



Program Specification for Medical Doctorate Degree In Nuclear Medicine

Program type: Single

Department offering the program: Kasr El-Aini Center For Radiation Oncology And
Nuclear Medicine (NEMROCK)

Program Code: NUCM 925

Total credit points: 255 (163 for the master degree + 92 for MD degree)

Academic year: 2013/2014

Program Coordinator: Prof .Hosna Moustafa (Prof of Nuclear Medicine)

Assistant of the program coordinator: Lamia Zidan (Assistant Lecturer of Nuclear
Medicine)

External evaluators: xxx

I. Aim of Program

The program is an academic degree that enables candidates to provide training and research in the area of Nuclear medicine which is a clinical and laboratory medical specialty that uses radioactive and stable tracers to study physiologic, biochemical and cellular processes for diagnosis, therapy and research. The candidates should master clinical, interpretational and therapeutic skills related to Nuclear Medicine practice, interact with community problems, respect ethical values according to community culture, and promote their medical standards through engaging in continuing medical education. The candidate should acquire the scientific knowledge and skills that enables them to engage in medical education and scientific medical research.

II. Intended Learning Outcomes of Program (ILOs)

A. **Knowledge and Understanding:** By the end of the program the candidate should be able to:

- 1) Recognize the basic physiological, biochemical and pathological knowledge related to different nuclear medicine applications and procedures.
- 2) Recognize the fundamental concepts related to radiation protection and possible risks associated with irradiation during diagnostic and therapeutic application from a risk vs. benefit perspective.
- 3) Describe the fundamentals of nuclear medicine radiation physics and operation principles of the Gamma Camera, , hybrid imaging (PET/CT & SPECT/CT) systems.
- 4) Recognize the basics of sectional imaging anatomy and indicate its relevance to nuclear medicine practice with hybrid imaging systems (PET/CT and SPECT/CT)
- 5) Discuss the main concepts of nuclear medicine radio pharmacy related to clinical nuclear medicine practice involving imaging, non-imaging and therapy procedures.
- 6) Identify clinical aspects of various clinical disorders and describe in details its relation to diagnostic nuclear medicine applications.

7) Identify clinical aspects of various clinical disorders and describe in details its relation to therapeutic nuclear medicine applications.

8) Acquire advanced knowledge in one of the fields related to nuclear medicine (chosen by the candidate).

9) Select area of research in the field of nuclear medicine in MD thesis leading to development of new diagnostic procedures and innovative therapies.

B. Intellectual Skills: By the end of the program the candidate should be able to:

1) Analyze symptoms & signs and construct a differential diagnosis for various disorders related to nuclear medicine diagnostic applications.

2) Set up imaging or therapeutic protocols taking into account the different clinical and individual factors.

3) Able to assess the risk benefit of radiation dose introduced for diagnosis or therapy.

4) Employ the concepts related to radiation protection and design a radiation protection plans and guidelines related to the various diagnostic or therapeutic procedures.

5) Review the basic radio-pharmacy procedures related to clinical nuclear medicine practice involving diagnostic and therapy procedures.

6) Interpret nuclear medicine imaging studies and studies related to sectional anatomy and nuclear medicine hybrid imaging systems (PET/CT and SPECT/CT).

7) Acquire advanced experience in one of the basics fields related to nuclear medicine (chosen by the candidate)

C. Professional and Practical Skills: By the end of the program the candidate should be able to:

1) Identify common functional and structural changes related to neoplastic and non-neoplastic disease processes and injury pertinent to nuclear medicine disorders.

2) Apply with adequate competence the basic knowledge related to nuclear medicine physics, radiation protection strategies, radio pharmacy, radiopharmaceutical preparation and administration to the patients.

3) Advise the referring physician on the most appropriate investigation and/or sequence of investigations for the presenting clinical problem.

4) Adapt the protocols to the needs and condition of the patient in diagnostic and therapeutic procedure.

5) Regulate the study analysis and interpretation of diagnostic study according to the clinical information.

6) Achieve a proficient level of interpretational skills in different diagnostic nuclear medicine applications including planar (static, dynamic & gated), SPECT/CT, PET/CT hybrid imaging.

7) Accurately locate and recognize anatomical structures of the central nervous system, head & neck genitourinary system, respiratory and cardio-vascular systems and digestive tract as demonstrated in sectional CT and MRI images.

8) Achieve a professional skill in different protocols of nuclear medicine therapy.

9) Acquire extra specific skills in one of the basics fields related to nuclear medicine (chosen by the candidate).

D. General and Transferable Skills: By the end of the program the candidate should be able to:

- 1) Communicate with other colleagues, researchers and health care providers in other specialities.
- 2) Can set up team working for research in both diagnostic and therapeutic fields of Nuclear medicine in field of oncology, cardiology and neurology.
- 3) Master extra computer skills necessary to make use of medical database and use the Internet for communication.
- 4) Show administrative and leadership skills that enables him to organize work and lead the junior staff.
- 5) Acquire abilities to train and teach students and junior staff members
- 6) Understand different scientific methodologies and have critical abilities to communicate with other specialty such radiology, oncology, nephrology, cardiologyext.
- 7) Write scientific article according to the basics of scientific research.

III. Academic standards

1. Academic reference standers: The academic standers of anatomy program is adopted and accredited by the departmental council
2. External References for Standards:
 - Syllabus for postgraduate specialization in Nuclear Medicine: European Union of Medical Specialists (UEMS) Educational & Syllabus Committee: 2006/2007 update. Cuocolo A, Milcinski M, Bischof Delaloye A. Eur J Nucl Med Mol Imaging (2010) 37:430–433
 - Objectives of training in nuclear medicine. The Royal College of Physicians and Surgeons of Canada.

IV. Program Admission Requirements

According to the Faculty of Medicine, Cairo University Bylaws for Post Graduate Programs (July 2009), applicants should have a Master degree in NM accredited or in the same specialty. Admission to the program is open during January and July. The training prior to registration may be accredited according to departmental and hospital evaluation.

V. Program Structure and Contents

Program duration: Two – Three academic years.

Program structure: Total Credit points 150 (Table 1)

- **Previous Master degree:** **163 points**
- **Compulsory courses; two academic year (30 weeks each)** **92 credit points**
 - Nuclear Medicine Technology 3 points
 - Diagnostic Nuclear Medicine 6 points
 - Therapeutic Nuclear Medicine and PET application 5 points
- **Elective courses (choose only one course)** **4 credit points**

○ Radiologic CT and MRI	4 points
○ Nuclear Medicine in skeletal system	4 points
○ Nuclear Medicine in Cardiology	4 points
- **Scientific activities** **2 credit points**
- **Residency training program Part 3** **32 credit points**
- **Medical Doctorate Thesis:** **40 credit points**

Table 1: Courses, Credit Points and ILOs

Courses		Credit Points		ILOs
Code	Title	CPs	Total	
Previous master degree		163		
Compulsory courses (two - Three academic year)		92		
NUCM925NMT	Nuclear Medicine Technology	3	12	A ₅ , A ₆ , A ₇ , A ₈ , A ₉ , A ₁₀ B ₃ , B ₄ , B ₅ C ₂ , C ₄ , C ₅
NUCM925DNM	Diagnostic Nuclear Medicine	6		A ₁ , A ₂ , A ₄ , A ₁₀ B ₁ , B ₂ , B ₆ , B ₇
NUCM925TNM	Therapeutic Nuclear Medicine	5		C ₁ , C ₃ , C ₄ , C ₆ , C ₇ , C ₈ , C ₉
Elective courses choose only one course				
NUCM925 CT	Radiologic CT	4	4	A ₁ , A ₂ , A ₄ , A ₁₀ B ₁ , B ₂ , B ₆ , B ₇ C ₁ , C ₃ , C ₄ , C ₆ , C ₇ , C ₈ , C ₉
NUCM925PET	PET in Nuclear Medicine	4		
NUCM925CARD	Nuclear Medicine in Cardiology	4		
Scientific activities				
Scientific activities		2		A ₃ , D ₁ , D ₂ , D ₅ , D ₆ , D ₇
CLINICAL TRAINING PROGRAM				
NUCM925C	Advanced training	32		B ₁ , B ₂ , B ₃ , B ₄ , B ₅ , B ₆ , B ₇ C ₁ , C ₂ , C ₃ , C ₄ , C ₅ , C ₆ , C ₇ , C ₈ , C ₉ D ₁ , D ₂ , D ₃ , D ₄ , D ₅
Thesis				
Thesis		40		A ₃ , A ₄ B ₇ C ₉ D ₁ , D ₂ , D ₃ , D ₆ , D ₇

Residency Training Program

- **Third Phase:**

According the Faculty of Medicine, Cairo University Bylaws for Post Graduate Programs (July 2009), the duration of the advanced training is 24 months. All the students should spend at least 18 months in the nuclear medicine department. They may spend electively 6 months in other departments or centers either at Cairo university hospitals or elsewhere. During this period the students will attend the outpatient clinics in oncology and endocrine department, share in the academic

activities and prepare his thesis and participate in the scientific activities of the department.

NB: The details of the training program are provided in separate document. The third phase of residency training (advanced training) is part of the MD degree

Medical Doctorate Thesis

All MD students should prepare a thesis in a topic related to nuclear medicine applications. The department and the ethical committees must approve the protocol of the research. The thesis should include a review part and a research part. The Thesis is supervised by one or more senior staff members from the nuclear medicine department and may include other specialties according to the nature of the research. The thesis should be evaluated and approved by a committee of three professors including one of the supervisors and an external professor. Approving the thesis is mandatory to allow the student to sit for the final exam.

Scientific Activities

The students should actively participate in the scientific activities of the departments such as:

- *MD discussion group*
- *Journal club.*
- *Seminars (including recent topics and controversial issues). Students are expected to participate in the discussions.*
- *Scientific meetings arranged by the department.*

Each activity is monitored and given credit points registered in a special section in the residency-training logbook. The student should collect the required points before allowed to sit for final exam.

VI. Regulations for Progression and Program Completion

After collecting the required credit points for the respective courses, the advanced residency training, the scientific activities, and the thesis the student will be eligible to sit for the final examination. In case the student fails to pass the examination, he/she may resubmit for the next examination. The candidate will receive his/her degree after passing this final examination. MD degree should be obtained within a maximum of 6 years after registration date.

VII. Assessment

A: Assessment Tools

- **Supervision and Monitoring of Training Program**

According to the Faculty of Medicine, Cairo University Bylaws for Residency Training Programs, coordinators carry continuous assessment during the program. A residency training logbook including scientific activities will be kept for each student to document all his/her clinical, laboratory and/or operative activities as well as his/her participation in different scientific activities. The head of the department should allow the students to undergo the final examination when they complete their training program and collect the credit points needed with at least 70% of attendances.

- **Formal Assessment**

According to the Faculty of Medicine, Cairo University Bylaws for Post Graduate Programs (July 2009). Students should be assessed at the end of the program.

- **Nuclear Medicine Technology**: one written exam (Three hour) including short essay questions, and MCQ (including problem solving) + oral exam + clinical exam
- **Nuclear Medicine Diagnosis**: one written exam (Three-hours) including short essay questions, and MCQ (including problem solving) + oral exam + clinical exam and practical exam.

Nuclear Medicine Therapy: one written exam (Three-hours) including short essay questions, and MCQ (including problem solving) + oral exam + clinical exam .

- **Elective course**: one and half hour written exam including short essay and multiple choice questions) + oral exam

B: Assessment Schedule:

The written exam will be held in April/October (four days):

Day one: Nuclear Medicine Technology

Day two: Nuclear Medicine Diagnosis

Day three: Nuclear Medicine Therapy

Day four: Elective Course

This will be followed by the clinical and oral exams in separate days

C: Weighing Of Assessment (Marks allocated to courses):

(50 marks for each credit point)

Courses		Marks				
Code	Title	Written	Oral	Practical	Clinical	Total
Compulsory course						
NUCM925NMT	Nuclear Medicine Technology	100	50	50	50	200
NUCM925DNM	Diagnostic Nuclear Medicine	100	50	200		400
NUCM925TNM	Therapeutic Nuclear Medicine and PET	100	50	100		250
Elective course						
only one course selected		50	50			100
Total						950

Remarks

- It is mandatory to pass all the papers of written exams separately.
- The passing mark in any written exam is $\geq 60\%$.

VIII. Evaluation of Program Intended Learning Outcomes

Evaluator	Tool	Sample
1. Senior Students	Questionnaire at the end of the program	All the PG students
2. Alumni	The faculty is currently developing an Alumni office for postgraduates	Not yet determined
3. External Evaluators	Review program and courses Attending the final exam	Once before implementation Bi-annual report
4. College Quality Assurance committee	Annual program reviewer	

Signatures**Date of approval by department:****Program Coordinators**

Prof Hosna Moustafa MD
(Prof. of Nuclear Medicine)

Lamia Zidan, MSc
(Assistant Lecturer of Nuclear Medicine)

Head of Department

Prof. Dr. Hamdy Abd El Azim
(Professor of Oncology and Radiation Therapy)