

**DEPARTMENT OF NUCLEAR MEDICINE
POMERANIAN MEDICAL UNIVERSITY IN SZCZECIN**

The name of Unit in which the subject is realized
Department of Nuclear Medicine

Head
Bożena Birkenfeld MD, PhD, Prof. PUM

Total hours:
20 hours include:
6 hours seminars
14 hours classes

ECTS: 1

The aim of nuclear medicine course is to provide the basic information concerning use of radionuclides in clinical practice. The knowledge will be helpful in understanding of diagnostic and therapeutic procedures and clinical guidelines which includes scintigraphy and radionuclide therapy in the process of patients management. Students receive basic information about physics, radioactivity, nuclear medicine instrumentation. Functional imaging and metabolic approach applied in everyday practice will be stressed especially.

The seminars are to introduce general aspects and concepts of functional diagnostics and radionuclide therapy in oncology, endocrinology, neurology, orthopaedics, paediatrics, nephrourology and internal medicine. The subjects also includes basics of radiopharmacy, radiation protection, in vitro diagnostic using radionuclides and hybrid imaging (PET/CT and SPECT/CT).

According to Polish law students are not allowed to work with open sources of radioactive compounds because of radiation protection rules. The practices are performed as demonstrations of instruments, generators, detectors, gammakameras and other equipment. During the classes attention is focused on presentation of the studies, nuclear medicine imaging results, discussions and case reports.

PROGRAM OF NUCLEAR MEDICINE

Physical background of nuclear medicine.

- Structure of the atom
- Radioactive decay
- Particle and photon interaction with the matter
- Radiation protection

Diagnosis and therapy of thyroid diseases.

- Introduction: repetition of anatomy and physiology of thyroid diseases.
- Physiology and pathology of hypothalamic-pituitary-thyroid axis
- Diagnosis of thyroid function in radioisotope methods:
 - in vitro
 - in vivo (scintigraphy)
- Treatment of thyroid diseases with iodine I-131

- Thyroid cancer in radioisotope diagnosis and therapy
- Thyroid scans in clinical context.

Clinical nuclear medicine part I.

- Bone scintigraphy
- Radionuclide metastatic bone pain palliation

Clinical nuclear medicine part II.

- Myocardial perfusion scintigraphy
- PET/CT clinical indications
- Sentinel lymph node detection lymphoscintigraphy
- Gastrointestinal tract investigations

Detection and measurements of nuclear radiation. Radionuclide imaging techniques.

- Detectors used for radioactivity measurement
- Gamma counting systems
- Single-photon emission-computed tomography
- Positron emission tomography

Radionuclide therapy

- Indications for radionuclide therapy
- Dosimetry
- Radionuclides for therapy
- Radionuclide treatment ward.

Clinical nuclear medicine part III.

- Central nervous system scintigraphy
- Renal scintigraphy,
- Scintigraphy of pulmonary embolism
- Parathyroid imaging
- Scintimammography

In vitro diagnostic methods.

- Quality assurance of radiopharmaceuticals
- Isotopic and non-isotopic immunoassays methods used in current laboratory practice.
- Rationale for thyroid diseases diagnosis-clinical application of appropriate laboratory testing
- The clinical assessment of laboratory testing
- The role of laboratory testing in diagnosis and treatment in up-dated medicine (neonatal testing, tumours markers)

Clinical nuclear medicine part IV.

- Imaging in osteomyelitis and arthritis
- Septic loosening of endoprosthesis
- Infection of vascular graft
- Fever of unknown origin problem
- Multimodality imaging SPECT/CT, PET/CT
- Lymphoscintigraphy. Sentinel lymph node biopsy.

Radiopharmacy. Radiation protection

- Radionuclide generators of short-lived nuclides
- Radiopharmacy laboratory design
- Production of radiopharmaceuticals

- Fundamentals of radiation biology
- dose limits for staff and patients, safety of staff and patients

TEXTBOOKS

1. *Stedman`s Medical Dictionary* - terms and definitions
2. Simon R. Cherry, James A. Sorensen, Michael E. Phelps - *Physics in nuclear medicine*.
3. Peter J. Ell, Sanjiv Sam Gambhir – *Nuclear Medicine in Clinical Diagnosis and Treatment*.
4. Kathryn A. Morton, Paige B Clark et al. – *Diagnostic Imaging, Nuclear Medicine*.
5. Gustav K. von Schulthess - *Molecular Anatomic Imaging*.
6. James H. Thrall, Harvey A. Ziessman – *Nuclear Medicine, The Requisites*.
7. Emilio Bombardieri, John Buscombe, Giovanni Lucignani, Otmar Schober – *Advances in Nuclear Oncology*.
8. Dominique Delbeke, Ora Israel – *Hybrid PET/CT and SPECT/CT Imaging*.
9. Richard L. Wahl, Ora Israel – *Atlas of PET/CT and SPECT/CT*.

NUCLEAR MEDICINE COURSE – REGULATIONS

1. Nuclear medicine course is obligatory for IV year students of Pomeranian Medical University Faculty of Medicine at total number of 20 hours (seminars and classes).
2. Seminars and classes are run at the premises of the Department of Nuclear Medicine. Knowledge of elementary physics is necessary.
3. Presence during all seminars and classes, positive result of written test taken at the end of the course are necessary to obtain credit of the subject. Absences must be cleared before the final test.
4. Pregnant students can postpone nuclear medicine course and complete it next year (during V year of study).