**TEACHING PLAN**

The nuclear medicine course comprises **30**school lessons: 15 lectures and 15 practical exercises. Practicals are organized in three or four separate groups, and therefore the overall number of practicals is 47. Attending of practical exercises is obligatory; the lectures are not obligatory, but the attendance enables student to gain additional points for activity during the course.

It is necessary that students have their nuclear medicine card (document obtained from administrative stuff) with them during lectures, practicals, colloquium and final exam in nuclear medicine. All attended lectures, practicals, as well as the colloquium and final exam results, will be registered in this student's document.

**THEORETICAL TEACHING (15 hours of lectures)**

1. **Introduction to nuclear medicine.**Basic principles of nuclear medicine.  Production of radioactivity. Radiopharmaceutical chemistry. Radiation safety. (1 lesson)
2. **Instrumentation in nuclear medicine.**Radiation detector systems. Imaging systems (Scintillation camera and SPECT). Static and dynamic acquisition and data processing. (1 lesson)
3. **Positron emission tomography (PET).**  Physics and chemistry of PET imaging. PET instrumentation and methodology. Hybrid imaging systems. (1 lesson)
4. **Molecular investigations in nuclear medicine.**Application of radio-labeled imaging agents in the investigations of the cell processes. (1 lesson)
5. **Nuclear medicine in neurology.**Morphological, hemodynamic, metabolic and functional investigations of the central nervous system**.** (1 lesson)
6. **Nuclear medicine in cardiology.**Hemodynamic, functional and morphological investigations of the heart. PET/CT in the investigation of perfusion and metabolism in the heart (1 lesson)
7. **Lung investigations in nuclear medicine.**Perfusion and ventilation lung studies. PET/CT in the investigation of lung and pleura (1 lesson)
8. **Nuclear medicine in nephrourology.**Urodynamic, hemodynamic, functional and morphological investigations of urinary system. PET in urological oncology. PET in nephrology (1 lesson)
9. **Nuclear medicine in the investigations of the musculoskeletal system.** Functional and morphological investigations of the bones and joints. PET in the management of bone tumors. (1 lesson)
10. **Pediatric Nuclear Medicine.**Nuclear medicine procedures in children.Common indications and considerations.Hybrid imaging in children. (1 lesson)
11. **Nuclear medicine in hematology.**Functional and morphological investigations in hematology**.** PET in the diagnosis of lympho-proliferative and myelo-proliferative diseases. (1 lesson)
12. **Nuclear medicine in endocrinology.**Functional and morphological investigations of endocrine system. Pet in endocrinology. (1 lesson)
13. **Nuclear medicine in gastroenterohepatology.** Functional and morphological investigations of liver, spleen and digestive system**.** (1 lesson)
14. **Nuclear medicine in infections and inflammations.**Specific radiopharmaceuticals and mechanisms of their accumulation in the inflammatory and infective lesions. (1 lesson)
15. **Nuclear medicine in oncology. Radionuclide therapy.** Mechanism of radiopharmaceutical accumulation in the tumor tissue. Principles of teranostics. (1 lesson)

**PRACTICAL TEACHING (15 practical for three (four) groups of students, overall 47**

 **practicals):**

1. **Instrumentation.** Acquainting with the nuclear medicine instrumentation. (1 lesson)
2. **Static, dynamic and tomography investigations in nuclear medicine.** Acquainting with the basis of the acquisition and processing of the static, dynamic and tomography studies. (1 lesson)
3. **Procedures for PET Studies.** Acquainting with the patient preparation and scanning considerations for PET.(1 lesson)
4. **Molecular imaging in nuclear medicine.** Application of PET and SPECT in the imaging of cell processes. (1 lesson)
5. **PET and SPECT methods in the brain investigation.** Demonstration of brain PET and SPECT scans. (1 lesson)
6. **Perfusion myocardial scintigraphy and radionuclide ventriculography. PET/CT in the investigation of perfusion and metabolism in the heart.** Demonstration of typical cases. (1 lesson)
7. **Perfusion and ventilation lung scintigraphy.  PET/CT in lung carcinoma.** Demonstration of typical cases. (1 lesson)
8. **Static and dynamic kidney scintigraphy.  PET in uro-oncology. Hybrid imaging of prostate carcinoma.** Demonstration of the characteristic findings**.** (1 lesson)
9. **Bone scintigraphy. PET in malignant and benign bone diseases.** Demonstration of characteristic cases. (1 lesson)
10. **Pediatric nuclear medicine procedures.** Demonstration of the typical findings. (1 lesson)
11. **Functional and scintigraphic investigations in hematology. PET of lymphoma.** Demonstration of the results of functional and scintigraphic investigations in hematology. (1 lesson)
12. **Functional and scintigraphic investigations of the thyroid, parathyroid, suprarenal glands and neuroendocrine tumors.** Demonstration of the characteristic scintigrams of the thyroid, parathyroid, suprarenal glands and GEP NET.(1 lesson)
13. **Scintigraphic methods in gastroenterology, liver and spleen  investigation.   PET of gastrointestinal tumors.** Demonstration of the characteristic cases. (1 lesson)
14. **Investigations of infection and inflammation.** **Fever of unknown origin.** Demonstration of results.(1 lesson)
15. **Application of radionuclide therapeutic agents.** Demonstration of clinical cases**.** (1 lesson).