[Medicinski fakultet u Rijeci]

Curriculum
2021/2022

[Za kolegij]

Radiation Protection of Population and Environment from Ionizing Radiation

Study program:	**Medical Studies in English (R)** (elective) [Sveučilišni integrirani prijediplomski i diplomski studij]
Department:	**[Katedra za nuklearnu medicinu]**
Course coordinator:	**izv. prof. dr. sc. Bogović Crnčić Tatjana, dr. med.**
Year of study:	**3**
ECTS:	**1.5**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**No**

Course information:

OBJECTIVES OF THE COURSE: This is an elective course designed to encounter students with open ionizing radiation sources available in nuclear medicine department (radionuclides, RN). Having in mind future general practitioners, the objective is to teach students about possible danger for people and our environment arising from ionizing (predominantly gamma) radiation, emphasizing the knowledge about the methods and rules of behaviour designed for protection of professionals, patients and environment and solving contamination incidents. Hybrid imaging (SPECT/CT, PET/CT) is introduced, with consequences regarding radiation protection. Preventive measures are discussed, including a handling and storage of radioactive waste. The legislature on radiation protection is presented.

COURSE DESCRIPTION: The basic physics of ionizing radiation, radioactive decay, production of radionuclides, and specific RNs used in NM are studied. Interactions of ionization with matter, including persons and environment are discussed. A lecture is given on basic points in radiation dosimetry introducing absorbed, equivalent and effective doses, stochastic and deterministic biological effects on persons and population. Radionuclides used in nuclear medicine are demonstrated, their production (generator, cyclotrons), storage and clinical (diagnostic and therapeutic) use. Complexity of radiation exposure arising from hybrid imagining is mentioned. Methods and rules in radiation protection are being demonstrated in «hot laboratory», contamination and decontamination concept, specifically for persons, patients and environment. Legal international regulations are presented (“Basic safety standards” issued by IAEA and COUNCIL DIRECTIVE 2013/59/EURATOM), including effective dose limits for professionals and population.

BASIC COMPETENCIES: A student should acquire knowledge that will enable him/her to estimate possible risks arising from the ionizing radiation used in routine diagnostic and therapeutic procedures in nuclear medicine. This is accomplished by understanding and using terms: absorbed, equivalent and effective dose. Radiation protection measures and procedures for solving or minimizing the consequences of accidental contamination of persons and environment should be adopted, which students may implement in their future professional work.

SPECIFIC COMPETENCIES: As students are not allowed to handle radioactive sources (according to the radiation protection legislature), the education is limited to demonstration of work with RN and instructions on specific procedures (use of radiation detectors) in radiation protection.

COURSE STRUCTURE:

Lectures: 8 hours

Seminars: 13 hours

Practicals: 4 hours

Total hours: 25

List of assigned reading:

1. Lectures, IAEA publication 2004 (Radiation, People and the Environment)

2. Fred A. Mettler Jr., and Milton J. Guiberteau. Essentials of Nuclear medicine and Molecular imaging, Seventh edition, 2019 by Elsevier, Inc. Chapters:1, 2, 4, 13.

List of optional reading:

OPTIONAL/ADDITIONAL READING:

1. RADIATION PROTECTION AND SAFETY IN MEDICAL USES OF IONIZING RADIATIONR. IAEA SAFETY STANDARDS SERIES No. SSG-46, Vienna 2018. (International Atomic Energy Agency, 2018. | Series: IAEA safety standards series, ISSN 1020–525X ; no. SSG-46 .UDC 614.876 | STI/ **PUB/1775**)
2. COUNCIL DIRECTIVE 2013/59/EURATOM. Official Journal of the European Union, 17.1.2014.

Curriculum:

Student obligations:

STUDENTS' OBLIGATIONS**:**

The attendance at lectures, seminars and practicals is mandatory. If necessary, a student can be absent from 30% of the classes of the overall course workload, but has to make up for the practicals and seminars he/she failed to attend. Students' obligation is active participation in all practicals and seminars.

During the classes, students are required to prepare one seminar presentation (Power Point Presentation, max 7 slides) on the given seminar topic (S 1, 2, 3, 4, 5, 6) and present it during seminars. After the class, the seminar presentation should be submitted as Power Point document in electronic form. Students are required to actively participate in discussion during seminars. Seminars will be evaluated. Successful completion of seminar is mandatory for taking final oral exam. If student does not satisfy, he/she will have the opportunity to repeat the presentation of the seminar paper.

Exam (exam taking, description of the written/oral/practical part of the exam, point distribution, grading criteria):

EVALUATION OF STUDENTS' WORK:

Students can obtain a total of 100 credits, half form seminar work, and half on oral exam.

Seminar work	Max.50
Final (Oral) exam	Max. 50
Total score	Max. 100

On the final exam, which is worth 50 credits, a student must obtain at least 10 credits (sufficient grade).

Assessment of the seminar work and final (oral) exam:

Sufficient	10-20
Good	21-30
Very good	31-40
Excellent	41-50

The ECTS grading system is defined by the following criteria:

A (5)	90 - 100 credits
B (4)	75 – 89.9 credits
C (3)	60 – 74.9 credits
D (2)	50 – 59.9 credits

Other notes (related to the course) important for students:

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COURSE HOURS 2021/2022

Radiation Protection of Population and Environment from Ionizing Radiation

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List of lectures, seminars and practicals:

EXAM DATES (final exam):
