A review.*International Journal of Applied Dental Sciences 2019; 5 (3): 401*,*408*.
- Divaris, K. (2019). The era of the genome and dental medicine.*Journal of Dental Research*,*98*(9), 949-955.
- Khan, M. I., Ahmed, N., Neela, P. K., & Unnisa, N. (2022). The human genetics of dental anomalies.*Global Medical Genetics*,*9*(02), 076-081.
- PRESCOTT, G. H., & BIXLER, D. (1968). Implications of genetics in dental practice.*Dental Clinics of North America*,*12*(1), 57-68.
- Gonçalves, J., Marques, H., Saleiro, R., Ferreira, Â., Ferreira, A., Ferreira, Â. T., & Ferreira Sr, A. (2023). Ewing's sarcoma of the zygoma: a very rare location.*Cureus*,*15*(3).
- Railean, S., Gudumac, E., Bernic, J., Poștaru, C., & Ursu, D. (2023). Pediatric Tumors And Congenital Anomalies In Oral & Maxillo-Facial Surgery.
- Bouchard, C., Troulis, M. J., & Kaban, L. B. (2022). Pediatric Dentoalveolar Surgery. In*Peterson's Principles of Oral and Maxillofacial Surgery*(pp. 191-210). Cham: Springer International Publishing.
- Kaban, L. B., Bouchard, C., & Troulis, M. J. (2009). A protocol for management of temporomandibular joint ankylosis in children.*Journal of Oral and Maxillofacial Surgery*,*67*(9), 1966-1978.
- Troulis, M. J., Troulis, M., & Kaban, L. B. (2013).*Minimally invasive maxillofacial surgery*. PMPH-USA.

Internet sources

1. RUDN ELS and third-party ELS, to which university students have access on the basis of concluded agreements:

- RUDN Electronic Library System - RUDN EBS http://lib.rudn.ru/
- ELS "University Library Online" http://www.biblioclub.ru
- EBS Yurayt http://www.biblio-online.ru
- ELS "Student Consultant" www.studentlibrary.ru
- EBS "Lan" http://e.lanbook.com/
- EBS "Trinity Bridge"

2. Databases and search engines:

- electronic fund of legal and normative-technical documentation http://docs.cntd.ru/
- Yandex search engine https:// www .yandex.ru/

- Google search engine https://www.google.ru/
- Abstract database SCOPUS
http :// www . elsescience . en / products / scopus /

Learning toolkits for self-studies during the development of the discipline:*

1. A course of lectures, presentations, video materials on the discipline "**Medical genetics in dentistry**".
2. Guidelines for the implementation and execution of control and independent work on the discipline "**Medical genetics in dentistry**"

* - all educational and methodological materials for independent work of students are placed in accordance with the current procedure on the page of the discipline **in TUIS** (the university telecommunication educational and information system).

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 (GC-1; GPC-5; GPC-6; PC-1; PC-2; PC-6) 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, Department of Pediatric Dentistry and Orthodontics		Im. Katbeh
Position, educational department	Signature	name and surname.

HEAD OF EDUCATIONAL DEPARTMENT:

Department of Pediatric Dentistry and Orthodontics		N.S. Tuturov
educational department	Signature	name and surname.

HEAD OF HIGHER EDUCATION PROGRAMME:

Deputy Director for Academic Affairs, Medical Institute, Head department, professor of the Department of propaedeutics of dental diseases		S.N. Razumova
Position, educational department	Signature	name and surname.