

THEMATIC PLAN

for lecture classes

3rd year of medical faculty, medical-diagnostic faculty and faculty of foreign students
studying on specialities

7-07-0911-01 'Medical Business', 7-07-0911-04 'Medical and Diagnostic Business',
in the discipline 'Radiation and Environmental Medicine'.

2024-2025 academic year

Name of topics, content of lectures
Section 2 'Radiation Medicine' 5th semester
1 Introduction. Physical basis of the action of ionising radiations 1. Radiation medicine: concept, goals, objectives, methods. The role of radiation factor in human life and biosphere. 2. Classification of ionising radiations, their properties. The essence of the phenomenon of radioactivity. 3. Law of radioactive decay. Interaction of electromagnetic and corpuscular radiations with matter. 4. Methods of registration of ionising radiations. 5. Dosimetry. General and individual dosimetry. Biological dosimetry
2. Levels of population exposure 1. Natural radiation background, characterisation of natural sources of ionising radiation of terrestrial and cosmic origin. 2. Radon, its sources, formation of population exposure doses due to radon. Optimisation of dose loads due to radon and its decay products. 3. Technogenic-altered radiation background, its components and their contribution to the formation of radiation doses to the population. 4. Formation of dose loads of the population under conditions of normal operation of a nuclear power plant (NPP). 5. Radiation situation in the Republic of Belarus after the Chernobyl NPP accident
3. Fundamentals of radiobiology 1. The problem of radiosensitivity is the central problem of radiobiology and radiation medicine. Theories explaining the radiobiological paradox. 2. Molecular basis of radiosensitivity. 3. Radiosensitivity of cells, organs and tissues. Bergonier-Tribondeau rule. 4. Action of ionising radiation on various organs and systems. Individual and age differences in radiosensitivity. 5. Action of radiation on embryo and foetus. 6. Modification of radiosensitivity. The concept of 'critical organs'.
4. Radiation lesions of a person 1. Deterministic effects of exposure: concept, dose dependence, characterisation of

effects.

2. Classification of radiation lesions. Acute radiation sickness. Clinic and basics of treatment. Chronic radiation disease. Clinic and basics of treatment. Local radiation lesions.

3. Stochastic effects of irradiation: the concept of 'low doses of ionising radiation', dose dependence. Somato-stochastic and genetic effects.

4. Linear threshold concept. The concept of radiation risk. Methodology of radiation risk assessment. Radiation hormesis.

5. Changes in the state of health of the population of the Republic of Belarus under chronic low-dose irradiation.

5. Radiation safety control

1. International and national regulatory and management bodies in the field of radiation safety. Basic principles of radiation safety assurance. Types of sources.

2. Notion of radiation accidents. Restriction of population exposure under conditions of a radiation accident. Normative-legal regulation in the field of radiation safety.

3. Reduction of dose loads on the population when using ionising radiation sources in medicine.: normative documents regulating patient exposure; categories of subjects; dose control levels for patients; forms of individual patient doses accounting; organisational, methodological and technical measures allowing to reduce the dose received by the patient.

4. Dose reduction measures carried out at the state level. Recommendations on reduction of individual doses and acceleration of radionuclide elimination from the organism