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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

Radiology

course title

Recommended by the Didactic Council for the Education Field of:

31.05.01 General Medicine

field of studies / speciality code and title

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

General Medicine

higher education programme profile/specialisation title

1. COURSE GOAL(S)

The goal of the course " Radiology" is to provide theoretical and practical training of medical doctors in the specialty of General Medicine in matters of modern Diagnostic Radiology.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course (module) " Radiology " is aimed at the development of the following competences /competences in part: GPC-4, GPC-5, 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)
GPC-4	A student is able to use the approved medical radiological devices, as well as to conduct examinations of the patient in order to establish a diagnosis	GPC-4.1. Able to use medical devices in accordance with the current rules of medical care provision, clinical recommendations and treatment protocols, standards of medical care
		GPC-4.2. Able to evaluate the effectiveness and safety of the use of medical devices
		GPC-4.3. A student has mastered the technique of performing typical medical manipulations using the approved medical devices
GPC-5	He is able to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional problems	GPC-5.1 Has mastered algorithms for clinical, laboratory and functional diagnostics in solving professional tasks;
		GPC-5.2 Is able to evaluate the results of clinical, laboratory and functional diagnostics in solving professional tasks;
		GPC-5.3 Is able to determine morphofunctional, physiological states and pathological processes in the human body based on knowledge about the structure of the human body, about functioning of organs and systems in normal and pathological conditions
PC-2	Capable of conducting a patient examination in order to establish a diagnosis	PC -2.7. Able to carry out differential diagnosis with other diseases/conditions, including urgent ones, as well as to establish a diagnosis taking into account the current international statistical classification of diseases and health-related pr
PC -6	Capable of maintaining medical records and organizing the activities of the subordinated nursing personnel	PC -6.3. Is able to keep medical records, including in electronic form.

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-4	Able to use devices according to medical care rules, as well as to conduct examinations of the patient in order to establish a diagnosis	Introductory practice for obtaining primary professional skills: patient care (simulation center); Introductory practice for obtaining primary professional skills: patient care; Practice of diagnostic profile: assistant ward nurse; Practice in obtaining primary professional skills: assistant to junior medical staff; General Surgery Biotechnology; Physics; Chemistry; Bioorganic chemistry; Pharmacology;	Neurology, medical genetics, neurosurgery; Endocrinology; Anesthesiology, intensive care, intensive care; Traumatology, orthopedics; General medical skills; Urgent conditions; Topographic anatomy and operative surgery; Hospital surgery, pediatric surgery; Oncology, radiation therapy; Experimental oncology
GPC -5	Able to assess morphofunctional, physiological conditions and pathological processes in the human body to solve professional problems	Biochemistry; Normal physiology; General Surgery; Biology; Microbiology, virology; Pathophysiology, Clinical pathophysiology; Propaedeutics of internal diseases; Immunology; Pathological anatomy, clinical pathological anatomy; Chemistry; Pharmacology; Bioorganic chemistry; Anatomy; Histology, embryology, cytology;	Obstetrics and gynecology; Oncology, radiation therapy; Molecular genetic methods; Methods of microbiological diagnostics; Phthisiology; Anesthesiology, intensive care, intensive care; Ophthalmology; Methods of cell biology and histology; Topographic anatomy and operative surgery; Forensic medicine; Maxillofacial surgery; Medical forensics; Otorhinolaryngology; Pediatrics; Sectional course
PC-2	Capable of conducting a	General Surgery;	Surgical practice : Assistant

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
	patient examination in order to establish a diagnosis	Propaedeutics of internal diseases; Microbiology, virology; Immunology; Molecular genetics in practical biology and medicine**; Pathophysiology, clinical pathophysiology; Pathological anatomy, clinical pathological anatomy;	surgeon ; Assistant physician of the therapeutic profile: assistant physician of the therapist; General medical practice: assistant to an outpatient clinic doctor ; Practice of obstetrician-gynecological profile: assistant obstetrician; Practice of obstetric and gynecological profile: assistant to a gynecologist; General medical practice: Assistant pediatrician ; Dermatovenerology; Neurology, medical genetics, neurosurgery; Ophthalmology; Faculty Surgery; Occupational diseases; Hospital therapy; Endocrinology; Outpatient therapy; Hospital surgery, pediatric surgery; Pediatrics; Obstetrics and gynecology; Anesthesiology, intensive care, intensive care; Oncology, radiation therapy; Otorhinolaryngology; Reproductive health; Traumatology, orthopedics; Faculty therapy; Maxillofacial surgery; General medical skills; Urgent conditions; Urology; Infectious diseases; Psychiatry, medical psychology; Allergology; Phthisiology; Endoscopic urology; Telemedicine; Clinical Dentistry; Current issues of neonatology**; Topical Issues of Neonatology**; Cardiology in Quests; Molecular genetic methods; Methods of microbiological diagnostics; Evidence-based medicine; Sectional course
PC-6	Capable of maintaining medical records and organizing the activities	Introductory practice for obtaining primary professional	General medical practice: assistant to an outpatient clinic doctor ;

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
	of the subordinated nursing personnel	skills: patient care (simulation center); Introductory practice for obtaining primary professional skills: patient care; Practice in obtaining primary professional skills: assistant to junior medical staff; Biostatistics; General Surgery; Propaedeutics of internal diseases; Bioethics**	Practice of obstetric and gynecological profile: assistant to a gynecologist; Assistant physician of the therapeutic profile: assistant physician of the therapist; Practice of obstetrician-gynecological profile: assistant obstetrician; Surgical practice : Assistant surgeon ; Public health and healthcare, economics health care; Outpatient therapy; Faculty therapy; Faculty Surgery; Obstetrics and gynecology; Urology; Infectious diseases; Endoscopic urology; Modern methods of medical statistics; Allergology; Oncology, radiation therapy; Ophthalmology; Hospital therapy; Hospital surgery, pediatric surgery; Pediatrics; Anesthesiology, intensive care, intensive care; Telemedicine; Forensic medicine

* 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 “RADIOLOGY” is 2 credits (72 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
		6
<i>Contact academic hours</i>	51	51
Lectures (LC)		
Lab work (LW)	51	51
Seminars (workshops/tutorials) (S)		
<i>Self-studies</i>	12	12
<i>Evaluation and assessment (exam/passing/failing grade)</i>	9	9
Course workload	academic hours_	72
		72

Type of academic activities	Total academic hours	Semesters/training modules
		6
credits	2	2

* 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
Physical and technical basics of Diagnostic Radiology	Types of radiation, their physical nature, diagnostic methods based on different types of radiation.	LW
	Properties of various types of radiation, the possibilities of radiological methods in the assessment of various organs, systems, tissues. Schematic structure of the X-ray apparatus, the principles of obtaining X-rays, braking and characteristic radiation. Using the properties of X-ray radiation as an example, to understand the principles of image acquisition in Radiology	LW
Pulmonary Radiology	Diagnostic capabilities of various techniques. How to evaluate the X-ray image of the lungs by syndromes reflecting the morphological structures of the lungs. Assessment of the pulmonary field size using the signs: the position of the diaphragm, the dimension of the intercostal spaces, the position of the mediastinal organs.	LW
	Assessment of lung parenchyma and its changes on X-ray image in the form of translucencies and shadows. Characteristics of shadows using the criteria: quantity, shape, size, localization, contours, structure, intensity, mobility used for diagnostics of lung diseases.	LW
Cardiovascular and Breast Radiology	Changes of the cardiac arches on chest radiographs in various changes of hemodynamics, leading to hemodynamic of the shape, position, and size of the heart. Implementation of radiographic analysis for acquired heart defects, in particular mitral and aortic ones, isolated or combined/ complex ones. Analysis of the detected changes in radiological descriptions and conclusions.	LW
	Studying the X-ray image of the breasts. Knowledge of the normal mammographic images, radiological features of benign and malignant tumors.	LW
Gastrointestinal Radiology	When analyzing the X-ray image, determine the phase of the study. In the relief phase, assess the condition of the mucosa in the norm of each part of	LW

Course module title	Course module contents (topics)	Academic activities types
	the upper part of the digestive tube. In the phase of tight filling to assess the status of the esophagus and stomach. To evaluate their functional characteristics (secretion, peristaltics, tone and evacuation).	
	In the relief phase, assess the condition of the mucosa in the norm of each part of the lower part of the digestive tube. In the phase of tight filling to assess the status of the colon and rectum. To evaluate their functional characteristics (secretion, peristaltics, tone and evacuation).	LW
Skeletal Radiology	Diagnostic capabilities of each of the techniques used to evaluate various components of the musculoskeletal system. Signs for differentiation between norm and pathology in the X-ray image. Assessing the condition of the soft tissues surrounding bones and joints. Evaluation of the joints, periosteum. Symptoms in musculoskeletal Radiology.	LW
Basics of Radiotherapy	Students get acquainted with various types of radiation and their characteristics (X-ray, gamma radiation, beta radiation, braking radiation, protons and electrons in radiation therapy. The methods of radiation therapy (radical, palliative radiotherapy, distant, intra-tissue, intracavitary, contact, systemic, single-field and multi-field, small-fraction and large -fraction) and the pathological processes in which they are used are considered. Complications of radiation therapy and methods of their prevention and treatment.	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	An auditorium for laboratory work, individual consultations, routine monitoring and interim certification, equipped with a set of specialized furniture and equipment.	Microsoft products (OS, office package) (Subscription Enrollment for Education Solutions (EES) No. 56278518 dated 23/04/2019) Guarantor (Agreement No. 13A/46/2018 dated

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
		02/04/2018) Consultant Plus (Information Support Agreement dated 01/09/2013) Regt number of the central office-03-207-7474 from September.2013
Seminar	An auditorium for conducting seminar-type classes, group and individual consultations, ongoing monitoring and interim certification, equipped with a set of specialized furniture and multimedia presentation equipment.	Microsoft products (OS, office package) (Subscription Enrollment for Education Solutions (EES) No. 56278518 dated 23/04/2019) Guarantor (Agreement No. 13A/46/2018 dated 02/04/2018) Consultant Plus (Information Support Agreement dated 01/09/2013) Regt number of the central office-03-207-7474 from September.2013
Computer lab	A computer classroom for conducting classes, group and individual consultations, ongoing monitoring and interim certification, equipped with personal computers (in the amount of 3 pcs.), a blackboard (screen) and multimedia presentation equipment.	Microsoft products (OS, office package) (Subscription Enrollment for Education Solutions (EES) No. 56278518 dated 23/04/2019) Guarantor (Agreement No. 13A/46/2018 dated 02/04/2018) Consultant Plus (Information Support Agreement dated 01/09/2013) Regt number of the central office-03-207-7474 from September.2013
Self-studying	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to Electronic Informational-Educational Media.	Microsoft products (OS, office package) (Subscription Enrollment for Education Solutions (EES) No. 56278518 dated 23/04/2019) Guarantor (Agreement No. 13A/46/2018 dated 02/04/2018) Consultant Plus (Information Support Agreement dated 01/09/2013) Regt number of the central office-03-207-

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
		7474 from September.2013

* The premises for students' self-studies are subject to **MANDATORY** mention

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main readings:

Herring William. Learning Radiology : recognizing the basics / W. Herring. - 4th edition - Philadelphia : Elsevier, 2020. - 382 p. : ill. - ISBN 978-0-323-56729-9 : 4730.00.

Ilasova E.B., Chekhonatskaya M.P., Priyozheva V.N. Radiation Diagnosis, 2009-, GOELAR-Medicine,-275 S.

Sinitsyn E.V., Ustyuzhanin D.V. Magnetic Resonance Imaging/ 2008-, 208 S.

Additional readings:

Internet-based sources

- 1. Electronic libraries with access for RUDN students:
 - Electronic library network of RUDN – ELN RUDN <http://lib.rudn.ru/MegaPro/Web>
 - ELN «University Library online» <http://www.biblioclub.ru>
 - ELN Urait <http://www.biblio-online.ru>
 - ELN «Student Advisor» www.studentlibrary.ru
 - ELN «Lan» <http://e.lanbook.com/>
 - 2. Databases and search engines:
 - electronic fund of legal and regulatory and technical documentation <http://docs.cntd.ru/>
 - search system Yandex <https://www.yandex.ru/>
 - search system Google <https://www.google.ru/>
- abstract database SCOPUS <http://www.elsevierscience.ru/products/scopus/>

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

1. The set of lectures on the course “Radiology” _____
2. The laboratory workshop (if any) on the course “Radiology”
3. The guidelines for writing a course paper / project (if any) on the course “Radiology”.
4.

* 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 (GPC-4, GPC-5, 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).

DEVELOPER:

Department of Oncology and Diagnostic Radiology

Associate Professor _____ G.M.Zapirov _____
Position, department name, initials, surname)

Head of the Department: _____ Academician, Professor A.D. Kaprin,

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