

**ACADEMIC STANDARD  
FOR THE *NUCLEAR MEDICINE* COURSE**

**1. Aim of the course**

The main aim of the course in NUCLEAR MEDICINE (NM) is profound introduction to contemporary diagnostic and therapeutic nuclear-medical methods. NM is part of the interdisciplinary approach in clinical oncology. It occupies an important place in the diagnosis of malignant diseases (solid tumors and oncohematological diseases in children and adults), in evaluating the therapeutic response, as well as in the treatment of thyroid gland pathology and metastatic bone disease.

**The aim is in compliance with:**

- ✓ the university's mission and concept;
- ✓ the volume and credit rating of the course (ECTS system), as shown in the curriculum;
- ✓ the qualification characteristic of the program,
- ✓ the academic degree - Master.

The aim is consistent with the place of the course in the program in terms of its significance and chronology in the curriculum. This is a summarizing and upgrading course included in the curriculum of medical students.

**2. Content of the course**

The content of the course syllabus is arranged chronologically in such a way that each subsequent lecture and related clinical cases to include material and concepts that have been already studied and discussed. The unnecessary overlapping of close disciplines is avoided; here, the aim is upgrading and updating of oncological knowledge.

**3. Prerequisites**

Students must have a basic knowledge of physics, biophysics, pharmacology, internal medicine in order to upgrade their knowledge during the course. NM is part of the general training and the radiology exam for medical students. The exam is held jointly with the Department of Radiology.

**4. Academic resources**

The academic staff of the Department comprises of two academic lecturers and 6 non-academic lecturers, one of them holding a doctoral degree in the relevant doctoral program. All lecturers from the relevant section have specialized in nuclear medicine.

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The lectures are delivered by an academic lecturer with a doctoral degree (Doctor of Science) in the respective doctoral program. Up to 30% of the lectures are awarded to non-academic lecturers with a doctoral degree in the relevant doctoral program.

Practical seminars are conducted by non-academic lecturers (assistants, chief assistants). Non-academic teachers hold a Master's degree in Medicine and are appointed after a competition.

#### **5. Material resources**

The Department of Clinical Oncology at the Medical Faculty - Medical University, Plovdiv, has four lecture halls; two of them are equipped with TVs for multimedia training.

#### **6. Lecture training**

The lectures are prepared and delivered in the form of interactive multimedia presentations, in order to facilitate the learning of the contemporary material. The lead lecturer chooses the volume and format of the lectures.

#### **7. Practical seminars**

They are held in groups. Methodological guidelines developed in the department as well as manuals are provided for the seminars. Independent and team tasks are assigned. The students' progress is checked, as well as the results achieved (knowledge and skills acquired) from a specific seminar. Students are assigned homework tasks, then discussions are held within the group - the reporting student defends their clinical thesis and discusses the solution offered to the diagnostic/therapeutic issue.

#### **8. Information Resources**

The lecturers have at their disposal ready lectures and seminars for this course. Where appropriate, theses in electronic version of the lectures, as well as other teaching materials, can be provided. A list is provided of the main recommended literature for the course, for each of its components (lectures, seminars), with priority to the modern available sources. Internet resources are also recommended, where students may find suitable materials.

#### **Text books**

1. Medical Oncology, edited by K. Timcheva, E. Krasteva, V. Tsekova, Sofia 2012. ISBN 978-954-553-145-3
2. Radiation and Oncology. Rolf Zauer, 2008.
3. Nuclear medicine therapy /Ed. Janet F. Eary, Winfried Brenner - New York: Informa, 2007 - 200 p.

4. Chandra, Ramesh Nuclear medicine physics: The basics / Ramesh Chandra. - 5th ed.: Williams & Wilkins, 1998-182 p.
5. Atlas of renal scintigraphy = Atlas scintigraphy ledvin - Praha : Agentura pancrac´ spol., 2002 - 72 p.
6. Harrison's Hematology and Oncology (Harrison's Specialties), Dan L. Longo (Author), McGraw-Hill Medical; 1 edition, 2010
8. CardioOncology or Oncocardiology - modern issues of diagnosis and treatment. Edited by Z. Grudeva-Popova, Plovdiv, 2012 ISBN 978-954-9549-58-4
9. Anemia in malignancies I. Nenova, Z. Grudeva-Popova, Plovdiv 2016. ISBN 978-619-7085-62-4
11. Collection of clinical oncology tests. Edited by Z. Grudeva-Popova, Plovdiv, 2017 ISBN 978-619-7085-97-6
12. Collection of Clinical Oncology tests. Edited by prof. Zhanet Grudeva-Popova. Plovdiv 2018 ISBN 978-619-237-012-1

#### **9. Tests**

Ongoing control of students' knowledge is carried out by means of a test exam after completion of each module (section). At the next seminar the students are provided with timely information as well as explanations of the results achieved at the test. This discussion facilitates further vocational training. The results of these tests are included as a component in the final mark for the semester.

#### **10. Independent preparation and extracurricular activity of students**

Students' independent work and consultations are organized by an assistant according to a pre-announced schedule. One of the purposes of extracurricular activity is to provide opportunity for work with students who show interest in the specialty. Students are consulted on the use of professional literature resources as well as on the methods for mastering them. Students are also provided with materials for self-study.

#### **11. Collaboration between teachers and students**

Quality collaboration and personal example of the lecturer (competence, charm, teamwork, professionalism, etc.) are important prerequisites for success when working together with young people. The cooperation is expressed in lecturer's commitment towards the students as well as in his/her preliminary preparation for overcoming current difficulties



related to the mastering of the material; use of consultation classes; involving students in club activities and collaborative research.

## **12. Exams**

The ongoing marks, as provided for under the curriculum for the course, are given based on the results at the test exams after each module; the participation during seminars and level of preparedness are also taken into consideration.

## **13. Evaluation Standards**

The level of students' knowledge in Nuclear medicine, as a course included in the curriculum of Medical Faculty - Medical University, Plovdiv, is evaluated by marks, divided into two main elements:

**The first one** represents the mark obtained by the students for their academic activity during the semester with regard to the completeness and quality of their individual performance as laid down in the course syllabus.

**The second one** represents the mark obtained at the course exam. The regulation for conducting the examination is also important in order to minimize the possibility of manipulation of its results.

Clear evaluation standards are developed for this course. Based on the above, a certain characteristic corresponds to each mark obtained at the exam:

✓ **Poor (2)** is given to students with scarce knowledge that cannot serve as a basis for acquiring a master's degree;

✓ **Fair (3)** is given to students who reproduce knowledge in "a ready scheme" that lacks key and important points of the thesis developed; there is a lack of willingness to use the clinical knowledge and professional competences acquired so far; there are serious terminological gaps;

✓ **Good (4)** is given to students who demonstrate limited independence in using the knowledge and professional competencies acquired so far; although their presentation is linguistically appropriate, there are a number of discrepancies in the concepts used in it.

✓ **Very Good (5)** is given to students who develop the topic independently, efficiently and non-conventionally; who seek a new algorithm and analysis of the literature used; who make an attempt to create and substantiate their thesis; who adequately use the concepts of the scientific field of the course studied; who demonstrate appropriate linguistic and medical terminology knowledge;

✓ **Excellent (6)** is given to students who substantiate their thesis independently, logically, with the presence of a creative element; who reasonably and originally use and interpret the literature related to the question asked; who demonstrate readiness to apply the knowledge and professional competencies acquired so far; their presentation is characterized by accuracy and rich linguistic knowledge.

At the beginning of the academic course, students need to be informed about the evaluation standards, procedures for carrying out ongoing control and opportunities for receiving feedback on their progress during the semester.

#### **14. Formation of the final mark**

The final mark determines the extent to which students have achieved the aim of the training set at the beginning. It is multi-component and includes a mark from a final exam (written or oral) and a mark from an ongoing control.

For each component included in the final mark, a significance coefficient (0 to 1) is determined; the total sum of the coefficients must always equals 1. The final mark is calculated as a sum of the marks, based on the six-grade system, of the different components, multiplied by the relevant significance coefficients.

$$Q (\text{final mark}) = (k1 \times Q1) + (k2 \times Q2) + (k3 \times Q3)$$

k1 = 0.30 coefficient for part I of the test;

k2 = 0.30 coefficient for part II of the test;

k3 = 0.40 coefficient for open test questions;

Q1 = mark for part I of the test;

Q2 = mark for part II of the test;

Q3 = mark for the open test questions;

If one of the components of the final exam is Poor (2), the final mark is always Poor.

#### **16. Documentation, storage of results and monitoring of evaluation**

Students, that have been evaluated, have the right, and the obligation, to get acquainted with the regulation, procedures and results of the evaluation; they also may submit claims and complaints in case of non-compliance with these rules.

The student's right within the meaning of the preceding paragraph is in force in case of identified technical discrepancies or errors (e.g. in calculating or entering the marks) as well as where there are serious grounds for doubting mismatch between the knowledge, skills and competences and the final mark received.

Adjustments to the marks and their entry in the student's book, examination report or the relevant record book are allowed to be made only by the lead lecturer.

Any disputes or claims carried out by students are made in writing, to the evaluating team; the team, on the other hand, is obliged to give a reasoned reply by the end of the next business day.

Any identified and proven serious violation of the students' rights in the process of evaluating their knowledge, skills and competences are addressed by a written complaint to the Deputy rector of QA (Quality and Accreditation).

Examination papers are stored and students are given an opportunity to get acquainted with them as well as with the reasons for the mark received in accordance with the rules and procedure announced in advance. The period during which students are provided access to examination papers and results shall be no longer than 3 (three) business days after the date of the examination.

The characteristics of the course are presented to the students at the beginning of the training. This is in compliance with the Higher Education Act, art. 56, para.1, "*the lecturers are obliged to develop, and provide in an appropriate manner the information about their lecture course, including titles and sequence of topics in the educational content; recommended literature; way of evaluation and methods of checking knowledge and skills*".

**HEAD OF DEPARTMENT:**  
**PROF. DR. ZHANET GRUDEVA-POPOVA**

