MASTER (MSC) DEGREE PROGRAM AND COURSES SPECIFICATIONS FOR NUCLEAR MEDICINE

(According to currently applied Credit points bylaws)

CLINICAL ONCOLOGY AND NUCLEAR MEDICINE

Faculty of medicine

Assiut University

2022-2023

Contents

Master degree of Nuclear Medicine

A. Basic Information

- **Program Title:** Master degree of Nuclear Medicine
- **Nature of the program: Single.**
- **Responsible Department:** Department of Clinical Oncology & Nuclear Medicine- Faculty of Medicine- Assiut University.
- **Program Academic Director (Head of the Department)**
  Prof. Samir Shehata
- **Coordinator (s):**
  - **Principle coordinator:** Ass Prof. Dr./ Iamiaa Mahmoud
  - **Assistant coordinator (s)** Ass prof. Dr./ Nadia Mahana
- **Internal evaluators: Ass Prof. Dr./ Waleed Ahmed**
- **External evaluator : Pro. Hosna Mostafa -Cairo University**
  Prof. Walid Omer-Cairo University
- **Date of Approval by the Faculty of Medicine Council of Assiut University: 23-9-2014**
- **Date of most recent approval of program specification by the Faculty of Medicine Council of Assiut University: 27-11-2022.**
- **Total number of courses: 7 courses + One elective course**

B. Professional Information

1- Program aims

1/1 To enable candidates to acquire satisfactory level of clinical skills, bedside care skills, in addition to update medical knowledge as well as clinical experience and competence in the area of nuclear medicine and enabling the candidates of making appropriate referrals to a sub-specialist.

1/2 Provide candidates with fundamental knowledge and skills of emergency nuclear medicine as regards; dealing with critically ill patients, techniques, indications, contraindications and training skills of different techniques in these cases.

1/3 To introduce candidates to the basics of scientific medical research.

1/4 Enable candidates to start professional careers as specialists in Egypt but recognized abroad.

1/5 To enable candidates to understand and get the best of published scientific research and do their own.

2- Intended learning outcomes (ILOs) *for the whole program*:

2/1Knowledge and understanding:

A. Explain the essential facts and principles of relevant basic sciences including Physics of Nuclear Medicine, Biological effects of radiation and protection, Pathology and Biochemistry related to Nuclear medicine.
B. Mention essential facts of clinically supportive sciences including Internal Medicine and general surgery related to Nuclear Medicine
C. Demonstrate sufficient knowledge of etiology, clinical picture, diagnosis, prevention and treatment of common diseases and situations related to Nuclear Medicine.
D. Give the recent and update developments in the pathogenesis, diagnosis, prevention and treatment of common diseases related to Nuclear Medicine.
E. Mention the basic ethical and medicolegal principles that should be applied in practice and relevant to the Nuclear Medicine.
F. Mention the basics and standards of quality assurance to ensure good clinical practice in the field of Nuclear Medicine.
G. Mention the ethical and scientific principles of medical research methodology.
H. State the impact of common health problems in the field of Nuclear Medicine on the society and how good clinical practice improves these problems.

2/2 Intellectual outcomes

A. Correlate the facts of relevant basic and clinically supportive sciences with clinical reasoning, diagnosis and management of common diseases and situations related to Nuclear Medicine.
B. Demonstrate an investigatory and analytic thinking approach (problem solving) to common clinical situations related to Nuclear Medicine
C. Design and /or present a case or review (through seminars/journal clubs) in one or more of common clinical problems relevant to the Nuclear Medicine.
D. Formulate management plans and alternative decisions in different situations in the field of the Nuclear Medicine.

2/3 Skills

2/3/1 Practical skills (Patient Care)

A. Obtain proper history and examine patients in caring and respectful behaviors.
B. Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment for common conditions related to Nuclear Medicine
C. Carry out patient management plans for common conditions related to Nuclear Medicine.
D. Use information technology to support patient care decisions and patient education in common clinical situations related to Nuclear Medicine.
E. Perform competently non invasive and invasive procedures considered essential for the Nuclear Medicine.
F. Provide health care services aimed at preventing health problems related to Nuclear Medicine.
G. Provide patient-focused care in common conditions related to Nuclear Medicine, while working with health care professionals, including those from other disciplines

H. Write competently all forms of patient charts and sheets including reports evaluating these charts and sheets (Write a consultation note, Inform patients of a diagnosis and therapeutic plan, completing and maintaining medical records)

2/3/2 General skills

Including:

- Practice-based Learning and Improvement
- Interpersonal and Communication Skills
- Professionalism
- Systems-based Practice

Practice-Based Learning and Improvement

A. Perform practice-based improvement activities using a systematic methodology (share in audits and risk management activities and use logbooks).
B. Appraises evidence from scientific studies.
C. Conduct epidemiological Studies and surveys.
D. Perform data management including data entry and analysis and using information technology to manage information, access on-line medical information; and support their own education.
E. Facilitate learning of students and other health care professionals including their evaluation and assessment.

Interpersonal and Communication Skills

F. Maintain therapeutic and ethically sound relationship with patients.

G. Elicit information using effective nonverbal, explanatory, questioning, and writing skills.
H. Provide information using effective nonverbal, explanatory, questioning, and writing skills.

I. Work effectively with others as a member of a health care team or other professional group.

Professionalism

J. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society

K. Demonstrate a commitment to ethical principles including provision or withholding of clinical care, confidentiality of patient information, informed consent, business practices

L. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

Systems-Based Practice

M. Work effectively in relevant health care delivery settings and systems including good administrative and time management.

N. Practice cost-effective health care and resource allocation that does not compromise quality of care.

O. Assist patients in dealing with system complexities.

3- Program Academic Reference Standards (ARS) (Annex 2)

Academic standards for master degree in Nuclear Medicine

Assiut Faculty of Medicine developed master degree programs' academic standards for different clinical specialties.

In preparing these standards, the General Academic Reference Standards for post graduate programs (GARS) were adopted. These standards sit out the graduate attributes and academic characteristics that are expected to be achieved by the end of the program. These standards were approved by the Faculty Council on 17-6- 2009. These standards were revised and approved without changes by the Faculty Council on 23-9-2014. These standards were revised and reapproved recently without changes by the Faculty Council on 27-11-2022.

4- Program External References (Benchmarks)

1. ACGME (Accreditation Council for Graduate Medical Education).
http://www.acgme.org/acWebsite/navPages/nav_Public.asp
2. ACR (American College of Radiology) "Nuclear Medicine fellow ship program"
(http://www.acr.org/SecondryMainMenuCategories/mbr_chapter/featuredCategories/mbr_svcs/fellowship_submit.aspx)

Comparison between program and external reference		
Item	**Nuclear Medicine program**	**American College of Radiology Nuclear medicine Fellowship Program**
Goals	Matched	Matched
ILOS	Matched	Matched
Duration	3-5 years	3 years
Requirement	Different	Different
Program structure	Different	Different

5. Program Structure and Contents

A. Duration of program: 3 – 5 years

B. Structure of the program:

Total contact number of credit points 180 point (20 out of them for thesis)

Didactic# 40 (22.2 %), practical 120 (66.7%), thesis 20 (11.1%), total 180

First part

Didactic 14 (35 %), practical 24 (60 %), elective course 2 CP (5%), total 40

Second part

Didactic 24 (20%), practical 96 (80 %), total 120

 # Didactic (lectures, seminars, tutorial)

According the currently applied credit points bylaws:

Total courses 160 credit point

Compulsory courses: 98.9%

Elective course: 2 credit point =1.25%

	Credit points	% from total
Basic science courses	24	13.3%
Humanity and social courses	2	1.1%
Speciality courses	134	74.5%
Others (Computer, …)		
Field training	120	66.7%
Thesis	20	11.1%

C. Program Time Table

A. Duration of program 3 years maximally 5 years divided into

- **Part 1: (One year)**

  Program-related basic science courses and ILOs

  Students are allowed to sit the exams of these courses after 12 months from applying to the MSc degree.

One elective course can be set during either the 1st or 2nd parts.

- **Thesis**

  For the MSc thesis;

  MSc thesis subject should be officially registered within 6 months from application to the MSc degree,

  Discussion and acceptance of the thesis could be set after 12 months from registering the MSc subject;

  It should be discussed and accepted before passing the second part of examination)

- **Part 2 (2 years)**

Program –related Speciality courses and ILOs

Students are not allowed to sit the exams of these courses before 3 years from applying to the MSc degree.

The students pass if they get 50% from the written exams and 60% from oral and clinical/practical exams of each course and 60% of summation of the written exams, oral and clinical/practical exams of each course

Total degrees 1900 marks.

700 marks for first part

1200 for second part

Written exam 40% - 70%.

Clinical/practical and oral exams 30% - 60%.

D. Curriculum Structure: (Courses):

Curriculum Structure: (Courses / units/ rotations):

Year 1

The first year of the fellowship is primarily for basic science related medical knowledge , internal medicine and general surgery (studied in Speciality courses over 12 months in collaboration with basic sciences department , Internal Medicine department and General surgery of Assiut Faculty of Medicine) and a clinical year during which the fellows gain experience with a wide variety of patients in inpatient and outpatient settings, develop proficiency in the performance and appropriate utilization of various procedures, and develop proficiency in the utilization and interpretation of nuclear medicine studies. Throughout the year, emphasis is placed on developing: 1) an understanding of basic mechanisms and pathophysiology of nuclear medicine related disease; 2) the ability to efficiently formulate clinical assessments and therapeutic plans; 3) the ability to critically analyze the relevant medical literature; and 4) skills in communicating with nursing and medical staff as well as house staff.

The first year fellow spends the year rotating among four different services: 1) Nuclear Medicine Wards at Assiut University Hospital; 2) Nuclear Medicine Unit at Assiut University Hospital; 3) Hot Laboratory for preparation and handling of radiopharmaceuticals in nuclear medicine unit at Assiut University Hospital; 4) Gamma Camera for imaging Procedures, Assiut University Hospital. These rotations are briefly described below.

Years 2 and 3

Although the primary focus of the second and third year is the development of skills and experience in research (see below), senior fellows continue to participate in clinical activities and certain procedures. First, they maintain their longitudinal outpatient and inpatient clinic experience throughout these years. Senior fellows will also actively participate in the regular weekly scientific seminars and collaborate with those fellows in their first year. In addition, fellows rotate through the different inpatient clinical services approximately two months on clinical rotations (on intensive care unit , sleep lab, PFTs labs, medical Nuclear Medicine emergency, and outpatient clinics). This rotation complements the previous inpatient and outpatient experiences.

Approximately by the end of the first year, fellows are expected to identify a research area in which the subsequent two years will be focused. Together, the trainee and supervisors develop a project for investigation that is of interest to the trainee and within the expertise of the faculty member; in certain instances, joint mentorship provided by two faculty members within the Division, or by one divisional faculty member and a collaborator from another unit, is appropriate. By the beginning of the second year, the fellow presents a conference in which he/she synthesizes existing knowledge, presents the problem for investigation, and describes the proposed plan of investigation. The faculty members and fellows in attendance provide feedback to the fellow and supervisors about the proposed project; this process of peer review provides a useful experience for the fellow and often strengthens the experimental approach.

During the second and third years, the trainee carries out the proposed work in the clinical research facilities of the faculty mentor(s). The trainee also benefits from interactions with other trainees, technicians, and collaborating investigators.

The trainee also participates in laboratory meetings and journal clubs specific to individual research groups. Presenting research findings at regional and national meetings and submitting work for publication are both important aspects of the investigative endeavor. The trainee will receive guidance and specific assistance in learning to prepare data for oral and written presentation, to prepare graphics, and to organize talks and prepare slides. Throughout the research training period, it is anticipated that the fellow will assume increasing intellectual responsibility and technical independence.

Research Pathway

Selection of a research project and supervisors is subject to the approval of the Clinical Oncology and Nuclear Medicine Department council approval and vice-Dean of post graduate studies of the faculty as officially regulated. Fellows may elect clinical trial, meta-Analysis/ systematic Review, clinical audit or epidemiological studies -based research training pathways. For all Master degree students, a research advisory committee will be selected by the fellow based on the approved regulatory rules of the faculty council. This committee will monitor the progress of research fellows and provide advice regarding research training and career development

Levels and courses of the program:

Courses and student work load list	Course Code	Credit points		
		Didactic #	training	Total
First Part				
Basic science Courses (8CP) **1. Course 1 (Physics of Nuclear Medicine)** **2. Course 2 (Biological effects of radiation and protection)** **3. Course 3 (Pathology and Nuclear Medicine)** **4. Course 4 (Biochemistry and Nuclear Medicine)**	**CLO227A §** **CLO227B** **CLO205** **CLO227C**	**3** **3** **2** **2**		**3** **3** **2** **2**
General clinical compulsory courses (6 points) **5. Course 5(Internal Medicine related to nuclear medicine)** **6. Course 6(General surgery related to nuclear medicine)**	**CLO218** **CLO211**	**2** **2**		**2** **2**
Elective courses*	**2 CP**			
Clinical training and scientific activities:				
Clinical training in General clinical compulsory courses (10 CP) **Internal Medicine** **General surgery**	**CLO218** **CLO211**		**5** **5**	**5** **5**
Clinical training and scientific activities in Speciality course (14 CP) **Nuclear Medicine(Advanced)**	**CLO227D**		**14**	**14**
Second Part	**Speciality course 24 CP** **Speciality Clinical Work 96 CP**			
Speciality Courses	**CLO227D**	**24**		**24**

7. Course 7 (Clinical Nuclear Medicine(Advanced) *)				
Training and practical activities in speciality (96 CP) Clinical Nuclear Medicine)	**CLO227D**		**96**	**96**
Total of the second part		**24**	**96**	**120**
Thesis	**20 CP**			
Total of the degree	**180 CP**			

 # Didactic (lectures, seminars, tutorial)

* Elective courses can be taken during either the 1st or 2nd parts.

Student work load calculation:

Work load hours are scheduled depending on the type of activities and targeted competences and skills in different courses

Elective Courses#:

- Medical statistics.
- Evidence based medicine.
- Medicolegal Aspects and Ethics in Medical Practice and Scientific Research
- Quality assurance of medical education
- Quality assurance of clinical practice.
- Hospital management

One of the above mentioned courses are prerequisites for fulfillment of the degree.

Thesis:

20 CP are appointed to the completion and acceptance of the thesis.

*Clinical Nuclear Medicine (Advanced) Course

Units' Titles' list	% from total	Level (Year)	Core Credit points		
			Didactic	training	Total
1) Unit 1 "Technology of nuclear medicine."	25%	1&2&3	6	27.5	33.5
2) Unit 2 "Clinical Nuclear Medicine	50%	2&3	12	55	67
3) Unit 3 " Radioisotopes therapy"	25%	2&3	6	27.5	33.5
Total No. of Units:	3		24	110	134

** Different Courses ILOs are arranged to be studied and assessed in the 1st and 2nd parts of the program as scheduled in the program time table.

6. Courses Contents (Annex 1)

The competency based objectives for each course/module/rotation are specified in conjunction with teaching/training methods, requirements for achieving these objectives and assessment methods.

See Annex 1 for detailed specifications for each course/ module

7-Admission requirements

- **Admission Requirements (prerequisites) if any :**
  - **I. General Requirements:**
    - MBBCh Degree from any Egyptian Faculties of Medicine
    - Equivalent Degree from medical schools abroad approved by the Ministry of Higher Education
    - One year appointment within responsible department (for non Assiut University based registrars)
  - **II. Specific Requirements:**
    - Fluent in English (study language)

VACATIONS AND STUDY LEAVE

The current departmental policy is to give working residents 2 week leave prior to first/ second part exams.

FEES:

As regulated by the postgraduate studies rules and approved by the faculty vice dean of post graduate studies and the faculty and university councils.

8-Progression and completion requirements

- Examinations of the first part could be set at 12 months from registering to the MSc degree.
- Examination of the second part cannot be set before 3 years from registering to the degree.
- Discussion of the MSc thesis could be set after 1 year from officially registering the MSc subject before setting the second part exams.
- The minimum duration of the program is 3 years.

The students are offered the degree when:

1. Passing the exams of all basic science, elective and Speciality courses of this program as regulated by the post graduates approved rules by the faculty council.

2. Completing all scheduled CP and log book (minimum 80%).
3. Discussion and acceptance of the MSc thesis.

9- Program assessment methods and rules (Annex IV)

Method	ILOs measured
Written examinations: **Structured essay questions** **Objective questions:** **MCQ** **Problem solving**	**K & I**
Clinical: **Long/short cases** **OSCE**	**K ,I, P &G skills**
Structured oral	**K ,I &G skills**
Logbook assessment	**All**
Research assignment	**I &G skills**

Weighting of assessments:

Courses		Degrees			
	Course Code	Written Exam	Oral Exam*	Practical /Clinical Exam	Total
First Part					
Basic science courses:					
1. Course 1 (Physics of Nuclear Medicine	**CLO227A §**	**60**	**45**	**45**	**150**
2. Course 2 (Biological effects of radiation and protection)	**CLO227B**	**60**	**45**	**45**	**150**
3. Course 3 (Pathology and Nuclear Medicine)	**CLO205**	**40**	**30**	**30**	**100**
4. Course 4 (Biochemistry and Nuclear Medicine)	**CLO227C**	**40**	**30**	**30**	**100**
General clinical courses					
5. Course 5(Internal Medicine related to nuclear medicine)	**CLO218**	**40**	**30**	**30**	**100**
6. Course 6(General surgery related to nuclear medicine)	**CLO211**	**40**	**30**	**30**	**100**
Total of the first part					**700**
Second Part					
Speciality Courses:					
Course 7 Nuclear Medicine (Advanced)*	**CLO227D**	**480**	**360**	**360**	**1200**
Paper 1: Technology of Nuclear medicine)		**120**			
Paper 2: Clinical Nuclear medicine)		**120**			
Paper 3: Clinical Nuclear medicine)		**120**			
Paper 4: (Radioisotopes therapy)		**120**			
Total of the degree					**1900**
Elective course		**50**	**50**		**100**

* 25% of the oral exam for assessment of logbook

*Clinical Nuclear Medicine (Advanced) Course

Units' **(Module)**Titles' list	% from total Marks	Degrees			
		Written Exam	Oral Exam	Practical / Clinical Exam	Total
1) Unit 1 "Technology of nuclear medicine."	25%	120	90	90	300
2) Unit 2 "Clinical Nuclear Medicine	50%	240	180	180	600
3) Unit 3 " Radioisotopes therapy"	25%	120	90	90	300
Total No. of Units (Modules):	3	480	360	360	1200

* 25% of the oral exam for assessment of logbook

700 marks for first part

1200 for second part

Written exam 40% (480 marks).

Clinical /practical and oral exams 60% (720 marks)

Elective course 100

Examination system:

- **First part:**
  - Written exam 3 hours in Physics of Nuclear radiation.+ Oral exam + Clinical / practical exam
    Written exam 3 hours in Biological effects of radiation and protection+ Oral exam + Clinical / practical exam
  - Written exam 2 hours Pathology & nuclear medicine.+ Oral exam + Clinical / practical exam
  - Written exam 2 hours in Internal Medicine related to nuclear medicine + Oral exam + Clinical / practical exam
  - Written exam 2 hours in General surgery related to nuclear medicine + Oral exam+ + Clinical / practical exam
- **Second part:**
  - Written exam four papers 3 hours for each in Nuclear Medicine (Advanced)[Paper 1: Technology of Nuclear medicine; Paper 2: Clinical Nuclear medicine ;Paper 3: Clinical Nuclear medicine; Paper 4: Radioisotopes therapy+ Oral exam+ Clinical & Practical exam
- **Elective courses**
  - Written exam one paper 1 hour in Elective course + Oral & Practical exam

10-Program evaluation

By whom	Method	Sample
Quality Assurance Unit	Reports Field visits	#
External Evaluator (s):According to department council External Examiner (s): According to department council	Reports Field visits	#
Stakeholders	Reports Field visits Questionnaires	#
Senior students	Questionnaires	#
Alumni	Questionnaires	#

#Annex 5 contains evaluation templates and reports (Joined in the departmental folder).

11-Declaration

We certify that all of the information required to deliver this program is contained in the above specification and will be implemented.

All course specifications for this program are in place.

Contributor	Name	Signature	Date
Program Principle Coordinator:	Ass Prof. Dr./Lamiaa Mahmoud		
Head of the Responsible Department (Program Academic Director):	Prof. Dr./ Samir Shehata		

Annex 1, Specifications for Courses / Modules

Annex 1: specifications for courses

First Part

Course 1 Physics of Nuclear radiation.

Name of department: ***Clinical Oncology & Nuclear Medicine***
Faculty of medicine
Assiut University
2022-2023

1. Course data

- **Course Title: Physics of Nuclear radiation.**
- **Course code: CLO227 A §**
- **Speciality : Nuclear Medicine**
- **Number of credit point: 3 credit point, didactic 3 credit point (100%)**
- **Department (s) delivering the course: Physics Department, Faculty of Science in conjunction with Clinical Oncology and Nuclear Medicine, Assiut University**
- **Coordinator (s): Staff members Physics Department , Faculty of Science in conjunction with Clinical Oncology and Nuclear Medicine, Assiut University as annually approved by both departments councils**
- **Date last reviewed: November 2022**
- **General requirements (prerequisites) if any :**
  - **None**
- **Requirements from the students to achieve course ILOs are clarified in the joining log book.**

2. Course aims

The student should acquire the facts of Physics of Nuclear radiation necessary for Nuclear Medicine

3. Course intended learning outcomes (ILOs):

A- Knowledge and understanding

ILOs	Methods of teaching/ learning	*Methods of Evaluation*
A. Illustrate physical details of: * The structure of matter and radiation * The absorption of radiation * Radioactive decay: * Production of radionuclides * Passage of charged particles through matter * Radiation detectors * Factors affecting radiation detectors and measurements * The anger camera (Basic principles) * The anger camera Performance characteristics * SPECT Cameras * PET	Didactic (lectures, seminars, tutorial)	- Written and oral examination - Log book

B- Intellectual outcomes

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Correlates the facts of Physics of Nuclear radiation with clinical reasoning, diagnosis and management of common diseases related to Nuclear Medicine.	Didactic (lectures, seminars, tutorial)	Written and oral examination Log book

C- Practical skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Demonstrate the applied Physics of Nuclear Medicine and instrumentation	-Laboratory work and field training	- Written and oral examination -Log book
B. Use information technology to support decisions in common situations related to Nuclear Physics		

D-General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Use information technology to manage information, access on-line medical information; and support their own education.	-Observation and supervision -Written & oral communication	- Oral Exam - Logbook

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
B. Write a report in the conditions mentioned in A.A	-Observation and supervision -Written & oral communication	-Oral Exam - Logbook - Check list

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
C. Demonstrate a commitment to ethical principles.	-Observation -Senior staff experience	- Oral Exam - Logbook

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
D. Work effectively in relevant health care delivery settings and systems.	-Observation -Senior staff experience	-360o global rating

4. Course contents (topic s/modules/rotation
Course Matrix

Time Schedule: First Part

Topic	Covered ILOs			
	Knowledge A	**Intellectual** B	**Practical skills** C	**General Skills** D
• The structure of matter and radiation	A	-	A-B	A-D
• The absorption of radiation	A	A	A-B	A-D
• Radioactive decay	A	A	A-B	A-D
• Production of radionuclide	A	-	A-B	A-D
• Passage of charged particles through matter	A	A	A-B	A-D
• Radiation detectors	A	-	A-B	A-D
• Factors affecting radiation detectors and measurements	A	-	A-B	A-D
• The anger camera (Basic principles)	A	-	A-B	A-D
• The anger camera Performance characteristics	A	-	A-B	A-D
• SPECT Cameras	A	-	A-B	A-D
• PET	A	-	A-B	A-D

5. Course methods of teaching/learning:

1. Didactic (lectures, seminars, tutorial)
2. Laboratory work
3. Observation and supervision
4. Written & oral communication
5. Senior staff experience

6. Course methods of teaching/learning: for students with poor achievements

1. Extra didactic (lectures, seminars, tutorial)
2. Laboratory work

7. Course assessment methods:

i. Assessment tools:

1. Written ,oral and clinical/practical examination
2. Log book

ii. Time schedule: At the end of the first part

iii. Marks: 150

8. List of references

i. Lectures notes

- Course notes
- Staff members print out of lectures and/or CD copies

ii. Essential books

Essentials of Nuclear Medicine Physics, Instrumentation, and Radiation Biology, Fourth Edition

Rachel A. Powsner MD,, Matthew R. Palmer PhD,, Edward R. Powsner MD,

November 2021

Print ISBN:9781119620990 |Online ISBN:9781119621027 |DOI:10.1002/9781119621027

iii. Recommended books

Nuclear Medicine Physics. The Basics, 8th Edition. Chandra, Ramesh and Rahmim, Arman. Lippincott Williams & Wilkins, a Wolters Kluwer business. Philadelphia, ISBN: 9781496381842

Virginia Tsapaki Ph.D. First published: 04 October 2020
https://doi.org/10.1002/mp.14515

iv. Periodicals, Web sites, … etc

- The Journal of Nuclear medicine
- Journal of clinical Nuclear Medicine
- European Journal of Nuclear Medicine and Molecular Imaging
- www.snm.org
- www.pubmed.com
- www.eanm.org

v. others

None

9. Signatures

Course Coordinator: Ass Prof. Dr./Lamiaa Mahmoud	**Head of the Department:** Prof. Dr./Samir Shehata
Date:	**Date:**

Course 2 Biological effects of radiation and protection

Name of department: Clinical Oncology and Nuclear Medicine
Faculty of medicine
Assiut University
2022-2023

1. Course data

- **Course Title: Biological effects of radiation and protection**
- **Course code: CLO227B**
- **Speciality is Nuclear Medicine**
- **Number of credit point: 3 credit point, didactic 3 credit point (100%)**
- **Department (s) delivering the course : Oncology and Nuclear Medicine**
- **Coordinator (s): Staff members of Clinical Oncology and Nuclear Medicine as annually approved by department council**
- **Date last reviewed: November-2022**
- **Requirements (prerequisites) if any :**
  - **None**
- **Requirements from the students to achieve course ILOs are clarified in the joining log book.**

2. Course aims

The student should acquire the Biological effects of radiation on the human body and methods of radiation protection.

3. Course intended learning outcomes (ILOs):

A- Knowledge and understanding

ILOs	Methods of teaching/ learning	*Methods of Evaluation*
A. Illustrate Principles of *Basic radiobiology* *Basic interaction of irradiation.* *Somatic effects* Diagnostic and nuclear medicine occupational exposure and risks. Sources of exposure of man I.R	-Didactic (lectures, seminars, tutorial)	- Written and oral examination - Log book

B- Intellectual outcomes

ILOs	Methods of teaching/ Learning	Methods of Evaluation
A. Correlates the facts of Biological effects of radiation and protection with clinical reasoning, diagnosis and management of common diseases related to Nuclear Medicine.	-Didactic (lectures, seminars, tutorial)	-Written and oral examination - Log book
B. Demonstrate an investigatory and analytic thinking (problem solving) approaches to common clinical situations related to Nuclear Medicine		

C- Practical skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment for common conditions related to Nuclear Medicine	-Observation and supervision -Field Training	-Log book
B. Provide health care services aimed at preventing health problems related to Nuclear Medicine	-Observation and supervision -Field Training	-Log book

D-General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Use information technology to manage information, access on-line medical information; and support their own education.	-Observation and supervision -Written & oral communication	- Oral Exam - Logbook

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
B. Write a report in the conditions mentioned in A.A	-Observation and supervision -Written & oral communication	-Oral Exam - Logbook - Check list

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
C. Demonstrate a commitment to ethical principles.	-Observation -Senior staff experience	- Oral Exam - Logbook

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
D. Work effectively in relevant health care delivery settings and systems.	-Observation -Senior staff experience	-360o global rating

4. Course contents (topic s/modules/rotation
Course Matrix

Time Schedule: First Part

Topic	Covered ILOs			
	Knowledge A	Intellectual B	Practical skills C	General Skills D
Basic radiobiology	A	A,B	-	A-D
Basic interaction of irradiation.	A	A,B	-	A-D
Somatic effects	A	A,B	-	A-D
Diagnostic and nuclear medicine occupational exposure and risks.	A	A,B	-	A-D
Sources of exposure of man I.R	A	A,B	-	A-D

5. Methods of teaching/learning:

1. Didactic (lectures, seminars, tutorial)
2. Observation and supervision
3. Written & oral communication
4. Senior staff experience

6. Methods of teaching/learning: for students with poor achievements

1. Extra didactic (lectures, seminars, tutorial)

7. Assessment methods:

i. Assessment tools:

1. Written , oral, Clinical/practical examination
2. Log book

ii. Time schedule: At the end of the first part

iii. Marks: 150

8. List of references

i. Lectures notes

- Course notes
- Staff members print out of lectures and/or CD copies

ii. Essential books

Essentials of Radiation Biology and Protection, 2nd edition (July 22, 2008) Steven Forshier : ISBN10:142831217X ISBN13: 9781428312173

iii. Recommended books

- **Radiobiology for the Radiologist, LWW; 8th edition** (June 8, 2018): ISBN-10:1496335414 ISBN-13:978-1496335418

iv. Periodicals, Web sites, … etc

- The Journal of Nuclear medicine
- Journal of clinical Nuclear Medicine
- European Journal of Nuclear Medicine & Molecular Imaging
- www.snm.org
- www.pubmed.com
- www.eanm.org

v. others: None

9. Signatures

Course Coordinator: Ass Prof. Dr./Lamiaa Mahmoud	**Head of the Department:** Prof. Dr./Samir Shehata
Date:	**Date:**

Course 3 (Pathology & nuclear medicine)

Name of department: Clinical Oncology and Nuclear Medicine
Faculty of medicine
Assiut University
2022-2023

1. Course data

- **Course Title: Pathology & nuclear medicine**
- **Course code: CLO205**
- **Speciality is Nuclear Medicine**
- **Number of credit point: 2 credit point, didactic 2credit point (100%)**
- **Department (s) delivering the course: Pathology in conjunction with Clinical Oncology and Nuclear Medicine**
- **Coordinator (s): Staff members of Pathology Department in conjunction with Clinical Oncology and Nuclear Medicine Department as annually approved by both departments councils**
- **Date last reviewed: November 2022**
- **Requirements (prerequisites) if any :**
  - **None**
- **Requirements from the students to achieve course ILOs are clarified in the joining log book.**

2. Course aims

The student should acquire the professional knowledge and facts of pathology necessary for Nuclear Medicine.

3. Course intended learning outcomes (ILOs):

A- Knowledge and understanding

ILOs	Methods of teaching/ learning	*Methods of Evaluation*
A. Describe Pharmacological *details* of: • General pathology of tumors • Thyroid diseases • Cardiology: Ischemic heart disease • Pulmonary embolism • Bone diseases -Tumors Osteomyelitis • Renal diseases -Obstructive Uropathy -Transplant Rejection • Liver diseases - Cirrhosis - Gall bladder diseases • Brain diseases -Tumors - Cerebral ischemia	-Didactic (lectures, seminars, tutorial)	- Written and oral examination - Log book

B- Intellectual outcomes

ILOs	Methods of teaching/ Learning	Methods of Evaluation
A. Correlates the facts of pathology with clinical reasoning, diagnosis and management of common diseases related to Nuclear Medicine.	-Didactic (lectures, seminars, tutorial)	-Written and oral examination - Log book

C- Practical skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Master of basic skills in the pathology of tumours.	-Laboratory work	-Assessment of practical skills -Log book
B. Use information technology to support decisions in common situations related to pathology of the Tumors.		
C. Examine Pathological slides of common Tumors		

D. General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Use information technology to manage information, access on-line medical information; and support their own education.	-Observation and supervision -Written & oral communication	- Oral Exam - Logbook

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
B. Write a report in the conditions mentioned in A.A	-Observation and supervision -Written & oral communication	-Oral Exam - Logbook - Check list

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
C. Demonstrate a commitment to ethical principles.	-Observation -Senior staff experience	- Oral Exam - Logbook

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
D. Work effectively in relevant health care delivery settings and systems.	-Observation -Senior staff experience	-360o global rating

4. Course contents (topic s/modules/rotation
Course Matrix

Time Schedule: First Part

Topic	Covered ILOs			
	Knowledge A	Intellectual B	Practical skills C	General Skills D
• General pathology of tumors	A	A	-	A-D
• Thyroid diseases	A	A	-	A-D
• Cardiology				
Ischemic heart disease	A	A	-	A-D
Pulmonary embolism	A	A	-	A-D
• Bone diseases				
-Tumors	A	A	-	A-D
-Osteomyelitis	A	A	-	A-D
• Renal diseases				
-Obstructive Uropathy	A	A	-	A-D
-Transplant Rejection	A	A	-	A-D
• Liver diseases				
- Cirrhosis	A	A	-	A-D
- Gall bladder diseases	A	A	-	A-D
• Brain diseases				
-Tumors	A	A	-	A-D
- Cerebral ischemia	A	A	-	A-D

5. Methods of teaching/learning:

1. Didactic (lectures, seminars, tutorial)
2. Extra Laboratory work
3. Observation and supervision
4. Written & oral communication
5. Senior staff experience

6. Methods of teaching/learning: for students with poor achievements

1. Extra didactic (lectures, seminars, tutorial)
2. Extra Laboratory work

7. Assessment methods:

i. Assessment tools:

1. Written , oral and Clinical/ practical examination
2. Log book

ii. Time schedule: At the end of the first part

iii. Marks: **100**

8. List of references

i. Lectures notes

- Course notes
- Staff members print out of lectures and/or CD copies

ii. Essential books

Robbins & Cotran Pathologic Basis of Disease (Robbins Pathology) 10th Edition 2020 ISBN: 9780323531139

iii. Recommended books

- Rosai and Ackerman's Surgical Pathology - 11th Edition - October 25, 2017Authors: John Goldblum, Laura Lamps, Jesse McKenney, Jeffrey Myers eBook ISBN: 9780323442022

iv. Periodicals, Web sites, … etc

- **Periodicals,**
  - Human pathology
  - Histopathology
  - American Journal of surgical pathology
- **Web sites:** http://www.ncbi.nlm.nih.gov/pubmed/

v. others

- None

9. Signatures

Course Coordinator: Ass Prof. Dr./Lamiaa Mahmoud	**Head of the Department:** Prof. Dr./Samir Shehata
Date:	**Date:**

Course 4 (Biochemistry & nuclear medicine)

Name of department: Clinical Oncology & Nuclear Medicine
Faculty of medicine
Assiut University
2022-2023

1. Course data

- **Course Title: Biochemistry & nuclear medicine**
- **Course code: CLO227C**
- **Speciality is Nuclear Medicine**
- **Number of credit point: 2 credit point, didactic 2credit point (100%)**
- **Department (s) delivering the Course:** Clinical Oncology and Nuclear Medicine
- **Coordinator (s):** Staff members of Clinical Oncology and Nuclear Medicine Department as annually approved by department council
- **Date last reviewed: November** 2022
- **Requirements (prerequisites) if any :**
  - None
- **Requirements from the students to achieve course ILOs are clarified in the joining log book.**

2. Course aims

The student should acquire the facts of biochemistry necessary for Nuclear Medicine.

3. Course intended learning outcomes (ILOs):

A- Knowledge and understanding

ILOs	Methods of teaching/ learning	*Methods of Evaluation*
A. Mention *principles of Biochemistry of:* - Thyroid hormones. - Parathyroid hormone. - Hormones: - Hormones of adrenal gland. -Glucose metabolism. -Minerals: Ca, P, I, Fe -Cell & Cancer biology: *Mechanism of activation of proto-oncogenes to oncogenes. *Tumor marker. *Growth factors. *Anti-oncogenes. -Radiation biology. -Free radicals & antioxidants. -Gene therapy.	-Didactic (lectures, seminars, tutorial)	- Written and oral examination - Log book

B- Intellectual outcomes

ILOs	Methods of teaching/ Learning	Methods of Evaluation
A. Correlates the facts of biochemistry with clinical reasoning, diagnosis and management of common diseases related to Nuclear Medicine.	-Didactic (lectures, seminars, tutorial)	-Written and oral examination - Log book

C- Practical skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
B. Use information technology to support decisions in common situations related to pa Biochemistry	-Laboratory work	-Assessment of practical skills -Log book

D-General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Use information technology to manage information, access on-line medical information; and support their own education.	-Observation and supervision -Written & oral communication	- Oral Exam - Logbook

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
B. Write a report in the conditions mentioned in A.A	-Observation and supervision -Written & oral communication	-Oral Exam - Logbook - Check list

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
C. Demonstrate a commitment to ethical principles.	-Observation -Senior staff experience	- Oral Exam - Logbook

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
D. Work effectively in relevant health care delivery settings and systems.	-Observation -Senior staff experience	-360o global rating

4. Course contents (topic s/modules/rotation

Course Matrix

Time Schedule: First Part

Topic	Covered ILOs			
	Knowledge A	Intellectual B	Practical skills C	General Skills D
- Thyroid hormones.	A	A	A	A-D
- Parathyroid hormone.	A	-	A	A-D
- Hormones:	A	A	A	A-D
- Hormones of adrenal gland.	A	-	A	A-D
-Glucose metabolism.	A	-	A	A-D
-Minerals: Ca, P, I, Fe	A	-	A	A-D
-Cell & Cancer biology: *Mechanism of activation of proto-oncogenes to oncogenes. *Tumor marker. *Growth factors. *Anti-oncogenes.	A	A	A	A-D
-Radiation biology.	A,B	A	A	A-D
-Free radicals & antioxidants.	A,B	A	A	A-D
-Gene therapy.	A,B	A	A	A-D

5. Course methods of teaching/learning:

1. Didactic (lectures, seminars, tutorial)
2. Laboratory work
3. Observation and supervision
4. Written & oral communication
5. Senior staff experience

6. Course methods of teaching/learning: for students with poor achievements

1. Extra didactic (lectures, seminars, tutorial)
2. Laboratory work

7. Course assessment methods:

i. Assessment tools:

1. Written , oral and clinical/practical examination
2. Log book

ii. Time schedule: At the end of the first part

iii. Marks: 100

8. List of references

i. Lectures notes

- Course notes
- Staff members print out of lectures and/or CD copies

ii. Essential books

- Harper's Illustrated Biochemistry, 32th Edition
  McGraw Hill / Medical; 32nd edition (September 7, 2022) **ISBN-10:** 1260469948 **ISBN-13 :** 978-1260469943

iii. Recommended books

- Lippincott's Illustrated Reviews: Biochemistry, 4th Edition LWW; Eighth, North American edition (April 20, 2021) **ISBN-10:** 9960717313 **ISBN-13 :** 978-9960717319

iv. Periodicals, Web sites, … etc

- **Periodicals,**
  - Biochemistry and molecular biology education journal.
  - Physiology and Biochemistry journal
- **Web sites**
  - http://www.ncbi.nlm.gov/
  - http://www.vlib.org/

http://www.genome.ad.jp/kegg/regulation

v. others : None

9. Signatures

Course Coordinator: Ass Prof. Dr./Lamiaa Mahmoud	**Head of the Department:** Prof. Dr./Samir Shehata
Date:	**Date:**

Course 5 Internal Medicine related to nuclear medicine

Name of department: Clinical Oncology and Nuclear Medicine
Faculty of medicine
Assiut University
2022-2023

1. Course data

- **Course Title:** Internal Medicine related to nuclear medicine
- **Course code:** CLO2218
- **Speciality is Nuclear Medicine**
- **Number of credit points: 7 credit point, Didactic 2 credit point (28.5%), training 5 credit point (71.5%)**
- **Department (s) delivering the course: Internal Medicine**
- **Coordinator (s): Staff members of Internal Medicine Department in conjunction with Clinical Oncology and Nuclear Medicine Department as annually approved by both departments councils**
- **Date last reviewed: November 202**
- **Requirements (prerequisites) if any : None**
- **Requirements from the students to achieve course ILOs are clarified in the joining log book.**

2. Course aims

- To make the students able to be familiar with the diagnosis and management of common medical problems that may be encountered with Nuclear Medicine
- To make the students able to deal with medical emergencies safely and effectively as regard their investigations and management.

3. Course intended learning outcomes (ILOs):

A- Knowledge and understanding

ILOs	Methods of teaching/ learning	*Methods of Evaluation*
A. Describe the etiology, clinical picture, diagnosis and management of the following diseases and clinical conditions: • **Thyroid** Hypothyroidism Hyperthyroidism Thyroiditis Thyroid malignancies • **Heart** CAD Angina Infarction Cardiomyopathy • **Renal:** Chronic renal failure Golmerulonephritis Pyelonephritis Kidney transplant	-Clinical round -Didactic (lectures, seminars, tutorial) -Case presentation -Hand on workshops, - Clinical rotation in the general medical emergency Unit	-log book & portfolio -Oral and written exam

Acute renal failure • **Suprarenal** Cushing Addison's Pheochromocytoma • **Parathyroid** Hyperparathyroidism&hypoparathyroidism • **GIT:** Liver cirrhosis Jaundice Causes of hepatosplenomegaly GIT bleeding • **Respiratory system:** Bronchogenic Cancer Pulmonary embolism		
B. Mention the principles of basics of general medicine in topics mentioned in A.A		
C. State update and evidence based Knowledge of Hypertension, Diabetes mellitus		
D. Memorize the facts and principles of the relevant basic supportive sciences related to topics mentioned in A.A		
E. Mention the basic ethical and medicolegal principles relevant to the topics mentioned in A.A.		
F. Mention the basics of quality assurance to ensure good clinical care in his field		
G. Mention the ethical and scientific principles of medical research		
H. State the impact of common health problems in the field of Internal Medicine on the society.		

B- Intellectual outcomes

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Correlates the facts of relevant basic and clinically supportive sciences with clinical reasoning, diagnosis and management of common diseases related to topics mentioned in A.A.	-Clinical rounds -Senior staff experience	-Procedure & case presentation -log book & portfolio
B. Demonstrate an investigatory and analytic thinking (problem solving) approaches to common clinical situations related to Nuclear Medicine.		
C. Design and present cases, seminars in common problem.		
D-Formulate management plans and alternative decisions in different situations in the field of the topics mentioned in A.A .		

C- Practical skills (Patient Care)

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Obtain proper history and examine patients in caring and respectful behaviors.	-Didactic (lectures, seminars, tutorial -Outpatient -Inpatient -Case presentation -Direct observation	- log book - Objective structure clinical examination (OSCE) -One MCQ examination at the second half of the second year

B. <u>Order the following non invasive and invasive diagnostic procedures:</u> • Routine appropriate Lab investigations related to conditions mentioned in A.A • ECG • Echocardiography. • Blood picture • Blood chemistry • Metabolic profile:[i.e. serum electrolytes] • Chest x rays • Endocrinal profile		
<u>C. Interpret the following non invasive and invasive diagnostic procedures:</u> • Routine appropriate Lab investigations related to conditions mentioned in A.A • ECG • Blood picture • Blood chemistry • Metabolic profile:[i.e. serum electrolytes] • Chest x rays • Endocrinal profile		
D. <u>Prescribe the following non invasive and invasive therapeutic procedures :</u> • proper treatment for conditions mentioned in A.A	- Clinical round with senior staff -Perform under supervision of senior staff	- Procedure presentation - Log book - Chick list
E. Carry out patient management plans for common conditions related to Internal Medicine mentioned in A.A.	- Clinical round with senior staff - Perform under supervision	

	of senior staff	
F. Use information technology to support patient care decisions and patient education in common clinical situations related to Nuclear Medicine.		
G. Provide health care services aimed at preventing health problems related to Conditions mentioned in A.A .		
H. Provide patient-focused care in common conditions related to Nuclear Medicine, while working with health care professionals, including those from other disciplines like: Conditions mentioned in A.A		

D-General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Perform practice-based improvement activities using a systematic methodology(audit, logbook)	-Case log -Observation and supervision -Written & oral communication	--Log book & portfolio -Procedure & case presentation
B. Appraises evidence from scientific studies(journal club)	- Case log - Observation and supervision - Written & oral communication - Journal clubs - Discussions in seminars and clinical rounds	--Log book & portfolio -Procedure & case presentation
C. Conduct epidemiological Studies and surveys.		

D. Perform data management including data entry and analysis.		
E. Facilitate learning of junior students and other health care professionals.	-Clinical rounds -Senior staff experience	

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
F. Maintain therapeutic and ethically sound relationship with patients.	-Simulations -Clinical round -Seminars -Lectures -Case presentation -Hand on workshops	-Global rating -Procedure &case presentation -Log book & portfolio -Chick list
G. Elicit information using effective nonverbal, explanatory, questioning, and writing skills.		
H. Provide information using effective nonverbal, explanatory, questioning, and writing skills.		
I. Present a case in common problems of Nuclear Medicine.		
J. Write a report • Patients' medical reports	-Senior staff experience	
K. Council patients and families about • Conditions mentioned in A.A	-Perform under supervision of senior staff	

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
L. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society	-Observation & supervision -Didactic	-Objective structured clinical examination -Patient survey
M. Demonstrate a commitment to ethical principles including provision or withholding of clinical care, confidentiality of patient information, informed consent, business practices		- 360o global rating
N. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities		-Objective structured clinical examination -360o global rating

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
O. Work effectively in relevant health care delivery settings and systems.	-Observation & supervision -Didactic	-360o global rating
P. Practice cost-effective health care and resource allocation that does not compromise quality of care.		-Check list evaluation of live or recorded performance
Q. Assist patients in dealing with system complexities.		-360o global rating - Patient survey

4. Course contents (topic s/modules/rotation
Course Matrix

Time Schedule: first part

Topic	Covered ILOs			
	Knowledge **A**	**Intellectual** B	**Practical skills** **C**	**General Skills** **D**
• **Thyroid**				
Hypothyroidism	A-H	A,B	A-H	A-Q
Hyperthyroidism	A-H	A,B	A-H	A-Q
Thyroiditis	A-H	A-D	A-H	A-Q
Thyroid malignancies	A-H	A-D	A-H	A-Q
Thyroid malignancies				
• **Heart**				
CAD	A-H	A-D	A-H	A-Q
Angina	A-H	A-D	A-H	A-Q
Infarction	A-H	A-D	A-H	A-Q
Cardiomyopathy	A-H	A-D	A-H	A-Q
• **Renal:**	A-H	A-D	A-H	A-Q
Chronic renal failure	A-H	A-D	A-H	A-Q
Golmerulonephritis	A-H	A-D	A-H	A-Q
Pyelonephritis	A-H	A-D	A-H	A-Q
Kidney transplant	A-H	A-D	A-H	A-Q
Acute renal failure	A-H	A-D	A-H	A-Q
• **Suprarenal**				
Cushing	A-H	A-D	A-H	A-Q
Addison's				
Pheochromocytoma	A-H	A-D	A-H	A-Q
• **Parathyroid**				
Hyperparathyroidism& hypoparathyroidism	A-H	A-D	A-H	A-Q
• **GIT:**				
Liver cirrhosis	A-H	A-D	A-H	A-Q

Jaundice	A-H	A,B	A-H	A-Q
Causes of hepatosplenomegaly				
GIT bleeding	A-H	A-D	A-H	A-Q
• **Respiratory system:**				
Bronchogenic Cancer	A-H	A-D	A-H	A-Q
Pulmonary embolism	A-H	A,B	A-H	A-Q

5. Course methods of teaching/learning:

1. Didactic (lectures, seminars, tutorial)
2. Clinical rounds
3. Seminars Clinical rotations
4. Service teaching
5. Observation
6. Post graduate teaching
7. Hand on workshops
8. Perform under supervision of senior staff
9. Simulations
10. Case presentation
11. Observation and supervision
12. Written & oral communication

6. Course methods of teaching/learning: for students with poor achievements

1. Extra Didactic (lectures, seminars, tutorial) according to their needs
2. Extra training according to their needs

7. Course assessment methods:

i. Assessment tools:

1. Clinical examination
2. Written and oral examination
3. Chick list
4. log book & portfolio
5. Procedure/case presentation

6. One MCQ examination in the second year and one in the third year
7. Objective structured clinical examination
8. Check list evaluation of live or recorded performance
9. Patient survey
10. 360o global rating

ii. Time schedule: At the end of the first part part

iii. Marks: 100

8. List of references

i. Lectures notes

- Course notes
- Staff members print out of lectures and/or CD copies

ii. Essential books

- Davidson's Principles and Practice of Medicine - 24th Edition - 2022-03

iii. Recommended books

- Harrison's Principles of Internal Medicine, 21th Edition by Anthony Fauci, Eugene Braunwald, Dennis Kasper, and Stephen Hauser (Hardcover - Mar 2021)

iv. Periodicals, Web sites, … etc

- **Periodicals**
  - Internal medicine journal
  - Annals of Internal medicine journal
  - Journal of General Internal Medicine
- **Web sites :** www.pubmed. Com

V. others : None

9. Signatures

Course Coordinator: Ass Prof. Dr./Lamiaa Mahmoud	**Head of the Department:** Prof. Dr./Samir Shehata
Date:	**Date:**

Course 6 General Surgery related to nuclear medicine

Clinical Oncology and Nuclear Medicine
Faculty of medicine
Assiut University
2022-2023

1. Course data

- **Course Title: General Surgery related to nuclear medicine**
- **Course code: CLO211**
- **Speciality is Nuclear Medicine**
- **Number of credit points: 7 credit point, Didactic 2 credit point (28.5%), training 5 credit point (71.5%)**
- **Department (s) delivering the course: General Surgery**
- **Coordinator (s): Staff members of General Surgery Department in conjunction with Clinical Oncology and Nuclear Medicine department as annually approved by both departments councils**
- **Date last reviewed: November 2022**
- **Requirements (prerequisites) if any :**
  - **None**
- **Requirements from the students to achieve course ILOs are clarified in the joining log book.**

2. Course Aims

The student should acquire the basic surgical Knowledge necessary for clinical reasoning, diagnosis and management of diseases related to Nuclear Medicine.

3. Course intended learning outcomes (ILOs):

A- Knowledge and understanding

ILOs	**Methods of teaching/ learning**	***Methods of Evaluation***
A. Describe the etiology, clinical picture, diagnosis and management of the following diseases and clinical conditions: • Thyrotoxicosis • Multinodular Goiter • Solitary thyroid nodule • Benign and malignant thyroid tumors • Parathyroid glands tumors • Suprarenal tumors • Lymphadenopathy • Lymphomas • Breast cancer • Testicular torsion • Causes of swollen leg & diagnosis of lymphoedema • Bone metastasis • Osteomylitis.	-Didactic (lectures, seminars, tutorial) -Clinical rounds -Case presentation -Hand on work shops	Log book & portfolio -Oral exam Written exam
B. Memorize the facts and principles of the relevant basic and clinically supportive sciences related to conditions mentioned in A.A.		

B- Intellectual outcomes

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Correlates the facts of relevant basic and clinically supportive sciences with clinical reasoning, diagnosis and management of common diseases related to Nuclear medicine.	-Clinical rounds -Senior staff experience	- Log book& portfolio -Procedure & case presentation
B. Design and present case, seminars in common problem.		

C- Practical skills (Patient Care)

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Obtain proper history and examine patients in caring and respectful behaviors in cases mentioned in A.A.	- Didactic (lectures, seminars, tutorial) -Clinical rounds	- log book - OSCE at the end of each year -Clinical examination in general surgery
B. Order the following non invasive and invasive diagnostic procedures -Routine appropriate Lab investigations related to conditions mentioned in A.A. -Nuclear Medicine studies related to conditions mentioned in A.A. -FNA -True cut needle biopsy & excisional biopsy		
C. Interpret Nuclear Medicine studies related to		

conditions mentioned in A.A.		
D. Carry out patient management plans for common conditions related to Nuclear Medicine.		

D-General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Perform practice-based improvement activities using a systematic methodology(audit, logbook)	-Case log -Observation and supervision -Written & oral communications	-Portfolios -Simulation
B. Perform data management including data entry and analysis.		

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
C. Maintain therapeutic and ethically sound relationship with patients.	-Observation & supervision -Didactic	-Simulation -Record review (report)
D. Elicit information using effective nonverbal, explanatory, questioning, and writing skills.		
E. Work effectively with others as a member of a health care team or other professional group		
F. Present a case in common problems of general surgery related to nuclear medicine.		

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
G. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society	-Observation & supervision -Didactic	-Objective structured clinical examination -Patient survey

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
H. Work effectively in relevant health care delivery settings and systems.	-Observation & supervision -Didactic	-360o global rating

4. Course contents (topic s/modules/rotation)
Course Matrix

Time Schedule: First part

Topic	Covered ILOs			
	Knowledge **A**	**Intellectual** B	**Practical skills** **C**	**General Skills** **D**
• Thyrotoxicosis	A,B	A,B	A-D	A-H
• Multinodular Goiter	A,B	A,B	A-D	A-H
• Solitary thyroid nodule	A,B	A,B	A-D	A-H
• Benign and malignant hyroid tumors	A,B	A,B	A-D	A-H
• Parathyroid glands umors	A,B	A,B	A-D	A-H
• Suprarenal tumors	A,B	A,B	A-D	A-D, G-H
• Lymphadenopathy	A,B	A,B	A-D	A-D, G-H
• Lymphomas	A,B	A,B	A-D	A-D, G-H
• Breast cancer	A,B	A,B	A-D	A -H
• Testicular torsion	A,B	A,B	A-D	A-D, G-H
• Causes of swollen leg & iagnosis of lymphoedema	A,B	A,B	A-D	A-D, G-H
• Bone metastasis	A,B	A,B	A-D	A-D, G-H
• Osteomylitis.	A,B	A,B	A-D	A-D, G-H

5. Course methods of teaching/learning:

1. Didactic (lectures, seminars, tutorial)
2. Clinical rounds
3. Clinical rotations
4. Service teaching
5. Post graduate teaching
6. Hand on workshops
7. Perform under supervision of senior staff

8. Simulations
9. Senior staff experience
10. Case presentation

6. Course methods of teaching/learning: for students with poor achievements

1. Extra Didactic (lectures, seminars, tutorial) according to their needs
2. Extra training according to their needs

7. Course assessment methods:

i. Assessment tools:

1. Clinical examination
2. Written and oral examination
3. Chick list
4. log book & portfolio
5. Procedure/case presentation
6. One MCQ examination in the second year and one in the third year
7. Objective structured clinical examination
8. Check list evaluation of live or recorded performance
9. Patient survey
10. 360o global rating

ii. Time schedule: At the end of the second part

iii. Marks: 100 mark

8. List of references

i. Lectures notes

- Course notes
- Staff members print out of lectures and/or CD copies

ii. Essential books

Bailey & Love's Short Practice of Surgery, 27th Edition 3-2018

iii. Recommended books

None

iv. Periodicals, Web sites, … etc

- Surgical Clinics of North America

v. others: None

9. Signatures

Course Coordinator: Ass Prof. Dr./Lamiaa Mahmoud	**Head of the Department:** Prof. Dr./Samir Shehata
Date:	**Date:**

Second Part

Course 7 Clinical Nuclear Medicine

Name of department: Clinical Oncology and Nuclear Medicine
Faculty of medicine
Assiut University
2022-2023

1. Course data

- **Course Title:** Clinical Nuclear Medicine
- **Course code:** CLO227D
- **Speciality is** Nuclear Medicine
- **Number of credit points: 134, didactic 24 credit points (17.9%), practical 110 credit points (82.1%).**
- **Department (s) delivering the course:** Department of Clinical Oncology and Nuclear Medicine - Faculty of Medicine- Assiut- EGYPT
- **Coordinator (s):**
  Course coordinator: Prof. Dr./ Mohamed A. Mekkawy
  Assistant coordinator (s) Prof. Samia Abdel Karem
- **Date last reviewed: November** 2022
- **General requirements (prerequisites) if any :**
  - **None**
- **Requirements from the students to achieve course ILOs are clarified in the joining log book.**

This course consists of 3 Units (Modules)

1) Unit 1 "Technology of nuclear medicine"
2) Unit 2 "Clinical Nuclear Medicine"
3) Unit 3 " Radioisotopes therapy"

Unit Coordinator (s):

Unit	Principle Coordinator	Assistant coordinators
4) Unit 1 "Technology of nuclear medicine"	Prof. Dr./ Mohamed A. Mekkawy	Prof. Dr./ Mostafa Sayed Mostafa Ass. Prof./ Hussien Rabie Lecturer Dr./ Waleed A. Diab Lecturer Dr./ Mohamed Hosny Lecturer Dr./ Lamiaa Mahmoud
5) Unit 2 "Clinical Nuclear Medicine"	Prof. Dr./ Mohamed A. Mekkawy	Prof. Dr./ Mostafa Sayed Mostafa Ass. Prof./ Hussien Rabie Lecturer Dr./ Waleed A. Diab Lecturer Dr./ Mohamed Hosny Lecturer Dr./ Lamiaa Mahmoud
Unit 3 " Radioisotopes therapy"	Prof. Dr./ Mohamed A. Mekkawy	Prof. Dr./ Mostafa Sayed Mostafa Ass. Prof./ Hussien Rabie Lecturer Dr./ Waleed A. Diab Lecturer Dr./ Mohamed Hosny Lecturer Dr./ Lamiaa Mahmoud

2. Course aims

1. Provide candidates with fundamental knowledge and skills of being proficient in the interpretation of imaging studies obtained in the area of diagnostic nuclear medicine.

2. To acquire satisfactory level of clinical skills, bedside care skills, in addition to update medical knowledge as well as clinical experience and competence in the area of therapeutic nuclear medicine.

3. The student should acquire the facts of technology necessary for performing Nuclear Medicine techniques

3. Course intended learning outcomes (ILOs):

Unit (Module) 1 Technology of nuclear medicine

A- Knowledge and understanding

ILOs	Methods of teaching/ learning	*Methods of Evaluation*
A. <u>Mention Radiopharmaceuticals, Techniques , Pitfalls in scanning of:</u> ***Skeletal systems:** -Radiopharmaceutical -Technique of skeletal scanning -Pitfall in skeletal scanning. ***Endocrine system:** **A. Thyroid gland:** -Radiopharmaceutical and technique -Cancer thyroid diagnosis **B. Adrenal Gland:** -Radiopharmaceutical and technique	-Didactic (lectures, seminars, tutorial)	- Written and oral examination - Log book

C. Parathyroid gland -Radiopharmaceurical and technique. ***Gentino-Urinary system** -Radiopharmaceutical -Techniques of urodynamics -Testicular scintigraphy. ***Hot laboratory technology:** - Design and requirements - Dispensing of RN ***Gamma camera and SPECT system:** - Data acquisition - Spatial resolution - Sensitivity and uniformity of response - Effect of scattered radiation. ***Gasro-Intestinal system:** Salivary gland scanning (Radiopharmaceurical and technique) Esophageal transient (Radiopharmaceurical and technique) Gastrooesophageal reflux (Radiopharmaceurical and technique) Gastric emptying (Radiopharmaceurical and technique) Gastrointestinal bleeding (Radiopharmaceurical and technique) Malabsorption and intestinal transient (Radiopharmaceurical and technique) ***Liver-spleen scanning:** Radiopharmaceutical and techique 99m Tc-MAA hepatic arterial perfusion ***Biliary system imaging** Radiopharmaceutical and technique. * **Pulmonary system:** -Radiopharmaceutical -Technique of ventilation-perfusion.		

B- Intellectual outcomes

ILOs	Methods of teaching/ Learning	Methods of Evaluation
A. Demonstrate an investigatory and analytic thinking approach (problem solving) to common clinical situations related to Technology of Nuclear Medicine.	-Didactic (lectures, seminars, tutorial)	- Written and oral examination - Log book
B. Design and present case for common problem related to Technology of Nuclear Medicine.	-Didactic (lectures, seminars, tutorial)	- Written and oral examination - Log book
C. Formulate management plans and alternative decisions in different situations in the field of the Technology of Nuclear Medicine.	-Didactic (lectures, seminars, tutorial)	- Written and oral examination - Log book

C- Practical skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Perform the Technology of Nuclear Medicine and instrumentation including items mentioned in A.A.	-Observation and supervision -Written & oral communication	-Log book

D-General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Use information technology to manage information, access on-line medical information; and support their own education.	-Observation and supervision -Written & oral communication	- Oral Exam - Logbook

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
B. Write a report in the conditions mentioned in A.A	-Observation and supervision -Written & oral communication	-Oral Exam - Logbook - Check list

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
C. Demonstrate a commitment to ethical principles.	-Observation -Senior staff experience	- Oral Exam - Logbook

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
D. Work effectively in relevant health care delivery settings and systems.	-Observation -Senior staff experience	-360o global rating

Unit (Module) 2 Clinical Nuclear Medicine

A- Knowledge and understanding

ILOs	Methods of teaching/ learning	*Methods of Evaluation*
A. Describe the essential and accurate information for taking relevant history and physical exam of the following diseases and clinical conditions: • Ischemic heart diseases • Renal diseases • Thyroid diseases • Hepatobiliary diseases • GIT disorders • Neuroendocrine tumors • Dementias • Cerebrovascular diseases • Metastatic diseases • Pyrexia of unknown origin • Pulmonary embolism	-Didactic (lectures, seminars, tutorial) -Clinical rounds -Clinical rotations (service teaching)	-OSCE at the end of each year -log book & portfolio - Two MCQ examination at the second year -Oral and written exam
B. Mention the principles of: • The development and structure of thyroid gland • Thyroid function tests • Epidemiology of thyroid diseases • Infectious & neoplastic bone lesions • Obstructive uropathy, Reno-vascular hypertension • Ischemic heart diseases • Biliary tract disorders • Pulmonary embolism		

C. State update and evidence based Knowledge of • Thyroid swelling management • Evaluation of neuroendocrine tumors • Evidence based preoperative "myocardial perfusion" evaluation • Identification and management of the acutely ill patient • Evaluation of the renal, lung, cardiac, liver …… transplant recipient and donor • Indications for different diagnostic Nuclear Medicine procedures		
D. Memorize the facts and principles of the relevant basic and clinically supportive sciences related to Clinical nuclear medicine.		
E. Mention the basic ethical and medicolegal principles that should be applied in practice and are relevant to the Clinical nuclear medicine		
F. Mention the basics and standards of quality assurance to ensure good clinical practice in the field of Clinical nuclear medicine		
G. Mention the ethical and scientific principles of medical research methodology		
H. State the impact of common health problems in the field of Clinical nuclear medicine on the society and how good clinical practice improve these problems.		

B- Intellectual outcomes

ILOs	Methods of teaching/ Learning	Methods of Evaluation
A. Correlates the facts of relevant basic and clinically supportive sciences with clinical reasoning, diagnosis and management of common diseases related to Clinical nuclear medicine.	-Clinical rounds -Senior staff	-Procedure & case presentation -log book &

B. Demonstrate an investigatory and analytic thinking (problem solving) approaches to common clinical situations related to Clinical nuclear medicine	experience	portfolio
C. Design and /or present a case or review (through seminars/journal clubs.) in one or more of common clinical problems relevant to the field of Clinical nuclear medicine.		
D-Formulate a diagnostic report of different Clinical nuclear medicine procedures.		

C- Practical skills (Patient Care)

ILOs	**Methods of teaching/ learning**	**Methods of Evaluation**
A. Obtain proper history and examine patients in caring and respectful behaviors.	-Didactic (lectures, seminars, tutorial) -Clinical rounds -Clinical rotations (service teaching)	-OSCE at the end of each year -log book & portfolio - One MCQ examination at the second half of the second year and another one in the third year
B. <u>Perform different diagnostic nuclear medicine procedures:</u> • Bone scan • Endocrinal disease imaging	-Clinical round with senior staff -Observation	-Procedure presentation - Log book - Chick list

• Genito-urinary scans • tumor imaging, • infection imaging • cardio-vascular imaging • GIT imaging • Brain scintigraphy • Hepato-biliary and spleen imaging • pulmonary imaging	-Post graduate teaching -Hand on workshops	
C. <u>interpret different diagnostic nuclear medicine procedures:</u> • Bone scan • Endocrinal disease imaging • Genito-urinary scans • tumor imaging, • infection imaging • cardio-vascular imaging • GIT imaging • Brain scintigraphy • Hepato-biliary and spleen imaging • pulmonary imaging		
D. <u>Interpret the following diagnostic procedures</u> • Routine appropriate Lab investigations related to conditions mentioned in A.A • X ray Chest, skeletal radiographs • Pulmonary function testing • CT & MRI scans related to conditions mentioned in A.A • ECG	-Clinical round with senior staff -Observation -Post graduate teaching -Hand on workshops	
E. Carry out patient management plans for common conditions related to Clinical Nuclear Medicine	- Clinical round with senior staff - Perform under	

	supervision of senior staff	
F. Use information technology to support patient care decisions and patient education in common clinical situations related to Clinical Nuclear Medicine		

D-General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Perform practice-based improvement activities using a systematic methodology (share in audit and risk management activities and use log book)	-Case log -Observation and supervision -Written & oral communication	--Log book & portfolio -Procedure & case presentation
B. Appraises evidence from scientific studies(journal club) * Researches and evidence based practice and internet updates about the conditions mentioned above in A.A	- Case log - Observation and supervision - Written & oral communication - Journal clubs - Discussions in seminars and clinical rounds	--Log book & portfolio -Procedure & case presentation
C. Perform data management including data entry and analysis using information technology to manage information, access on-line medical information; and support their own education.		
D. Facilitate learning of junior students and other health care professionals including their evaluation and assessment.	-Clinical rounds -Senior staff experience	

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
E. Maintain therapeutic and ethically sound relationship with patients.	-Simulations -Clinical round -Seminars -Lectures -Case presentation -Hand on workshops	-Global rating -Procedure &case presentation -Log book portfolio -Chick list
F. Elicit information using effective nonverbal, explanatory, questioning, and writing skills.		
G. Provide information using effective nonverbal, explanatory, questioning, and writing skills.		
H. Work effectively with others as a member of a health care team or other professional group as regard diagnosis of the above mentioned conditions in A.A		
I .Write a report • Patients' medical reports • Different diagnostic nuclear medicine techniques	-Senior staff experience	

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
J. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society	-Observation Senior staff experience -Case taking	-Objective structured clinical examination -Patient survey
K. Demonstrate a commitment to ethical principles including provision or withholding of clinical care, confidentiality of patient information, informed consent, business practices		
L. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities		-Objective structured clinical examination

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
P. Work effectively in relevant health care delivery settings and systems including good administrative and time management.	-Observation -Senior staff experience	
Q. Practice cost-effective health care and resource allocation that does not compromise quality of care.		-Check list evaluation of live or recorded performance
R. Assist patients in dealing with system complexities.		- Patient survey

Unit (Module) 3 Radioisotopes therapy

A- Knowledge and understanding

ILOs	Methods of teaching/ learning	*Methods of Evaluation*
A. Describe the indications, contra indications, procedures and complications of the following: • Radioiodine therapy of hyperthyroidism and differentiated thyroid carcinoma. • Radionuclide therapy of neuroendocrine tumors • Radionuclide therapy for painful bone disease. • Radionuclide therapy of lymphoma • Radionuclide therapy of primary and metastatic hepatic tumors • Radiosynovectomy	-Didactic (lectures, seminars, tutorial) - journal club, -Critically appraised topic, Educational prescription -Present a case (true or simulated) in a grand round	-Log book& Portfolio -Oral exam & Written exam
B. Mention the principles of: • Hyperthyroidism and differentiated thyroid carcinoma. • Neuroendocrine tumors • Painful bone disease. • Lymphoma • Primary and metastatic hepatic tumors • Radiosynovectomy		
C. State update and evidence based Knowledge of different radionuclide therapeutic procedures for conditions mentioned in A.A		

D. Memorize the facts and principles of the relevant basic and clinically supportive sciences related to Radioisotopes therapy.		
E. Mention the basic ethical and medicolegal principles that should be applied in practice and are relevant to the Radioisotopes therapy.		
F. Mention the basics and standards of quality assurance to ensure good clinical practice in the field of Radioisotopes therapy.		
G. Mention the ethical and scientific principles of medical research methodology		
H. State the impact of common health problems in the field of Radioisotopes therapy and how good clinical practice improve these problems.		

B- Intellectual outcomes

ILOs	Methods of teaching/ Learning	Methods of Evaluation
A. Correlates the facts of relevant basic and clinically supportive sciences with clinical reasoning, diagnosis and management of common diseases related to Radioisotopes therapy.	-Clinical rounds -Senior staff experience	-Procedure & case presentation -log book & portfolio
B. Demonstrate an investigatory and analytic thinking (problem solving) approaches to common clinical situations related to Radioisotopes therapy.		
C. Design and /or present a case or review (through seminars/journal clubs.) in one or more of common clinical problems relevant to the field of Radioisotopes therapy.		
D-Formulate management plans and alternative decisions in different situations in the field of the Radioisotopes therapy.		

C- Practical skills (Patient Care)

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Obtain proper history and examine patients in caring and respectful behaviors.	-Didactic (lectures, seminars, tutorial) -Outpatient -Inpatient -Case presentation -Direct observation	- Log book - Objective structure clinical examination (OSCE) - One MCQ examination at the second half of the second year
B. Order the following non invasive and invasive diagnostic procedures • Blood picture. • Kidney function test. • Thyroid function test. • Other Lab tests according to the case • Tumor markers of thyroid cancer. • Chest X ray. • Neck sonography • CT & MRI scans according to the case • Fine needle aspiration& True cut needle biopsy	-Clinical round with senior staff -Observation -Post graduate teaching -Hand on workshops	-Procedure presentation - Log book - Chick list
E. Perform the following diagnostic procedures according to the case: - Bone scintigraphy - Thyroid scintigraphy - I-131 WBS	-Clinical round with senior staff -Observation -Post graduate teaching -Hand on	

- MIBG Whole body scan - Tumor imaging (Thallium, Gallium, Tc99m MIBI, DMSA-V, ……) - PET and PET/CT studies -Sentinal lymph node localization	workshops	
- D . Interpret the following diagnostic procedures according to the case: Bone scintigraphy - Thyroid scintigraphy - I-131 WBS - MIBG Whole body scan - Tumor imaging (Thallium, Gallium, Tc99m MIBI, DMSA-V, ……) - PET and PET/CT studies -Sentinal lymph node localization		
E. Carry out patient management plans for common conditions related to Radioisotopes therapy.	- Clinical round with senior staff - Perform under supervision of senior staff	
F. Use information technology to support patient care decisions and patient education in common clinical situations related to Radioisotopes therapy.		
G. Provide health care services aimed at preventing health problems related to Radioisotopes therapy.		
H. Provide patient-focused care in common conditions related to Radioisotopes therapy, while working with health care professionals, including those from other disciplines like: • Tracheostomy tube care		

• Disinfection • Caring wounds		
I. Write competently all forms of patient charts and sheets including reports evaluating these charts and sheets.(Write a consultation note, Inform patients of a diagnosis and therapeutic plan, completing and maintaining medical records)		

D-General Skills

Practice-Based Learning and Improvement

ILOs	Methods of teaching/ learning	Methods of Evaluation
A. Perform practice-based improvement activities using a systematic methodology (share in audit and risk management activities and use logbook).	-Case log -Observation and supervision -Written & oral communication	--Log book & portfolio
B. Appraises evidence from scientific studies (journal club)	- Case log - Observation and supervision - Written & oral communication - Journal clubs - Discussions in seminars and clinical rounds	--Log book & portfolio
C. Conduct epidemiological Studies and surveys.		
D. Perform data management including data entry and analysis using information technology to manage information, access on-line medical information; and support their own education		

E. Facilitate learning of junior students and other health care professionals including their evaluation and assessment.	-Clinical rounds -Senior staff experience	

Interpersonal and Communication Skills

ILOs	Methods of teaching/ learning	Methods of Evaluation
F. Maintain therapeutic and ethically sound relationship with patients.	-Observation & supervision -Didactic	Simulation Record review (report)
G. Elicit information using effective nonverbal, explanatory, questioning, and writing skills.		
H. Provide information using effective nonverbal, explanatory, questioning, and writing skills.		
J. Work effectively with others as a member of a health care team or other professional group.		
J. Present a case in common problems of Therapeutic Nuclear Medicine.		
K. Write a report • Patients' medical reports • Death report	-Senior staff experience	
L. Council patients and families about • Sequel of radionuclide therapy and follow-up plan • How to deal with patients receiving radioactive materials.	-Perform under supervision of senior staff	

Professionalism

ILOs	Methods of teaching/ learning	Methods of Evaluation
M. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society	-Observation & supervision -Didactic	-Objective structured clinical examination -Patient survey
N. Demonstrate a commitment to ethical principles including provision or withholding of clinical care, confidentiality of patient information, informed consent, business practices		- 360o global rating
O. Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities		-Objective structured clinical examination -360o global rating

Systems-Based Practice

ILOs	Methods of teaching/ learning	Methods of Evaluation
P. Work effectively in relevant health care delivery settings and systems including good administrative and time management.	-Observation -Senior staff experience	-360o global rating
Q. Practice cost-effective health care and resource allocation that does not compromise quality of care.		-Check list evaluation of live or recorded performance
R. Assist patients in dealing with system complexities.		-360o global rating - Patient survey

4. Course contents (topic s/modules/rotation
Course Matrix

Time Schedule: Second part

Topic	Covered ILOs			
	Knowledge **A**	**Intellectual** B	**Practical skills** C	**General Skills** D
Technology of nuclear medicine				
Skeletal systems: -Radiopharmaceutical -Technique of skeletal scanning -Pitfall in skeletal scanning. ***Endocrine system:**	A	A-C	A	A-D
***Endocrine system:** **A. Thyroid gland:** -Radiopharmaceutical and technique -Cancer thyroid diagnosis **B. Adrenal Gland:** -Radiopharmaceutical and technique **C. Parathyroid gland** -Radiopharmaceurical and technique.	A	A-C	A	A-D
Gentino-Urinary system -Radiopharmaceutical -Techniques of urodynamics -Testicular scintigraphy.	A	A-C	A	A-D
***Hot laboratory technology:** - Design and requirements - Dispensing of RN	A	A-C	A	A-D
***Gamma camera and SPECT system:** - Data acquisition - Spatial resolution - Sensitivity and uniformity of response	A	A-C	A	A-D

- Effect of scattered radiation.				
***Gasro-Intestinal system:** Salivary gland scanning (Radiopharmaceurical and technique) Esophageal transient (Radiopharmaceurical and technique) Gastrooesophageal reflux (Radiopharmaceurical and technique) Gastric emptying (Radiopharmaceurical and technique) Gastrointestinal bleeding (Radiopharmaceurical and technique) Malabsorption and intestinal transient (Radiopharmaceurical and technique)	A	A-C	A	A-D
***Liver-spleen scanning:** Radiopharmaceutical and techique 99m Tc-MAA hepatic arterial perfusion	A	A-C	A	A-D
***Biliary system imaging** Radiopharmaceutical and technique.	A	A-C	A	A-D
* **Pulmonary system:** -Radiopharmaceutical • -Technique of ventilation-perfusion.	A	A-C	A	A-D
Unit 2 Clinical Nuclear Medicine				
• Ischemic heart diseases	A-H	A-D	A-F	A-R
• Renal diseases	A-H	A-D	A-F	A-R
• Thyroid diseases	A-H	A-D	A-F	A-R

• Obstructive uropathy	A-H	A-D	A-F	A-R
• Renovascular hypertension	A-H	A-D	A-F	A-R
• Hepato-biliary diseases	A, D-H	A-D	A-F	A-R
• GIT motility disorders	A, D-H	A-D	A-F	A-R
• GIT bleeding	A,D-H	A-D	A-F	A-R
• Neuro-endocrine tumors	A-H	A-D	A-F	A-R
• Dementias	A,D-H	A-D	A-F	A-R
• Cerebro-vascular diseases	A, D-H	A-D	A-F	A-R
• Metastatic diseases	A-H	A-D	A-F	A-R
• Pyrexia of unknown origin	A-H	A-D	A-F	A-R
• Pulmonary embolism	A-H	A-D	A-F	A-R
Unit 3 Radioisotopes therapy				
• Radioiodine therapy of hyperthyroidism and differentiated thyroid carcinoma	A-H	A-D	A-H	A-R
• Radionuclide therapy of neuroendocrine tumors	A-H	A-D	A-H	A-R
• Radionuclide therapy for painful bone disease	A-H	A-D	A-H	A-R
• Radionuclide therapy of lymphoma	A-H	A-D	A-H	A-R
• Radionuclide therapy of primary and metastatic hepatic tumors	A-H	A-D	A-H	A-R
• Radiosynovectomy	A-H	A-D	A-H	A-R

5. Course methods of teaching/learning:

1. Didactic (lectures, seminars, tutorial)
2. Clinical rounds
3. Clinical rotations
4. Service teaching
5. Post graduate teaching
6. Hand on workshops
7. Perform under supervision of senior staff
8. Simulations
9. Senior staff experience
10. Case presentation
11. Case taking
12. Outpatient
13. Inpatient
14. Direct observation
15. journal club,
16. Critically appraised topic
17. Educational prescription
18. Observation and supervision
19. Written & oral communications

6. Course methods of teaching/learning: for students with poor achievements

3. Extra Didactic (lectures, seminars, tutorial) according to their needs
4. Extra training according to their needs

7. Course assessment methods:

i. Assessment tools:

1. Oral examination
2. Clinical examination
3. Written examination

4. One MCQ examination
5. Objective structure clinical examination (OSCE)
6. Procedure & case Log b& Portfolios
7. Simulation
8. Record review (report)
9. Patient survey
10. 360o global rating
11. Check list evaluation of live or recorded performance

ii. Time schedule: At the end of the second part

iii. Marks: 1200 mark

8. List of references

i. Lectures notes

- Course notes
- Staff members print out of lectures and/or CD copies

ii. Essential books

- **Nuclear Medicine: The Requisites.** James H. Thrall, Harvey A. Ziessman – 2020, 5th edition

iii. Recommended books

- **Essentials of Nuclear Medicine and Molecular Imaging: Expert Consult - Online and Print** by Fred A. Mettler Jr. MD MPH and Milton J. Guiberteau MD FACR FACNM | Nov 21, 2018

iv. Periodicals, Web sites, … etc

- The Journal of Nuclear medicine
- Journal of clinical Nuclear Medicine

- European Journal of Nuclear Medicine and Molecular Imaging
- www.snm.org
- www.pubmed.com
- www.eanm.org

v. others

- Atlas of Nuclear Medicine

9. Signatures

Course Coordinator: Ass Prof. Dr./Lamiaa Mahmoud	**Head of the Department:** Prof. Dr./Samir Shehata
Date:	**Date:**

ANNEX 2
Program Academic Reference Standards (ARS)

1- Graduate attributes for master degree in Nuclear Medicine

***The Graduate (after residence training and master degree years of study) must*:**

1- Have the capability to be a scholar, understanding and applying basics, methods and tools of scientific research and clinical audit in Nuclear Medicine.

2- Appraise and utilise scientific knowledge to continuously update and improve clinical practice in Nuclear Medicine.

3- Acquire sufficient medical knowledge in the basic biomedical, clinical, behavioural and clinical sciences, medical ethics and medical jurisprudence and apply such knowledge in patient care in the field of Nuclear Medicine.

4- Provide patient care that is appropriate, effective and compassionate for dealing with common health problems and health promotion using evidence-based and updated information.

5- Identify and share to solve health problems in his speciality.

6- Acquire all competencies –including the use of recent technologies- that enable him to provide safe, scientific, and ethical and evidence based clinical care including update use of new technology in Nuclear Medicine.

7- Demonstrate interpersonal and communication skills that ensure effective information exchange with individual patients and their families and teamwork with other health professions, the scientific community and the public.

8- Function as supervisor, and trainer in relation to colleagues, medical students and other health professions.

9- Acquire decision making capabilities in different situations related to Nuclear Medicine.

10- Show responsiveness to the larger context of the health care system, including e.g. the organisation of health care, partnership with health care providers and managers, practice of cost-effective health care, health economics, and resource allocations.

11- Be aware of public health and health policy issues and share in system-based improvement of health care.

12- Show appropriate attitudes and professionalism.

13- Demonstrate skills of lifelong learning and maintenance of competence and ability for continuous medical education and learning in subsequent stages in Nuclear Medicine or one of its subspecialties.

2- Competency based Standards for clinical master degree graduates

2.1- Knowledge and understanding

By the end of the program, the graduate should demonstrate satisfactory knowledge and understanding of

2-1-A- Established basic, biomedical, clinical, epidemiological and behavioral sciences related conditions, problem and topics.

2-1-B- The relation between good clinical care of common health problems in the speciality and the welfare of society.

2-1-C- Up to date and recent developments in common problems related to *Nuclear Medicine*.

2-1-D- Ethical and medicolegal principles relevant to practice in Nuclear Medicine.

2-1-E -Quality assurance principles related to the good medical practice in Nuclear Medicine.

2-1-F- Ethical and scientific basics of medical research.

2.2- Intellectual skills:

By the end of the program, the graduate should be able to demonstrate the following:

2-2-A- Correlation of different relevant sciences in the problem solving and management of common diseases of *Nuclear Medicine.*

2-2-B- Problem solving skills based on data analysis and evaluation (even in the absence of **some) for common clinical situations related to** *Nuclear Medicine.*

2.2- C- Demonstrating systematic approach in studying clinical problems relevant to *Nuclear Medicine.*

2-2-D- M**aking alternative decisions in different** situations **in** *Nuclear Medicine .*

2.3- Clinical skills

By the end of the program, the graduate should be able to

2-3-A - Provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

2-3-B- Demonstrate patient care skills relevant to *Nuclear Medicine* for patients with common diseases and problems.

2-3- C- Write and evaluate reports for situations related to the field of *Nuclear Medicine.*

2.4- General skills

By the end of the program, the graduate should be able to

- ***Competency-based outcomes for Practice-based Learning and Improvement***

2-4-A- Demonstrate practice-based learning and improvement skills that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence,, improvements in patient care and risk management.

2-4-B- Use all information sources and technology to improve his practice.

2-4-C- Demonstrate skills of teaching and evaluating others.

- ***Competency-based objectives for Interpersonal and Communication Skills***

2-4-D- Demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their families, and other health professionals.

- ***Competency-based objectives for Professionalism***

2-4-E- Demonstrate professionalism behaviors, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.

- ***Competency-based objectives for Systems-based Practice***

2-4-F- Demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively use system resources to provide care that is of optimal value.

2-4-g- Demonstrate skills of effective time management.

2-4-H- Demonstrate skills of self and continuous learning.

Annex 3, Methods of teaching/learning

Annex 3, Methods of teaching/learning

	Patient care	**Medical knowledge**	**Practice-based learning/ Improvement**	**Interpersonal and communication skills**	**Professionalism**	**Systems-based practice**
Didactic (lectures, seminars, tutorial)	X	X		X	X	X
journal club,	X	X	X			
Educational prescription	X	X	X	X	X	X
Present a case (true or simulated) in a grand round	X	X	X	X	X	
Observation and supervision	X		X	X	X	X
conferences		X	X	X		X
Written assignments	X	X	X	X	X	X
Oral assignments	X	X	X	X	X	X

Teaching methods for knowledge

- ❖ Didactic (lectures, seminars, tutorial)
- ❖ journal club
- ❖ Critically appraised topic
- ❖ Educational prescription (a structured technique for following up on clinical questions that arise during rounds and other venues).
- ❖ Present a case (true or simulated) in a grand round
- ❖ Others

Teaching methods for patient care

- ❖ Observation and supervision /Completed tasks procedure/case logs
- ❖ On-the-job" training without structured teaching is not sufficient for this skill (checklists).
- ❖ Simulation is increasingly used as an effective method for skill/ teamwork training.

Teaching methods for other skills

- ❖ Written communication (e.g., orders, progress note, transfer note, discharge summary, operative reports, and diagnostic reports).
- ❖ Oral communication (e.g., presentations, transfer of care, interactions with patients, families, colleagues, members of the health care team) and/or non verbal skills (e.g., listening, team skills)
- ❖ Professionalism, including medical ethics, may be included as a theme throughout the program curriculum

that includes both didactic and experiential components (e.g., may be integrated into already existing small group discussions of vignettes or case studies and role plays, computer-based modules) and may be modeled by the faculty in clinical practice and discussed with the resident as issues arise during their clinical practice.

Annex 4, Assessment methods

Annex 4, ILOs evaluation methods for Master Degree students.

Method	Practical skills	K	Intellectual	General skills			
	Patient care	K	I	Practice-based learning/ Improvement	Interpersonal and communication skills	Professionalism	Systems-based practice
Record review	X	X	X		X	X	X
Checklist	X				X		
Global rating	X	X	X	X	X	X	X
Simulations	X	X	X	X	X	X	
Portfolios	X	X	X	X	X		
Standardized oral examination	X	X	X	X	X		X
Written examination	X	X	X	X			X
Procedure/ case log	X	X					
OSCE	X	X	X	X	X	X	X

Annex 4, Glossary of Master Degree doctors assessment methods

- Record Review – Abstraction of information from patient records, such as medications or tests ordered and comparison of findings against accepted patient care standards.

- Chart Stimulated Recall – Uses the MSc doctor's patient records in an oral examination to assess clinical decision-making.

- Mini clinical evaluation: Evaluation of Live/Recorded Performance (single event) – A single resident interaction with a patient is evaluated using a checklist. The encounter may be videotaped for later evaluation.

- Standardized Patients (SP) – Simulated patients are trained to respond in a manner similar to real patients. The standardized patient can be trained to rate MSc doctor's performance on checklists and provide feedback for history taking, physical examination, and communication skills. Physicians may also rate the MSc doctor's performance.

- Objective Structured Clinical Examination (OSCE) – A series of stations with standardized tasks for the MSc doctors to perform. Standardized patients and other assessment methods often are combined in an OSCE. An observer or the standardized patient may evaluate the MSc doctors.

- Procedure or Case Logs – MSc doctors prepare summaries of clinical experiences including clinical data. Logs are

useful to document educational experiences and deficiencies.

- PSQs – Patients fill out Patient Survey questionnaires (PSQs) evaluating the quality of care provided by a MSc doctors.

- Case /problems – assess use of knowledge in diagnosing or treating patients or evaluate procedural skills.

- Models: are simulations using mannequins or various anatomic structures to assess procedural skills and interpret clinical findings. Both are useful to assess practice performance and provide constructive feedback.

- 360 Global Rating Evaluations – MSc doctors, faculty, nurses, clerks, and other clinical staff evaluate MSc doctors from different perspectives using similar rating forms.

- Portfolios – A portfolio is a set of project reports that are prepared by the MSc doctors to document projects completed during the MSc study years. For each type of project standards of performance are set. Example projects are summarizing the research literature for selecting a treatment option, implementing a quality improvement program, revising a medical student clerkship elective, and creating a computer program to track patient care and outcomes.

- Examination MCQ – A standardized examination using multiple-choice questions (MCQ). The in-training examination and written board examinations are examples.

- Examination Oral – Uses structured realistic cases and patient case protocols in an oral examination to assess clinical decision-making.

- Procedure or Case Logs – MSc doctors prepare summaries of clinical experiences including clinical data. Logs are useful to document educational experiences and deficiencies.

- PSQs – Patients fill out Patient Survey questionnaires (PSQs) evaluating the quality of care provided by MSc doctors.

Annex 5, Program evaluation tools

By whom	Method	sample
Quality Assurance Unit	Reports Field visits	#
External Evaluator (s):According to department council External Examiner (s): According to department council	Reports Field visits	#
Stakeholders	Reports Field visits questionnaires	#
Senior students	Questionnaires	#
Alumni	Questionnaires	#

Annex 6, Program Correlations:

مصفوفة توافق المعايير القومية القياسية العامة لبرامج الماجستير مع المعايير الأكاديمية المعتمدة من كلية الطب □ جامعة أسيوط لدرجة الماجستير في الطب النووي

General Academic Reference Standards (GARS) versus Program ARS

1- Graduate attributes

Faculty ARS	NAQAAE General ARS for Postgraduate Programs
1- Have the capability to be a scholar, understanding and applying basics, methods and tools of scientific research and clinical audit in *Nuclear Medicine.*	1- إجادة تطبيق أساسيات و منهجيات البحث العلمي واستخدام أدواته المختلفة
2- Appraise and utilise scientific knowledge to continuously update and improve clinical practice in *Nuclear Medicine.*	2-تطبيق المنهج التحليلي واستخدامه في مجال التخصص
3- Acquire sufficient medical knowledge in the basic biomedical, clinical, behavioural and clinical sciences, medical ethics and medical jurisprudence and apply such knowledge in patient care in *Nuclear Medicine.*	3-تطبيق المعارف المتخصصة و دمجها مع المعارف ذات العلاقة في ممارسته المهنية
4- Provide patient care that is appropriate, effective and compassionate for dealing with common health problems and health promotion using evidence-based and update information.	4-إظهار وعيا بالمشاكل الجارية و الرؤى الحديثة في مجال التخصص
5- Identify and share to solve health problems in *Nuclear Medicine.*	5-تحديد المشكلات المهنية و إيجاد حلولا لها
6- Acquire all competencies that enable him to provide safe, scientific, ethical and evidence based clinical care including update use of new technology in *Nuclear Medicine.*	6-إتقان نطاق مناسب من المهارات المهنية المتخصصة، واستخدام الوسائل التكنولوجيةالمناسبة بما يخدم ممارسته المهنية

7- Demonstrate interpersonal and communication skills that ensure effective information exchange with individual patients and their families and teamwork with other health professions, the scientific community and the public. 8- Function as supervisor, and trainer in relation to colleagues, medical students and other health professions.	7–التواصل بفاعلية و القدرة على قيادة فرق العمل
9- Acquire decision making capabilities in different situations related to *Nuclear Medicine.*	8–اتخاذ القرار في سياقات مهنية مختلفة
10- Show responsiveness to the larger context of the health care system, including e.g. the organisation of health care, partnership with health care providers and managers, practice of cost-effective health care, health economics, and resource allocations.	9– توظيف الموارد المتاحة بما يحقق أعلي استفادة و الحفاظ عليها
11- Be aware of public health and health policy issues and share in system-based improvement of health care.	10–إظهار الوعي بدوره في تنمية المجتمع و الحفاظ على البيئة في ضوء المتغيرات العالمية و الإقليمية
12- Show appropriate attitudes and professionalism.	11–التصرف بما يعكس الالتزام بالنزاهة و المصداقية و الالتزام بقواعد المهنة
13- Demonstrate skills of lifelong learning and maintenance of competence and ability for continuous medical education and learning in subsequent stages in *Nuclear Medicine* or one of its subspecialties.	12–تنمية ذاته أكاديميا و مهنيا و قادرا علي التعلم المستمر

2. Academic standard

Faculty ARS	NAQAAE General ARS for Postgraduate Programs
2.1.A -Established basic, biomedical, clinical, epidemiological and behavioral sciences related conditions, problems and topics.	2-1-أ-النظريات و الأساسيات المتعلقة بمجال التعلم وكذا في المجالات ذات العلاقة.
2.1.B- The relation between good clinical care of common health problems in *Nuclear Medicine* and the welfare of society.	2-1-ب-التأثير المتبادل بين الممارسة المهنية وانعكاسها علي البيئة.
2.1. C- Up to date and recent developments in common problems related to *Nuclear Medicine.*	2-1-ج-التطورات العلمية في مجال التخصص.
2.1. D- Ethical and medicolegal principles relevant to practice in the *Nuclear Medicine..*	2-1-د-المبادئ الأخلاقية و القانونية للممارسة المهنية في مجال التخصص.
2.1. E-Quality assurance principles related to the good medical practice in *Nuclear Medicine.*	2-1-هـ- مبادئ و أساسيات الجودة في الممارسة المهنية في مجال التخصص
2.1. F- Ethical and scientific basics of medical research.	2-1-و- أساسيات وأخلاقيات البحث العلمي

2.2. A-Correlation of different relevant sciences in the problem solving and management of common diseases of *Nuclear Medicine.* 2.2. B- Problem solving skills based on data analysis and evaluation (even in the absence of some) for common clinical situations related to *Nuclear Medicine.*	2-2-أ- تحليل و تقييم المعلومات في مجال التخصص والقياس عليها لحل المشاكل
2.2. B- Problem solving skills based on data analysis and evaluation (even in the absence of some) for common clinical situations related to *Nuclear Medicine.*	2-2-ب- حل المشاكل المتخصصة مع عدم توافر بعض المعطيات
2.2. A-Correlation of different relevant sciences in the problem solving and management of common diseases of *Nuclear Medicine.*	2-2-ج- الربط بين المعارف المختلفة لحل المشاكل المهنية
2.2. C- Demonstrating systematic approach in studying clinical problems relevant to the *Nuclear Medicine.*	2-2-د- إجراء دراسة بحثية و /أو كتابة دراسة علمية منهجية حول مشكلة بحثية
2.4.A-Demonstrate practice-based learning and Improvement skills that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, improvements in patient care and risk management	2-2هـ- تقييم المخاطر في الممارسات المهنية في مجال التخصص
2.4.A-Demonstrate practice-based learning and Improvement skills that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence,	2-2-و- التخطيط لتطوير الأداء في مجال التخصص

improvements in patient care and risk management	
2.2.D- Making alternative decisions in different situations in the field of *Nuclear Medicine.*	2-2-ز- اتخاذ القرارات المهنية في سياقات مهنية متنوعة
2.3.A- provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. 2.3.B- Demonstrate patient care skills relevant to *Nuclear Medicine* for patients with common diseases and problems.	2-3-أ- إتقان المهارات المهنية الأساسية و الحديثة في مجال التخصص
2.3.C- Write and evaluate reports for Situation related to *Nuclear Medicine..*	2-3-ب- كتابة و تقييم التقارير المهنية
2.3.A- provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. 2.3.B- Demonstrate patient care skills relevant to that speciality for patients with common diseases and problems.	2-3-ج- تقييم الطرق و الأدوات القائمة في مجال التخصص
2.4.D- Demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their families, and other health professionals.	2-4-أ-التواصل الفعال بأنواعه المختلفة
2.4.A-Demonstrate practice-based learning and improvement skills investigation that involves and evaluation of their own patient care, appraisal and	2-4-ب- استخدام تكنولوجيا المعلومات بما يخدم الممارسة المهنية

assimilation of scientific evidence, improvements in patient care and risk management 2.4.B- Use all information sources and technology to improve his practice.	
2.4.A-Demonstrate practice-based learning and improvement skills that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, improvements in patient care and risk management 2.4.B- Use all information sources and technology to improve his practice. 2.4.E-Demonstrate professionalism behavior, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.	2-4-ج- التقييم الذاتي وتحديد احتياجاته التعلمية الشخصية
2.4.A-Demonstrate practice-based learning and improvement skills that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, , improvements in patient care and risk management.	2-4-د- استخدام المصادر المختلفة للحصول على المعلومات و المعارف
2.4. C- Demonstrate skills of teaching and evaluating others.	2-4-هـ- وضع قواعد ومؤشرات تقييم أداء الآخرين

2.4. F- Demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively use system resources to provide care that is of optimal value.	2-4-و- العمل في فريق ، وقيادة فرق في سياقات مهنية مختلفة
2.4.G- Demonstrate skills of effective time management.	2-4-ز- إدارة الوقت بكفاءة
2.4.H- Demonstrate skills of self and continuous learning.	2-4-ح- التعلم الذاتي و المستمر

Comparison between ARS and ILOS for master degree in Nuclear Medicine.

(ARS)	(ILOs)
2-1- Knowledge and understanding **2-1-A-** Established basic, biomedical, clinical, epidemiological and behavioral sciences related conditions, problem and topics.	***2-1- Knowledge and understanding*** **2-1-A**- Explain the essential facts and principles of relevant basic sciences including, Physics of Nuclear radiation, Biological effects of radiation and protection, Pathology and Biochemistry related to Nuclear Medicine 2-1-B- Mention essential facts of clinically supportive sciences including Basics of internal Medicine & neonatology and general surgery related to *Nuclear Medicine.* **2-1-C-** Demonstrate sufficient knowledge of etiology, clinical picture, diagnosis, prevention and treatment of the common diseases and situations related to *Nuclear Medicine.*
2-1-B The relation between good clinical care of common health problem in the *Nuclear Medicine* and the welfare of society.	**2-1-H-** State the impact of common health problems in the field of *Nuclear Medicine* on the society and how good clinical practice improve these problems.
2-1-C- Up to date and recent developments in common problems related to the field of *Nuclear Medicine* **.**	**2-1-C-** Demonstrate sufficient knowledge of etiology, clinical picture, diagnosis, prevention and treatment of the common diseases and situations related to *Nuclear Medicine.* **2-1-D-** Give the recent and update developments in the pathogenesis, diagnosis, prevention and treatment of common diseases related to *Nuclear Medicine.*
2-1-D- Ethical and medicolegal Principles relevant to practice in the *Nuclear Medicine* field.	**2-1-E-** Mention the basic ethical and medicolegal principles that should be applied in practice and are relevant to the field of *Nuclear Medicine.*

2-1-E-Quality assurance principles related to the good medical practice in the *Nuclear Medicine* field.	**2-1-F-** Mention the basics and standards of quality assurance to ensure good clinical practice in the field of *Nuclear Medicine.*
2-1-F- Ethical and scientific basics of medical research.	**2-1-G-** Mention the ethical and scientific principles of medical research methodology**.**
***2-2- Intellectual skills*:**	***2-2- Intellectual skills:***
2-2-A-Correlation of different relevant sciences in the problem solving and management of common diseases of the *Nuclear Medicine.*	**2-2-A-** Correlate the facts of relevant basic and clinically supportive sciences with clinical reasoning, diagnosis and management of common diseases of the *Nuclear Medicine.*
2-2-B-Problem solving skills based on data analysis and evaluation (even in the absence of some) for common clinical situations related to *Nuclear Medicine.*	**2-2-B-** Demonstrate an investigatory and analytic thinking approach (problem solving) to common clinical situations related to *Nuclear Medicine.*
2-2-C- Demonstrating systematic approach in studding clinical problems relevant to the *Nuclear Medicine* field.	**2-2-C-** Design and /or present a case or review (through seminars/journal clubs.) in one or more of common clinical problems relevant to the *Nuclear Medicine* field.
2-2-D Making alternative decisions in different situations in the field of the *Nuclear Medicine.*	**2-2-D-** Formulate management plans and alternative decisions in different situations in the field of the *Nuclear Medicine.*

Continuous (ARS)	continuous (ILOs)
2-3- Clinical skills:	***2/3/1/Practical skills (Patient Care :)***
2-3-A- Provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.	**2-3-1-A-** Obtain proper history and examine patients in caring and respectful behaviors.
	2-3-1-B- Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment for common conditions related to *Nuclear Medicine.*
2-3-B- Demonstrate patient care skills relevant to that *Nuclear Medicine* for patients with common diseases and problems.	**2-3-1-C-** Carry out patient management plans for common conditions related to *Nuclear Medicine.*
	2-3-1-D- Use information technology to support patient care decisions and patient education in common clinical situations related to *Nuclear Medicine.*
	2-3-1-E- Perform competently non invasive and invasive procedures considered essential for the *Nuclear Medicine.*
	2-3-1-F- Provide health care services aimed at preventing health problems related to *Nuclear Medicine.*
	2-3-1-G- Provide patient-focused care in common conditions related to *Nuclear Medicine*, while working with health care professionals, including those from other disciplines.
2-3-C- Write and evaluate reports for situations related to the field of *Nuclear Medicine.*	**-3-1-H** Write competently all forms of patient charts and sheets including reports evaluating these charts and sheets. (Write a consultation note, Inform patients of a diagnosis and therapeutic plan, completing and maintaining medical records).

2-4- General skills	***2/3/2 General skills***
2-4-A- Demonstrate practice-based learning and improvement skills that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, improvements in patient care and risk management	**2-3-2-A-** Perform practice-based improvement activities using a systematic methodology (share in audits and risk management activities and use logbooks). **2-3-2-B-** Appraises evidence from scientific studies. **2-3-2-C-** Conduct epidemiological studies and surveys.
2-4-B- Use all information sources and technology to improve his practice.	**2-3-2-C-** Conduct epidemiological studies and surveys. **2-3-2-D**.Perform data management including data entry and analysis and using information technology to manage information, access on-line medical information; and support their own education.
2-4-C- Demonstrate skills of teaching and evaluating others.	**2-3-2-E-** Facilitate learning of students other health care professionals including their evaluation and assessment.
2-4-D- Demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their families, and other health professionals.	**2-3-2-F-** Maintain therapeutic and ethically sound relationship with patients. **2-3-2-G-** Elicit information using effective nonverbal, explanatory, questioning, and writing skills. **2-3-2-H-** Provide information using effective nonverbal, explanatory, questioning, and writing skills. **2-3-2-I-** Work effectively with others as a member of a health care team or other professional group.
2-4-E-Demonstrate professionalism behaviors, as manifested through a commitment to carrying out professional	**2-3-2-J-** Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society. **2-3-2-K**- Demonstrate a commitment to

responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.	ethical principles including provision or withholding of clinical care, confidentiality of patient information, informed consent, business practices. **2-3-2-L**-Demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities.
2-4-F- Demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively use system resources to provide care that is of optimal value.	**2-3-2-M**-Work effectively in relevant health care delivery settings and systems including good administrative and time management **2-3-2-N-** Practice cost-effective health care and resource allocation that does not compromise quality of care. **2-3-2-O**- Assist patients in dealing with system complexities.
2-4-G- Demonstrate skills of effective time management	**2-3-2-M**-Work effectively in relevant health care delivery settings and systems including good administrative and time management
2-4-H- Demonstrate skills of self and continuous learning.	**2-3-2-A-** Perform practice-based improvement activities using a systematic methodology (share in audits and risk management activities and use logbooks).

III-Program matrix
Knowledge and Understanding

Course	Program covered ILOs							
	2/1/A	2/1/B	2/1/C	2/1/D	2/1/E	2/1/F	2/1/G	2/1/H
Course 1 (Physics of Nuclear Medicine	✓							
Course 2 (Biological effects of radiation and protection)	✓							
Course 3 (Pathology and Nuclear Medicine)	✓							
Course 4 (Biochemistry and Nuclear Medicine)	✓							
Course 7 (General surgery related nuclear medicine)	✓	✓	✓	✓				
Course 8 (Internal medicine related nuclear medicine)	✓	✓	✓	✓	✓	✓	✓	✓
Course 6 Clinical nuclear medicine	✓	✓	✓	✓	✓	✓	✓	✓

Intellectual

Course	Program covered ILOs			
	2/2/A	2/2/B	2/2/C	2/2/D
Course 1 (Physics of Nuclear Medicine)	✓			
Course 2 (Biological effects of radiation and protection)	✓	✓		
Course 3 (Pathology and Nuclear Medicine)	✓			
Course 4 (Biochemistry and Nuclear Medicine)	✓			
Course 7 (General surgery related nuclear medicine)	✓		✓	
Course 8 (Internal medicine related nuclear medicine)	✓	✓	✓	✓
Course 6 Clinical nuclear medicine	✓	✓	✓	✓

Practical Skills (Patient Care)

Course	Program covered ILOs							
	2/3/1/A	2/3/1/B	2/3/1/C	2/3/1/D	2/3/1/E	2/3/1/F	2/3/1/G	2/3/1/H
Course 1 (Physics of Nuclear Medicine)				✓				
Course 2 (Biological effects of radiation and protection)		✓				✓		
Course 3 (Pathology and Nuclear Medicine)				✓	✓			
Course 4 (Biochemistry and Nuclear Medicine)				✓				
Course 7 (General surgery related nuclear medicine)	✓	✓	✓					
Course 8 (Internal medicine related nuclear medicine)	✓	✓	✓	✓	✓	✓	✓	
Course 6 Clinical nuclear medicine	✓	✓	✓	✓	✓	✓	✓	✓

General Skills

Course	Program covered ILOs							
	2/3/2/ A	2/3/2/ B	2/3/2/ C	2/3/2/ D	2/3/2/ E	2/3/2/ F	2/3/2/ G	2/3/2/ H
Course 1 (Physics of Nuclear Medicine)				✓				✓
Course 2 (Biological effects of radiation and protection)				✓				✓
Course 3 (Pathology and Nuclear Medicine)				✓				✓
Course 4 (Biochemistry and Nuclear Medicine)				✓				✓
Course 7 (General surgery related nuclear medicine)	✓			✓	✓	✓	✓	
Course 8 (Internal medicine related nuclear medicine)	✓	✓	✓	✓	✓	✓	✓	✓
Course 6 Clinical nuclear medicine	✓	✓	✓	✓	✓	✓	✓	✓

General Skills

Course	Program covered ILOs						
	2/3/2/I	2/3/2/J	2/3/2/K	2/3/2/L	2/3/2/M	2/3/2/N	2/3/2/O
Course 1 (Physics of Nuclear Medicine)			✓		✓		
Course 2 (Biological effects of radiation and protection)			✓		✓		
Course 3 (Pathology and Nuclear Medicine)			✓		✓		
Course 4 (Biochemistry and Nuclear Medicine)			✓		✓		
Course 7 (General surgery related nuclear medicine)		✓			✓		
Course 8 (Internal medicine related nuclear medicine)	✓	✓	✓	✓	✓	✓	✓
Course 6 Clinical nuclear medicine	✓	✓	✓	✓	✓	✓	✓

Annex 7, Additional information:

Department information

Equipments and Specialized Units:

- Clinical Oncology and Nuclear Medicine patients' wards:
- Daily Nuclear Medicine out patients' clinics (new patients, follow up post discharge appointments, discharged critical care patients Follow up clinic)
- Hot Laboratory (equipped with dose calibrator, survey meter, storage area for radiopharmaceutials, dosimeters,……..) the lab is fully equipped for safe handling and administration of radiopharmaceutials
- Gamma Camera Unit.
- PET/CT unit.
- Scientific Library (Clinical Oncology and Nuclear Medicine Text Books and periodicals), MD, MSc thesis,
- Seminar room with data show
- Electronic Library of Scientific Seminars, case presentations.
- Data base filing of all the cases, procedures and out patient clinic data

Staff members

Prof. Dr./ Mohamed A. Mekkawy
Ass. Prof./ Waleed Ahmad Diab
Ass. Prof Dr./ Lamia Mahmoud
Ass. Prof DR./ Nadia mohany

Opportunities within the department

Clinical Oncology and Nuclear Medicine patients' wards:

- Hot Laboratory
- Gamma Camera Unit.
- PET/CT machin.
- Scientific Library
- Seminar room with data show
- Electronic Library of Scientific Seminars, case presentations.
- Data base filing of all the cases, procedures and out patient clinic data

Department quality control insurance for completing the program

- Evaluation by the Department head and stuff members.
- Regular assessments.
- Log book monitoring.
- Recent equipments and Specialized Units.

(End of the program specifications)