

Peer Revision

Reviewers	University	Date of Revision
- Prof. Dawlat Salem	Cairo	10/12/2011
- Prof. Ahmad K. Mansur	Mansura	28/11/2011

Program Specification of Master degree in Nuclear Medicine

Sohag University

Faculty of Medicine

A. Basic Information

1. Program Title: MASTER DEGREE IN NUCLEAR MEDICINE
2. Program Type: Single
- 1- Faculty: Faculty of Medicine
- 2- Department: Oncology and Nuclear Medicine
- 3- Coordinator: prof: Prof Al-Saied mostafa
- 4- Assistant coordinator: Dr. Wafaa Abd Elhamied
- 5- External Evaluator(s): prof: Hosna Mohamed Mustafa
- 6- Last date of program specifications approval: Faculty council No. "317",
decree No. "1533" dated 17/12/2018.

B. Professional Information

1. Program Aims:

The aim of this program is to provide the postgraduate with the medical knowledge and skills essential for the practice of specialty and necessary to gain further training and practice in the field of Nuclear Medicine through providing:

- 1- Scientific knowledge essential for practice of Nuclear Medicine according to the international standards.
- 2- Skills necessary for proper diagnosis and management of patients including diagnostic, problem solving and decision making skills.
- 3- Ethical principles related to the practice in this specialty.
- 3- Active participation in community needs assessment and problems solving.
- 5- Maintenance of learning abilities necessary for continuous medical education.
- 6- Maintenance of research interest and abilities.

2. Attributes of the student:

1. Mastering the basics of scientific research methodologies.
2. The application of the analytical method and used in the field of nuclear medicine.
3. The application of specialized knowledge and integrate it with the relevant knowledge in practice.
4. Be aware of the problems and has modern visions in the field of nuclear medicine.
5. Identify problems in the field of nuclear medicine and find solutions to them.
6. Mastery of professional skills in this specialty and use of the appropriate recent technologies supporting these skills.
7. Communicate effectively and the ability to lead work teams.
8. Decision-making in his professional contexts.
9. To employ and preserve the available resources to achieve the highest benefit.
10. Awareness of his role in the community development and preservation of the environment at the lights of both international and regional variables.



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7. Communicate effectively and the ability to lead work teams.
8. Decision-making in his professional contexts.
9. To employ and preserve the available resources to achieve the highest benefit.
10. Awareness of his role in the community development and preservation of the environment at the lights of both international and regional variables.

11. Reflects the commitment to act with integrity and credibility, responsibility and commitment to rules of the profession.
12. Academic and professional self development and be capable of continuous learning.

3. Program Intended Learning Outcomes (ILOs)

a) Knowledge and Understanding:

By the end of the study of doctoral program in Nuclear Medicine the Graduate should be able to :

- a1. Mention physics related to nuclear Medicine
- a2. Enumerate methods of radioactive protection
- a3. List the clinical pathology related to nuclear medicine.
- a4. Mention nuclear medicine technology of different diseases
- a5. Mention radiobiology.
- a6. Explain biostatistics
- a7. Describe surgery related to the nuclear medicine.
- a8. Discuss Nuclear Medicine uses in cancer and non cancer diseases
- a9. Mention internal medicine diseases that related to nuclear medicine.
- a10. Enumerate different uses of PET.
- a11. Enumerate basic biochemistry and its relation to nuclear medicine field

b) Intellectual Skills

By the end of the study of doctoral program in Nuclear Medicine the Graduate should be capable of:

- b1. Interpret data acquired through history taking of the patient to reach a provisional diagnosis for the patient scan.
- b2. Select from different diagnostic alternatives the ones that help reaching a final solving for the problems in nuclear medicine.
- b3. Conduct research studies, that adds to knowledge.
- b4. Formulate scientific papers in the area of Nuclear Medicine.
- b5. Assess risk in professional practices in the field of Nuclear Medicine.
- b6. Plan to improve performance in the field of Nuclear Medicine.
- b7. Identify Nuclear Medicine problems and final solutions.
- b8. Have the ability to innovate nontraditional solutions to Nuclear Medicine problems.
- b9. Manage Scientific discussion based on scientific evidences and proofs.
- b10. Criticize researches related to Nuclear Medicine.

c) Professional and Practical Skills

By the end of the study of doctoral program in Nuclear Medicine the Graduate should be able to:

- c1. Master the basic and modern professional clinical and medical skills in the area of nuclear medicine.
- c2. Write and evaluate medical reports.
- c3. Evaluate and develop methods and tools existing in the area of Nuclear Medicine.
- c4. Perform imaging evaluation of Nuclear Medicine problems.
- c5. Train junior staff through continuous medical education programs.
- c6. Design new methods, tools and ways of professional practice.

d) General and Transferable Skills

By the end of the study of doctoral program in Nuclear Medicine the Graduate should be capable of:

- d1. Present reports in seminars effectively.
- d2. Use appropriate computer programs.
- d3. Teach others and evaluate their performance.
- d4. Assess himself and identify his personal learning needs.
- d5. Use of different sources for information and knowledge.
- d6. Work coherently and successfully as part of a team and team's leadership.
- d7. Manage scientific meetings according to the available time.

4. Academic Standards

Sohag Faculty Of Médecine adopted the general National Academic Reference Standards (NARS) Provided by the national authority for quality assurance and accreditation of education (naqqe) for postgraduate programs. This was approved by the Faculty Council decree NO.6854, in its session NO.177 Dated:18/5/2009. Based on these NARS; Academic Reference Standards(ARS) were suggested for this program. These ARS were approved by the Faculty Council decree NO. 7528, in its session NO.191 Dated:15/3/2010. The adoption of NARS and the suggested ARS were approved by University council degree No 587, in its session No.60. Dated 26-12-2011

5. Curriculum Structure and Contents

- 5. a- Program duration 6 semesters (3 years)
- 5. b- Program structure
- 5. b.i- No. of hours per week:

Subject	hours /week		
	Lectures	Practical	Clinical
<u>First Part:</u>			
Minors :			
Bio Statistics & Computer	15	30	---
Physics	15	30	
Biochemistry	15	--	
Pathology	15	30	
Radiobiology & Radiation Protection	15	30	
Technology	15	30	
Internal Medicine	15		30
Surgery	15		30
<u>Second Part:</u>			
Nuclear Medicine and PET	210		300

code	Item	No	%	
b.i	Total credit hours	Compulsory	٥٠	١٠٠
		Elective	٠	٠
		Optional	٠	٠
b.iii	credit hours of basic sciences courses	٧	١٤	
b.iv	credit hours of courses of social sciences and humanities	٠	٠	
b.v	credit hours of specialized courses:	30	٦٠	
b.vi	credit hours of other course	٢	٤	
b.vii	Practical/Field Training	٥	١٠	
b.viii	Program Levels (in credit-hours system):			
	Level 1: 1 st part	١٥	٣٠	
	Level 2: 2 nd Part	٢٤	٤٨	
	Level 3: Thesis	٦	١٢	

6. Program Courses 10 courses are compulsory

6.1- Level of program:

Semester...1.....

First part

a. Compulsory

Course Title	No. of hours	No. of hours /week Lect.	Practical	Program ILOs Covered (By No.)
FIRST PART:				
Minors:				
Bio Statistics	45	15	30	a6 ,d1,d2,d3,d4,
Physics	45	15	30	a1,b2,c6
Biochemistry	45	15	30	a11,c1,c2,c3,c4,c5
Pathology	45	15	30	c6 a3,d1,d2,d3,d4,d5,d6.
Radiobiology& Radiation Protection	45	15	30	a2,a5
Technology	45	15	30	a4
Internal Medicine	45	15	30	a9,c1,c2,c3,c4,c5,c6
Surgery	45	15	30	a7,d1,d2,d3,d4,d5,,d6,d7
Second Part:				
Nuclear Medicine ,PET	510	210	300	a8 ,a10,b1,b2,b3,b4,b5, b6,b7,b8,b9b10

6.2 Repeat for all higher years/semesters /levels

7. Program Admission Requirements

I- General Requirements.

1. Candidate should have either:

- i. MBBch degree from any Egyptian Faculty of Medicine or

- ii. Equivalent Degree from Medical Schools abroad approved by the ministry of high Education.
- 2. Candidate should pass the house office training year.
- 3. Those who are not university hospital residents should pass a training for at least 12 months in one of the known hospitals.
- 4. Follow postgraduate bylaw Regulatory rules of Sohag Faculty of Medicine approved by the ministerial decree No. (44), dated 6/1/2010.

II. Specific Requirements:

A- Candidates graduated from Egyptian Universities should have at least “Good Rank” in their final year/cumulative years examination, and grade “Good Rank” in Internal Medicine Course too.

B- Candidate should know how to speak & write English well.

C- Candidate should know have computer skills.

8. Regulations for Progression and Program Completion

Duration of program is 50 credit hours (≥ 4 semesters ≥ 3 years), starting from registration till 2nd part exam; divided to:

First Part: (15 Credit hours ≥ 6 months ≥ 1 semester):

- Program-related basic & clinical sciences & research Methodology, Ethics & medical reports, Biostatistics and computer.
- At least six months after registration should pass before the student can ask for examination in the 1st part.
- Two sets of exams: 1st in October — 2nd in April.
- At least 50% of the written exam is needed to pass in each course.
- For the student to pass the first part exam, a score of at least 60% (Level D) in each course is needed.
- Those who fail in one course need to re-exam it only for the next time only, and if re-fail, should register for the course from the start.

Thesis/Essay(6 Credit hours ≥ 6 months=1 semester):

- Completion of the 1st part credit hours and passing the exams are pre requisites for documentation of the **Thesis/Essay** subject.
- Should be completed, defended and accepted after passing the 1st part examination, and at least one month before allowing to enter 2nd part final examination.
- Accepting the thesis is enough to pass this part.

Second Part: (24 Credit hours ≥ 18 months= 3 semesters):

- 1- Program related specialized science of Nuclear Medicine Courses. After passing at least :

- Completion of the 1st part credit hours and passing the exams are pre requisites for documentation of the 2nd part courses.
- After passing at least:
 - University hospital residents: 36 months residency in the department of Obstetrics & Gynecology.
 - Residents in other places: Completed 36 months residency; 12 months of them training in the department of Obstetrics & Gynecology.

- The students should pass the 1st part before asking for examination in the 2nd part.
- Fulfillment of the requirements in each course as described in the template and registered in the log book (5 Credit hours; with obtaining $\geq 75\%$ of its mark) is a prerequisite for candidates to be assessed and undertake part 1 and part 2 examinations; the credit hours of the logbook are calculated as following:
 - Each Cr. Hr.= 60 working Hrs.
 - Logbook= 5 Cr. Hr. X 60 working Hrs = 300 Working Hrs.
 - Collection of working Hrs. is as following:

Activity		Hrs
Grand rounds	اجتماع علمي موسع	٦
Training courses	دورات تدريبية	12/ day
Conference attendance	حضور مؤتمرات علمية داخلي خارجية	١٢/day 18/day
Thesis discussion	حضور مناقشات رسائل	٦
Workshops	حضور ورش عمل	١٢/day
Journal club	ندوة الدوريات الحديثة	٦
Seminars	لقاء علمي موسع	٦
Morbidity and Mortality conference	ندوة تحليل المخاطر المرضية أو الوفاة	٦
Self education program	برنامج التعليم الذاتي	٦

- Two sets of exams: 1st in October - 2nd in April.
- At least 50% of the written exam is needed to pass in each course.
- For the student to pass the 2nd part exam, a score of at least 60% (Level D) in each course is needed.

9. Methods of student assessments:

Method of assessment	weight	The assessed ILOs
1-Activities		- General transferable skills, intellectual skills
2-Written Exams: -Short essay: 40% -structured questions: 25% -MCQs: 20% -Commentary, Problem solving: 15%	50%	- Knowledge - Knowledge - Knowledge, intellectual skills - Intellectual skills, General transferable skills
3-OSCE/OSPE	50%	-Practical skills, intellectual skills, general transferable skills
4-Structured Oral Exams		- Knowledge, Intellectual skills, General transferable skills

Assessment schedule:

Part I:

- Physics: Written Exam (2 hours) +OSCE + Structured oral Exam
- Radiobiology & Radioprotection Protection: Written Exam (2 hours) + Structured oral Exam + OSCE

- Pathology: Written Exam (2 hours) + OSPE + Structured oral Exam
- Medical Biochemistry: Written Exam (2 hours) + Structured oral Exam
- Technology: Written Exam (2 hours) + Structured oral Exam + OSCE
- General Surgery: Written Exam (2 hours) + Structured oral Exam + OSCE
- Internal medicine & neonatology: Written Exam (2 hours) + Structured oral Exam + OSCE
- Biostatistics & Computer and Research Methodology: Written Exam (2 hours) + Structured oral Exam + OSPE

Part II:

-Four Written Exams: two (3 hours for each) for Therapeutic Nuclear Medicine and Diagnostic, two for Diagnosis and treatment of diseases radioisotope + OSCE + Structured oral Exam.

10. Evaluation of Program:

Evaluator	Tool	Sample
1- Senior students	Questionnaire	2
2- Alumni	Questionnaire	0
3- Stakeholders (Employers)	Questionnaire	3
4-External Evaluator(s) (External Examiner(s))	Report	1
5- Other		

Course Specification of Physics in Master degree

University of Sohag

Faculty of Medicine

1. Program on which the course is given: Postgraduate study
2. Major or minor element of program: Minor
3. Department offering the program: Oncology & Nuclear Medicine Department.
4. Department offering the courses: Oncology & Nuclear Medicine Department and Public Health Department.
5. Academic year /leve: 1st part of Master degree in Nuclear Medicine.
6. Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Physics of Nuclear Medicine

Code: ONC-NUC 0521-200

Module	Lectures	Practical	Tutorial	Total hours
Physics of Nuclear Medicine	15	30	-	45

B. Professional Information

1. Overall Aims of Course

By the end of the course the post graduate students should be able to have the professional knowledge and skills of the physics and instrumentation of Nuclear Medicine in sufficient depth to be of permanent value to the candidates as well as to cope with the continuous growth and advance of this field.

2. Intended Learning Outcomes of Course (ILOs):

According to the intended goals of the faculty

a) Knowledge and Understanding:

By the end of the course the student should be able to:

- a1. Enumerate the knowledge and understanding of the basic principles of nuclear physics (the atom structure, radioactivity and radioactive decay, radionuclide production methods, radiation interactions, radiation detection and counting)
- a2. Become familiar with the terminologies, Units of radiation and the abbreviations of the radiation physics.
- a3. Have sufficient information about basis of the radionuclide imaging principles of gamma cameras, image processing and reconstruction tomography.
- a4. By the end of the course the student should be able to provide core knowledge of advances in nuclear medicine fields like Single Photon Emission Tomography (SPECT) and positron Emission Tomography (PET).
- a5. Define and discuss the main concepts of tracer kinetics of labeled molecules and the ability to extract quantitative biological data form these studies.
- a6. Capable of addressing the radiation protection concepts and safety issues and its relation to health physics

b) Intellectual Skills:

By the end of the course the student should have the ability to:

- b1. Calculate the specific activity, half life, average life time & decay factors of different commonly used radionuclides.
- b2. Qualify the images quality of radionuclide imaging by the gamma camera.
- b3. Awareness of the FAQ about the radiation and radiation protection.

c) Professional and Practical Skills:

By the end of the course the student should have the ability to:

- c1. Preparing radiopharmaceuticals for using it in common nuclear medicine procedures.
- c2. Capable of image processing in different radionuclide imaging procedures.
- c3. Identification of common problems of radiation protection, usage of radioactive materials, radiation protection, image processing and how to solve these problems.
- c4. Identification of quality control measures of different nuclear medicine instrumentations.
- c5. Usage of radiation protection and radiation counting methods.

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

- d1. Appreciate the importance of life long learning and show a strong commitment to it.
- d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.
- d3. Use data analysis and communication skills
- d4. Respect, be willing to work through systems, collaborate with other members of the students.
- d5. Be reliable and responsible in fulfilling obligations.
- d6. Effectively utilize various computer based instruction tools and E-learning of physics of Nuclear Medicine and utilize a variety of computer-based self assessment tools.
- d7. Accept the limitation in knowledge and always strive for excellence.

3. Course contents:

Topic	No. of hours	Lecture	Practical
<u>1- Basic atom and Nuclear Physics:</u>	3	1	2
1.1. Quantities and Units.			
1.2. The Atom.			
1.3. The Nucleus.			
<u>2- Modes of radioactive decay:</u>	3	1	2
2.1. decay by: α , β , γ emission, isometric transition and internal conversion, electron capture			
2.2. Decay modes and line of stability.			
<u>3- Decay of radioactivity:</u>	3	1	2
3.1. Activity, specific activity.			
3.2. Determining decay factor.			
<u>4- Radionuclide and radiopharmaceutical production:</u>	3	1	2
4.1. Reactor produced RN.			

4.2. Accelerator produced RN.			
4.3. RN Generators.			
4.4. Equation of RN production.			
4.5. Radionuclide for nuclear medicine.			
4.6. Radiopharmaceuticals preparation.			
<u>5- Interaction of radiation with matter:</u>	3	1	2
5.1. Interactions of charged particles.			
5.2. Passage of photons through matter.			
5.3. Attenuation of photon beams.			
<u>6Radiation Detectors:</u>	3	1	2
6.1 Gas filled detectors.			
6.2 Semiconductor detectors.			
6.3 Scintillation detectors.			
6.4 Electronic instrumentation for radiation detection systems.			
6.5 Problems in radiation detection and measurements.			
6.6 Counting Systems: 6.6a. NaI (TI) Well counter 6.6b. Conventional NaI (TI) detectors. 6.6c. Liquid scintillation counters. 6.6d. Gas filled detectors. 6.6e. Semiconductor detectors. 6.6f. In vivo counting systems.			
<u>7 Gamma Camera</u>	4	1.5	2.5
7.1 Basic principles: 7.1a. General concepts of radionuclide imaging 7.1b. Basic principles of Gamma Camera: system components, detector system & electronics, collimators, event detection.			
7.2 Performance and characteristics.			
<u>8Image quality in Nuclear Medicine:</u>	3	1	2
8.1 Methods for characterizing and evaluating image quality.			
8.2 Spatial Resolution, contrast, noise.			
<u>9 Tomographic Reconstruction.</u>	3	1	2
<u>10- SPECT:</u>	3	1	2
10.1 SPECT system.			
10.2 Practical implementation of SPECT.			
10.3 Performance characteristics of SPECT.			
<u>11PET:</u>	3	1	2
11.1 Annihilation coincidence detection.			
11.2PETdetector and scanner designs.			
11.3 Data acquisition for PET.			
11.4 Data correction and quantitative aspects of PET.			
<u>12-Digital image processing in nuclear</u>	3	1	2

<u>medicine.</u>			
13-Radiation Safety and Health physics:	4	1.5	2.5
13.1 Quantities and Units.			
13.2 Regulations to the use of radionuclide.			
13.3 Safe handling and disposal of radioactive materials.			
13,4adiation monitoring.			
TOTAL	45	15	30
Credit Hours	2	1	1

4. Teaching and Learning Methods

- 4.1. Lectures.
- 4.2. Practical learning on field of hot laboratory and Gamma Camera.
- 4.3. Sample problems with solution to illustrate certain quantitative relationships and to demonstrate stranded calculations that are daily required in the field of Nuclear medicine.
- 4.3. Figures, tables & presentations.
- 4.5. The internet.
- 4.6- Practical sessions(Computer application)
- 4.7- Computer search assignments

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2-Written Exams:	- Knowledge
-Short essay: 40%	- Knowledge
-structured questions: 25%	- Knowledge, intellectual skills
-MCQs: 20%	- Intellectual skills, General transferable skills,
-Commentary, Problem solving: 15%	- Practical skills, intellectual skills
5.3-Structured Oral Exams	- Knowledge
	-Practical skills, intellectual skills
5.4-OSPE	- general transferable skills, intellectual skills
5.5Computer search assignment	

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
- Assessment 2. Final Written examination: week 24
- Assessment 3. Final Oral examination: week 24
- Assessment4. Final OSPE: week 24

Weighting of Assessments

Final-term Examination	50%
Oral Examination	30%
OSPE	20%
Total	100%

formative only assesment:simple research assignment,attendance and absenteeism.

6. List of References

- 6.1- Course Notes: Lecture notes prepared by the staff members in the department
- 6.2- Essential Books (Text Books):
 - Sorenson's Physics in Nuclear Medicine.

- 6.3.Recommended books:
Essentials of nuclear medicine physics.
6.4- periodicals, web sites, etc.

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure:including testching class,comfortable desks,good areation,bathrooms,good illumination,safty & security tools.
- b. Teatching tools:including screens,computers,data shows,projectors,flip charts,white boards,video player,digital video camera,scanner,copier,colour&laser printers.

Course Coordinator: Dr. Wafa Abd-El Hameed

Head of Department: Prof. Dr. El Sayed Moustafa

Date: 18/12/2011, **Revised:**1/9/2012, **Revised:**1/12/2013, **Revised:**1/12/2018

Course Specification of Radiobiology & Radiation Protection in Master degree Nuclear Medicine

Sohag University

Faculty of Medicine

1. Program on which the course is given: Postgraduate study
2. Major or minor element of program: Minor
3. Department offering the program: Oncology & Nuclear Medicine Department.
4. Department offering the course: Oncology & Nuclear Medicine Department.
5. Academic year / 1st part of Master degree in Nuclear Medicine.
6. Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Radiation biology & radiation protection

Code: ONC - NUC 0521-200

Total hours :

Lectures	Practical	Tutorial	Total hours
15	30	-	45

B. Professional Information

1. Overall Aims of Course

By the end of the course the post graduate students should be able to:

1. Describe the effects radiation on cells.
2. Discuss the effects of cell response to radiation.
3. Describe the short and long term effects of radiation on the whole body
4. Apply the basic principles of radiation protection to reduce exposure to patients and staff.
5. Apply the techniques of radiation monitoring of the area and the personnel
6. Practice the techniques of decontamination and radioactive waste disposal

2. Intended Learning Outcomes of Course (ILOs):

According to the intended goals of the faculty

a) Knowledge and Understanding:

By the end of the course the student should be able to:

- a1. Describe the effects radiation on cells.
- a2. Discuss the effects of cell response to radiation.
- a3. Describe the short and long term effects of radiation on the whole body

b) Intellectual Skills:

By the end of the course the student should have the ability to:

- b1. Describe the effects radiation on cells.
- b2. Discuss the effects of cell response to radiation.
- b3. Describe the short and long term effects of radiation on the whole body

c) Professional and Practical Skills:

By the end of the course the student should have the ability to:

- c1. Apply the basic principles of radiation protection to reduce exposure to patients and staff.

- c2. Apply the techniques of radiation monitoring of the area and the personnel
 c3. Practice the techniques of decontamination and radioactive waste disposal

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

- d1. Appreciate the importance of life long learning and show a strong commitment to it.
 d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.
 d3. Use data analysis and communication skills
 d4. Respect, be willing to work through systems, collaborate with other members of the students.
 d5. Be reliable and responsible in fulfilling obligations.
 d6. Effectively utilize various computer based instruction tools and E-learning of physics of Nuclear Medicine and utilize a variety of computer-based self assessment tools.
 d7. Accept the limitation in knowledge and always strive for excellence.

3. Course contents:

Topic	No. of hours	Lecture	Practical
Radiation Biology:	27	9	18
1- Basic radiobiology	9	3	6
1.1. Cell biology structure, chemical composition ,cell division and cell cycle.			
1.2. Basic biology interaction			
1.3. Radiation and cellular (DNA. Chromosomes and others).			
1.4. Cellular radiosensitivity.			
1.5. Cell population and radiation response of cells.			
1.6. Tissue response to radiation.			
2- Basic interaction of irradiation:	9	3	6
2.1. Survival curves of mammalian cells.			
2.2. Factors affecting survival curves.			
3- Somatic effects:	9	3	6
3.1. On Digestive system.			
3.2. On Blood.			
3.3. On Reproductive system.			
3.4. On Kidney.			
3.5. On Respiratory system.			
3.6. On Bone and cartilage.			
3.7. On cardiovascular system.			
Radiation protection :	18	6	12
4- Diagnostic and nuclear medicine occupational exposure and risks	9	3	6
4.1. Acute radiation syndrome.			
4.2. Effect of irradiation on fetus.			
5- Sources of exposure of man to I.R	9	3	6
5.1. Units of ionizing radiation.			
5.2. International recommendation MPDs			

& MPC			
5.3. Organization of radiation protection in nuclear medicine Department			
5.4. Legislation of radiation protection			
5.5. monitoring of radiation N.M.			
5.6. Methods of radiation protection in N.M. department			
5.7. Radiation doses for various N.M investigation and treatment			
5.8. Risk estimates to patients radiation workers and population for various nuclear medicine procedures			
5.9. Management of radiation contamination of accidents of N.M. departments			
TOTAL	45	15	30
Credit Hours	2	1	1

4. Teaching and Learning Methods

- 4.1. Lectures.
- 4.2. Practical learning on field of hot laboratory and Gamma Camera.
- 4.3. Sample problems with solution to illustrate certain quantitative relationships and to demonstrate stranded calculations that are daily required in the field of Nuclear medicine.
- 4.3. Figures, tables & presentations.
- 4.5. The internet.

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2-Written Exams: -Short essay: 40% -structured questions: 25% -MCQs: 20% -Commentary, Problem solving: 15%	- Knowledge - Knowledge - Knowledge, intellectual skills - Intellectual skills, General transferable skills, - Practical skills, intellectual skills
5.3-Structured Oral Exams	- Knowledge

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
- Assessment 2. Final Written examination: week 24
- Assessment 3. Final Oral examination: week 24

Weighting of Assessments

Final-term Examination	% 50%
Oral Examination	% 30%
Practical Examination & attendance and absenteeism	% 20%
Total	100%

formative only assesment:simple research assignment,attendance and absenteeism.

6. List of References

6.1- Course notes:

Lecture notes prepared by the staff members in the department.

6.2- Essential Books (Text Books):

Elithabeth's of Radiobiology.

6.3-recommended books:

6.4- periodicals, web sites, etc.

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure:including testching class,comfortable desks,good areation,bathrooms,good illumination,safty & security tools.
- b. Teatching tools:including screens,computers,data shows,projectors,flip charts,white boards,video player,digital video camera,scanner,copier,colour&laser printers.

Course Coordinator: Dr. Wafa Abd-El Hameed

Head of Department: Prof. Dr. El Sayed Moustafa

Date: 18/12/2011, **Revised:**1/9/2012, **Revised:**1/12/2013, **Revised:**1/12/2018

Course Specification of Medical Biochemistry in Master degree of Nuclear Medicine

Sohag University

Faculty of Medicine

1. Program on which the course is given: Postgraduate study
2. Major or minor element of program: minor
3. Department offering the program: Oncology & Nuclear Medicine Department.
4. Department offering the course: Medical Biochemistry department .
5. Academic year / level: 1st part of Master degree in Nuclear Medicine.
6. Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Medical Biochemistry

Code: BIO 0521-200

Module	Lectures	Practical	Tutorial	Total hours
Biochemistry	15		-	15

B. Professional Information

1. Overall Aims of Course

By the end of the course the post graduate students should be able to:

- a- Sufficient knowledge about the basic Biochemistry.
- b- Considerable knowledge about lab work.

2. Intended Learning Outcomes of Course (ILOs):

According to the intended goals of the faculty

a) Knowledge and Understanding:

By the end of the course the student should be able to have sufficient knowledge about:

- a1. Basic biochemistry and its relation to nuclear medicine field.

b) Intellectual Skills:

By the end of the course the student should be able to:

- b1. have skills and abilities about basic biochemistry.

c) Professional and Practical Skills:

By the end of the course the student should have the ability to

- c1. Apply the basic principles of Basic biochemistry and its relation to nuclear medicine field.

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

- d1. Appreciate the importance of life long learning and show a strong commitment to it.
- d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.
- d3. Use data analysis and communication skills
- d4. Respect, be willing to work through systems, collaborate with other members of the students.
- d5. Be reliable and responsible in fulfilling obligations.
- d6. Effectively utilize various computer based instruction tools and E-learning of physics of Nuclear Medicine and utilize a variety of computer-based self assessment tools.
- d7. Accept the limitation in knowledge and always strive for excellence.

3. Course contents:

Topic	No. of hours	Lecture	Practical
<u>General:</u>			
1- Carbohydrate metabolism	1	1	
2- Lipid metabolism	1	1	
3- Protein metabolism	1	1	
4- Nucleo protein metabolism	1	1	
5- Hormones: chemistry, characteristic, mode of action.	1	1	
6- Role of hormones and growth factors, regulation of DNA synthesis and cellular proliferation	1	1	
7- Oncogens and protooncogens and their relations to hormones and growth factors.	1	1	
8- Enzymes.	0.5	0.5	
9- CAMP and adenyly cyclase system	1	1	
10- Receptors definition, structure and types regulation of receptor expression, post receptor transductal mechanism	1	1	
11- Mediators and modulators regulation of nuclear function	1	1	
12- Minerals ca, p, I, Fe ++, Zn, Cu,	1	1	
13- Subcellular structure and biological membranes	0.5	0.5	
<u>Special:</u>			
14- Biochemistry of: 14.1. Liver 14.2. Kidney 14.3 Bone 14.5 Lung 14.6. Nervous system	1	1	
15. Immuno chemistry.	0.5	0.5	
16- Molecular biology.	0.5	0.5	
17- Technology: 17.1. Radio Immuno assay. 17.2. Receptor assay 17.3 Chromatograph (Drug monitoring)	1	1	
Total	15	15	

4. Teaching and Learning Methods

- 4.1. Lectures.
- 4.2. clinical lessons.
- 4.3. Assignments.
- 4.4. Seminars, presentations, graphs, pictures, tables, etc...

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2- Written Exams: - Short essay: 40% - structured questions: 25% - MCQs: 20% - Commentary, Problem solving: 15%	- Knowledge - Knowledge - Knowledge, intellectual skills - Intellectual skills, General transferable skills, - Practical skills, intellectual skills
5.3- Structured Oral Exams	- Knowledge

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
Assessment 2. Final Written examination: week 24
Assessment 3. Final Oral examination: week 24

Weighting of Assessments

Final-term Examination	% 50%
Oral Examination	% 30%
Practical Examination & attendance and absenteeism	% 20%
Total	100%

formative only assessment: simple research assignment, attendance and absenteeism.

6. List of References

6.1- Essential Books (Text Books)

1. Text book of Biochemistry For Medical students 8th edition by DM Vasudevan 2016
2. Harper's illustrated Biochemistry 31 edition by Victor Rodwell et al 2018

6.2- Recommended Books

1. Lectures notes on clinical Biochemistry, Whitby et al 1993
2. Lippincott's illustrated reviews Biochemistry, Champe, PC, Harvey, RA, 8th edition 2010

6.3- Periodicals, Web Sites, ... etc

- <http://www.ncbi.nlm.gov/>
<http://www.vlib.org/>
[www.genome.ad.jp/kegg/regulation.](http://www.genome.ad.jp/kegg/regulation)
Findarticle.com
Freemedicaljournals.com

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure: including teaching class, comfortable desks, good aeration, bathrooms, good illumination, safety & security tools.

- b. Teaching tools:including screens,computers,data shows,projectors,flip charts,white boards,video player,digital video camera,scanner,copier,colour&laser printers.

Course Coordinator: Dr. Amira Morad Foad

Head of Department. Dr. Nagwa Said Ahmed

Date: 18/12/2011, **Revised:**1/9/2012, **Revised:**1/12/2013, **Revised:**1/12/2018

Course Specification of Pathology in Master degree of Nuclear Medicine

Sohag University

Faculty of Medicine

- 1- Program on which the course is given: Postgraduate study
- 2- Major or minor element of program: Minor
- 3- Department offering the program: Oncology & Nuclear Medicine Department
- 4- Department offering the course: Pathology Department.
- 5- Academic year / level: 1st part of Master degree in Nuclear Medicine
- 6- Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Pathology

Code: PAT 0521-200

Module	Lectures	Practical	Tutorial	Total hours
Pathology	15	30	-	45

B. Professional Information

1. Overall Aims of Course

By the end of the course the post graduate students should be able to have the professional knowledge of the pathology of medical diseases, in addition to cancer pathology of different organs, staging, prognostic factors and their relation with treatment outcome of different types of cancer.

2. Intended Learning Outcomes of Course (ILOs):

According to the intended goals of the faculty

a) Knowledge and Understanding:

By the end of the course the student should be able to:

- a1. Develop understanding basis of general and systemic pathology.
- a2. Enumerate the knowledge and understanding of general pathology of cancer & correlates radiological & ultrasonographic picture with histopathologic pictures.
- a3. Become familiar with etiology, pathogenesis and pathologic manifestation of diseases.
- a4. Be able to correlate gross and histopathology with the clinical basis of diseases.
- a5. Have sufficient information about the fate and complications and prognosis of different diseases.
- a6. By the end of the course the student should be able to provide core knowledge of processes affecting organ system, with an emphasis on understanding mechanisms of disease.
- a7. Define and discuss the main disease categories that may affect the body (general pathology) & correlates radiological & sonographic picture with histopathologic pictures.

b) Intellectual Skills:

By the end of the course the student should have the ability to:

- b1. Interpret in a professional manner a pathology report.
- b2. Able to solve pathological problems
- b3. Data interpretation

c) Professional and Practical Skills:

By the end of the course the student should have the ability to:

- c1. Identify the macroscopic and microscopic criteria of the altered structure (pathology) of the body and its major organs and systems that are seen in various diseases.
- c2. Identify various causes (genetic, developmental, metabolic, toxic, microbiologic, autoimmune, neoplastic, and degenerative) and mechanisms of diseases and the way through which they operate in the body (pathogenesis).

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

- d1. Appreciate the importance of life long learning and show a strong commitment to it.
- d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.
- d3. Write a report commenting on a pathological specimen.
- d4. Use data analysis and communication skills
- d5. Respect, be willing to work through systems, collaborate with other members of the students.
- d6. Be reliable and responsible in fulfilling obligations.
- d7. Effectively utilize various computer based instruction tools and E-learning of Pathology and utilize a variety of computer-based self assessment tools.
- d8. Accept the limitation in knowledge and always strive for excellence.

3. Course contents:

Topic	No. of hours	Lecture	Practical
<u>1- General Pathology:</u>	12	4	8
1.1. General pathology of tumors.			
1.2. Effect of ionizing radiation.			
1.3. Immunological basics of tumors.			
1.4. Molecular biology of tumors.			
<u>2- Heart:</u>	3	1	2
2.1. Myocardial ischemia and infarction			
2.2. Cardiomyopathy & heart failure.			
<u>3- Respiratory system:</u>	3	1	2
3.1. Tumors of lung & pleura.			
3.2. Tumors of the mediastinum.			
<u>4- Gastrointestinal tract:</u>	4.5	1.5	3
4.1. Tumors of the GIT			
4.2. Tumors of the liver, gall bladder & pancreas			
<u>5- Kidney & male genital system:</u>	3	1	2
5.1. Tumors of the kidney & urinary bladder.			
5.2. Tumors of the testis & prostate.			

<u>7- The musculoskeletal system:</u>	4.5	1.5	3
7.1. Tumors of bone & joints.			
7.2. Tumors of soft tissues.			
<u>8- Brain:</u>	3	1	2
8.1. Tumors of the brain.			
8.2. Tumors of the spinal cord.			
<u>9-Diseases of blood, lymph nodes, and spleen:</u>	4.5	1.5	3
9.1. Leukemia & lymphomas.			
9.2. Multiple myeloma.			
<u>10- Tumors of the female genital system & breast.</u>	3	1	2
10.1. Tumors of uterus & ovary.			
10.2. Tumors of the breast.			
<u>11- Endocrine system:</u>	4.5	1.5	3
11.1. Thyroid & parathyroid tumors.			
11.2. Adrenal gland tumors.			
Total	45	15	30
Credit Hours	2	1	1

4. Teaching and Learning Methods

- 4.1. Lectures.
- 4.2. clinical lessons.
- 4.3. Assignments.
- 4.4. Seminars, presentations, graphs, pictures, tables, etc...

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2-Written Exams:	- Knowledge
-Short essay: 40%	- Knowledge
-structured questions: 25%	- Knowledge, intellectual skills
-MCQs: 20%	- Intellectual skills, General transferable skills,
-Commentary, Problem solving: 15%	- Practical skills, intellectual skills
5.3-Structured Oral Exams	- Knowledge

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
 Assessment 2. Final Written examination: week 24
 Assessment 3. Final Oral examination: week 24

Weighting of Assessments

Final-term Examination	% 50%
Oral Examination	% 30%
Practical Examination & attendance and absenteeism	% 20%
Total	100%

formative only assesment:simple research assignment,attendance and absenteeism.

6. List of References

6.1- Essential Books (Text Books):

- Muir's text book of pathology, 15th edition, 2014.

- Robbins Pathologic Basis of Diseases, 10th edition, 2015.

6.2- Recommended Books:

- Rosai&Ackerman text book of Pathology, 11th edition,2017
- Sternberg text book of Pathology, 6th edition, 2015.

6.4- Periodicals, American journal of pathology

Pathology

Human pathology

Web Sites: <http://www.ncbi.nlm.nih.gov/pubmed/>

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure:including testching class,comfortable desks,good areation,bathrooms,good illumination,safty & security tools.
- b. Teatching tools:including screens,computers,data shows,projectors,flip charts,white boards,video player,digital video camera,scanner,copier,colour&laser printers.

Course Coordinator: Dr. Fatma El Zahraa Salah El Deen

Head of Department: Dr. Afaf Al-Nashar

Date: 18/12/2011, **Revised:**1/9/2012, **Revised:**1/12/2013, **Revised:**1/12/2018

Course Specification Of Internal Medicine in master degree of Nuclear Medicine

Sohag University

Faculty of Medicine

1. Program on which the course is given: master degree in Nuclear Medicine
2. Major or minor element of program: Minor
3. Department offering the program: Oncology and Nuclear Medicine Department.
4. Department offering the course: Internal Medicine Department.
5. Academic year / 2nd part of master degree in Nuclear Medicine.
6. Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Course Specification Of Internal Medicine in master degree in Nuclear Medicine

Code: MED 0521-200

Module	Lectures	Practical	Credit	Total hours
Internal Medicine	15	30	2	45

B. Professional Information

1. Overall Aims of Course

By the end of the course of Internal Medicine, the candidate should be able to:

- 1- Deal with common medical conditions on the basis of adequate history taking, physical examination interpretation of relevant supportive investigations and management.

2. Intended Learning Outcomes of Course (ILOs)

a) Knowledge and Understanding:

By the end of the course the graduate should be able to:

- a1. Grasp the spectrum of clinical symptomatology related to different Internal medicine disorders.
- a2. Appreciate the clinical spectrum of common medical conditions with multisystem affection.

b) Intellectual Skills

By the end of the course the graduate should be able to:

- b1. Interpret the most important symptoms and signs of disease in Internal Medicine patients.
- b2. Formulate appropriate management plans for individual patients presenting with the most common medical disorders.
- b3. Make decisions regarding common clinical situations using appropriate problem solving skills.

c) Professional and Practical Skills

- c1. Conduct a proper general examination and identify normal and major abnormal physical signs.
- c2. Conduct proper regional examination of the thorax and abdomen by inspection, palpation, percussion and auscultation to identify:
 - Surface anatomy of internal organs.
 - Normal physical signs.
 - Major abnormal physical signs.
- c3. Develop and present a comprehensive medical sheet including history and physical examination.
- c4. Interpret the significance and relevance of abnormal physical signs.
- c5. Identify the appropriate supportive investigations relevant to a particular patient and adequately interpret the results.
- c6. Integrate the patient's symptomatology, historic data, abnormal physical signs and investigations into a comprehensive differential diagnosis.
- c7. Identify adequate logistics for further patient assessment and management.
- c8. Get acquainted with special therapeutic and interventional techniques related to the specialty.
- c9. Adequately interpret the results of common laboratory investigations as urine analysis, blood picture, liver and kidney function tests, etc.
- c10. Identify a clear priority plan in the patient's management.

d) General and Transferable Skills

By the end of the course the graduate should be able to:

- d1. Presentation, analyzing and solving of clinical problems .

3. Course contents:

Topic	No. of hours	Lecture	Practical
<u>1. Medical Emergencies:</u> 1.1. Acute renal failure 1.2. GIT bleeding 1.3. Pulmonary embolism 1.4. Heart failure	3	1	2
<u>2. Endocrinology:</u> 2.1. Thyroid gland disorders: 2.1.1. Hypothyroidism 2.1.2. Hyperthyroidism 2.1.3. Thyroiditis 2.1.4. Thyroid malignancies 2.2. Parathyroid disorders: Hyperparathyroidism 2.3. Suprarenal gland disorders: 2.3.1. Cushing's disease. 2.3.2. Addison's disease. 2.3.3. Pheochromocytoma 2.4. Pituitary 2.4.1. Hypopituitarism 2.4.2. Acromegaly 2.4.3. Gigantism 2.5. Complication of DM	6	2	4
<u>3. CNS:</u> 3.1. Epilepsy 3.2. Stroke	5	2	4

3.3. Dementia			
<u>4. Nephrology:</u> 4.1. Chronic renal failure 4.2. Golmerulonephritis 4.3. Pyelonephritis 4.4 Kidney transplant	6	2	4
<u>5. Cardiovascular system:</u> 5.1. CAD 5.2. Angina 5.3. Infarction 5.4. Cardiomyopathy 5.5. Hypertension	6	2	4
<u>6. Respiratory system</u> 6.1. Pulmonary embolism 6.2. COPD 6.3 Bronchogenic Carcinoma	6	2	4
<u>7. Hematology:</u> 7.1. Anaemias 7.2. Haemolytic anaemias 7.3. Megaloblastic anaemia 7.4. Aplastic anaemia 7.5. Hypersplenism	6	2	4
<u>8. Gastroentology:</u> 8.1. Liver cirrhosis 8.2. Jaundice 8.3. Portal hypertension 8.4 Causes of hepatosplenomegaly	6	2	4
TOTAL	45	15	30
Credit Hours	2	1	1

4. Teaching and Learning Methods

- 4.1. Lectures.
- 4.2. Practical learning on clinical cases.
- 4.3. case presentations.
- 4.3. Figures, tables & presentations.
- 4.5. The internet.

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2-Written Exams: -Short essay: 40% -structured questions: 25% -MCQs: 20% -Commentary, Problem solving: 15%	- Knowledge - Knowledge - Knowledge, intellectual skills - Intellectual skills, General transferable skills, - Practical skills, intellectual skills
5.3-Structured Oral Exams	- Knowledge

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
- Assessment 2. Final Clinical examination: week 96
- Assessment 3. Final Written examination: week 96
- Assessment 4. Final Oral examination: week 96

Weighting of Assessments

Final-term Examination	separate exam
Passing in the written exam is a condition to attend the following exams:	
Oral Examination	50%
clinical Examination & attendance and absenteeism	50%
Total	100%

formative only assesment:simple research assignment, log book, attendance and absenteeism.

6. List of References:

6.1- Essential Books (Text Books)

- Kumar and Clarke Textbook of Medicine; Parveen Kumar and Richard Clark; Blackwell Science; 9th edition, 2018
- Hutchison's Clinical Methods; Robert Hutchison; Harry Rainy; 24st edition;2018

6.2- Recommended Books

- Goldman-Cecil Textbook of Medicine;25th edition, 2018.
- Harrison's principles of internalmedicine,20th edition, 2018.

6.3- Periodicals, Web Sites, ... etc

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure: including testching class, comfortable desks, good areation, bathrooms, good illumination, safty & security tools.
- b. Teatching tools: including screens, computers, data shows,projectors,flip charts,white boards,video player,digital video camera, scanner,copier, colour&laser printers.

Course Coordinator: Dr. Mohamed Mustafa Ahmed Malak.

Head of Department: Prof. Usama Ahmed Arafa.

Date: 18/12/2011, Revised:1/9/2012, Revised:1/12/2013, **Revised: 1/12/2018**

Course Specification of Nuclear Medicine Technology in master degree of Nuclear Medicine

Sohag University

Faculty of Medicine

- 1- Program on which the course is given: Postgraduate study
- 2- Major or minor element of program: Minor
- 3- Department offering the program: Oncology & Nuclear Medicine Department
- 4- Department offering the course: Oncology & Nuclear Medicine Department
- 5- Academic year /level: 1st part of Master degree in Nuclear Medicine
- 6- Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Technology of Nuclear Medicine

CODE: ONC - NUC 0521-200

Module	Lectures	Practical	Tutorial	Total hours
Technology of nuclear medicine	15	30	-	45

B. Professional Information:-

1. Overall Aims of Course

- a. Explain the principles of tomographic systems.
- b. Discuss the principles of operation and performance of the multi-crystal cameras.
- c. Compare single crystal cameras, multi-crystal cameras and tomographic systems with particular attention to image quantification.
- d. Explain the reconstruction techniques in single photon emission tomography (SPECT) and the different factors that affect final image quality.
- e. Perform the various data acquisition and analysis method
- f. Report effectively the results of computer based applications
- g. Describe the role of computers including pictures Archiving and Communication System (PACs) in Nuclear Medicine.

2. Intended Learning Outcomes of Course (ILOs)

a) Knowledge and Understanding:

By the end of the course the graduate should be able to:

- a1. Explain the principles of tomographic systems.
- a2. Discuss the principles of operation and performance of the multi-crystal cameras.

b) Intellectual Skills:

By the end of the course the graduate should be able to:

- b1. Compare single crystal cameras, multi-crystal cameras and tomographic systems with particular attention to image quantification .
- b2. Explain the reconstruction techniques in single photon emission tomography (SPECT) and the different factors that affect final image quality.

b3. Explain different radiopharmaceuticals and techniques used in nuclear medicine.

c) Professional and Practical Skills:

By the end of the course the graduate should be able to:

- c2. Perform the various data acquisition and analysis method
- c3. Report effectively the results of computer based applications
- c4. Describe the role of computers including pictures Archiving and Communication System (PACs) in Nuclear Medicine.

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

- d1. Appreciate the importance of life long learning and show a strong commitment to it.
- d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.
- d3. Write a report commenting on a pathological specimen.
- d4. Use data analysis and communication skills
- d5. Respect, be willing to work through systems, collaborate with other members of the students.
- d6. Be reliable and responsible in fulfilling obligations.
- d7. Effectively utilize various computer based instruction tools and E-learning of Pathology and utilize a variety of computer-based self assessment tools.
- d8. Accept the limitation in knowledge and always strive for excellence.

3. Course contents:

Topic	No. of hours	Lescture	Practical/ clinical
<u>1- Skeletal systems:</u> 1.1. Radiopharmaceutical 1.2.a. Pitfall in skeletal scanning 1.2.b. Clinical applications	4.5	1.5	3
<u>2- Endocrine system:</u> 2.1. Thyroid gland: 2.1.a. Radiopharmaceutical and technique 2.1.b. Clinical applications 2.1.c. Ca thyroid diagnosis 2.1.d. Radioiodine therapy 2.2. Adrenal Gland: Radiopharmaceutical, technique and clinical Applications 2.3. Parathyroid gland 2.3.a. Radiopharmaceurical and technique 2.3.b. Clinical applications	4.5	1.5	3
<u>3- GIT system:</u> 3.1. Intestinal system: 3.1.a. Salivary gland scanning 3.1.b. Esophageal transient 3.1c. Gastroesophageal reflux 3.1.d. Gastric emptying	4.5	1.5	3

3.1.e. Gastrointestinal bleeding 3.1.f. Malabsorption and intestinal transient 3.2. Liver-spleen scanning: 3.2.a. Radiopharmaceutical and technique 3.2.b. Clinical applications 3.2.c. ^{99m} Tc-MAA hepatic arterial perfusion 3.3. Biliary system imaging 3.3.a. Radiopharmaceutical and technique 3.3.b. Clinical applications			
<u>4- Genito-Urinary system</u> 4.1. Radiopharmaceutical 4.2. Techniques of urodynamics 4.3. Clinical applications in kidney diseases 4.4. Testicular scintigraphy 4.5. Kidney transplant.	4.5	1.5	3
<u>5- Central nervous system:</u> 5.1. Radiopharmaceutical 5.2. Technique of brain SPECT 5.3. Technique of cisternography 5.4. Clinical applications	4.5	1.5	3
<u>6- Pulmonary system:</u> 6.1. Radiopharmaceutical 6.2. Technique of ventilation-perfusion 6.3. Clinical applications	4.5	1.5	3
<u>7- Infection & inflammation :</u> 7.1. Radiopharmaceutical 7.2. Clinical applications	4.5	1.5	3
<u>8- Cardiovascular system</u> 8.1. Myocardial perfusion 8.1.a. Radiopharmaceutical 8.1.b. Stress test (treadmill, pharmacological) 8.1.c. Technique of SPECT 8.1.d. Quantitative assessment 8.1.e. Clinical applications 8.2. Nuclide ventriculography 8.2.a. Radiopharmaceutical 8.2.b. Stress test 8.2.c. Technique of first pass 8.2.d. Technique of gated blood pool 8.2.e. Clinical applications 8.3. Congenital heart disease 8.4. Infarct avid imaging	4.5	1.5	3

9- Positron Emission Tomography	4.5	1.5	3
10- Radionuclide therapy 10.1-1301 in thyrotoxicosis and cancer thyroid. 10.2- MIBG therapy 10.3- Radionuclide in bone metastases 10.4- Radionuclide in intracavitary lesions 10.5- Radio-immunotherapy	4.5	1.5	3
Total	45	15	30
Credit Hours	2	1	1

4. Teaching and Learning Methods

- 4.1. Lectures.
- 4.2. clinical lessons.
- 4.3. Assignments.
- 4.4. Seminars, presentations, graphs, pictures, tables, etc...

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2- Written Exams: - Short essay: 40% - structured questions: 25% - MCQs: 20% - Commentary, Problem solving: 15%	- Knowledge - Knowledge - Knowledge, intellectual skills - Intellectual skills, General transferable skills, - Practical skills, intellectual skills
5.3- Structured Oral Exams	- Knowledge

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
 Assessment 2. Final Written examination: week 24
 Assessment 3. Final Oral examination: week 24

Weighting of Assessments

Final-term Examination	% 50%
Oral Examination	% 50%

Total 100%

formative only assesment:simple research assignment,attendance and absenteeism.

6. List of References

6.1- Course Notes:

Lecture notes prepared by the staff members in the department.

6.2- Essential Books (Text Books):

- Nuclear Medicine: The Requisites.

6.3- Recommended Books:

- Pete Shackett: Nuclear Medicine Technology.

6.4- Periodicals, Web Sites:

Pub med

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure:including testching class,comfortable desks,good areation, bathrooms, good illumination, safty & security tools.
- b. Teatching tools: including screens, computers, data shows, projectors,flip charts,white boards,video player,digital video camera, scanner, copier, colour&laser printers.

Course Coordinator: Dr. Wafa Abd-Elhameed

Head of department: Prof Dr. El-Sayed Moustafa

Date: 18/12/2011, Revised:1/9/2012, Revised:1/12/2013, Revised:1/12/2018

Course Specification of Biostatistics and computer in Master degree

Sohag University

Faculty of Medicine

1. Program on which the course is given: Postgraduate study
2. Major or minor element of program: Minor
3. Department offering the program: Oncology & Nuclear Medicine Department.
4. Department offering the courses: Community Medicine and public Health Department.
5. Academic year /level: 1st part of Master degree in Nuclear Medicine.
6. Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Biostatistics of Nuclear Medicine and Biostatistics and computer

Code: COM 0521-200

Module	Lectures	Practical	Credit	Total hours
Biostatistics and computer	15	30	2	45

B. Professional Information

1. Overall Aims of Course

- To develop a post-graduate who will apply the knowledge and skills learned, and is able to take the responsibility of making study design, collect, code, analyze and interpret data

2. Intended Learning Outcomes of Course (ILOs):

According to the intended goals of the faculty

a) Knowledge and understanding:

By the end of the course, the Pediatrics post-graduate is expected to be able to:

- a1. Define the sources of data and methods of collection for vital statistics
- a2. Describe five sampling techniques and list at least three advantages of sampling
- a3. Summarize data, construct tables and graphs
- a4. Calculate measures of central tendency and measures of dispersion
- a5. Describe the normal curves and its uses
- a6. Interpret selected tests of significance and the inferences obtained from such tests
- a7. List screening tests.
- a8. Identify the types of study design and selection of suitable design for each subject.
- a9. Appraise the importance of screening and medical statistics.
- a10. Define the screening tests pertinent to selected diseases and the at-risk approach in the application of screening tests
- a11. List at least four types of study designs
- a12. Describe the study design, uses, and limitations
- a13. Explain the usefulness of screening tests, and calculate sensitivity, specificity, and predictive values

a14. Describe the public health surveillance system

b) Intellectual Skills

By the end of the course, the student is expected to be allowed to:

- b1. In epidemiological and quantitative domain:
- b2. Identify prevalent health problems in a community, using various epidemiological strategies
- b3. Collect and verify data from different sources
- b4. Organize and manage data, including graphic and tabular presentations
- b5. Analyze and interpret data
- b6. Anticipate and participate in investigation of an epidemic/outbreak as part of a health team

c) Professional and Practical Skills:

By the end of the course, the student is expected to practice the following:

- c1. Diagnose an epidemic of infectious or non infectious diseases in the field of nuclear medicine.

d) General and Transferable Skills:

By the end of the course, the student is expected to be able to:

- d1. Use standard computer programs effectively.
- d2. Utilize computers in conducting researches.
- d3. Work in a group.
- d4. Communicate well with his colleagues, top management and subordinates.
- d5. Establish a good client – physician relationship.

3. Course contents:

Topic	No. of hours	Lecture	Practical
1. terminology and rationale of research and biostatistics	3	1	2
2. Data collection methods	3	1	2
3. Types of Data	3	1	2
4. Tabulation of data	3	1	2
5. Graphical presentation of data	3	1	2
6. Measures of central tendency	4	1	3
7. Measures of dispersion	3	1	2
8. Normal distribution curve	3	1	2
9. Study design :Cross sectional study prevalence rate	3	1	2
10. Cohort study, incidence rate, relative & attributable risk	5	2	3
11. Case-control study, Odd's ratio	3	1	2
12. Basics of Screening	3	1	2
13. Sampling	3	1	2
14. Basics of selected tests of significance and analytical statistics	3	1	2
Total	45	15	30
Credit Hours	2	1	1

4. Teaching and Learning Methods

1. Lectures.
2. Practical learning on field of hot laboratory and Gamma Camera.
3. Sample problems with solution to illustrate certain quantitative relationships and to demonstrate stranded calculations that are daily required in the field of Nuclear medicine.
4. Figures, tables & presentations.
5. The internet.
6. 4.6- Practical sessions(Computer application)
7. 4.7- Computer search assignments

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2-Written Exams: -Short essay: 40% -structured questions: 25% -MCQs: 20% -Commentary, Problem solving: 15%	- Knowledge - Knowledge - Knowledge, intellectual skills - Intellectual skills, General transferable skills, - Practical skills, intellectual skills
5.3-Structured Oral Exams	- Knowledge -Practical skills, intellectual skills
5.4-OSPE	- general transferable skills, intellectual skills
5.5Computer search assignment	

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
Assessment 2. Final Written examination: week 24
Assessment 3. Final Oral examination: week 24
Assessment4. Final OSPE: week 24

Weighting of Assessments

Final-term Examination	50%
Oral Examination	30%
OSPE	20%
Total	100%

formative only assesment:simple research assignment,attendance and absenteeism.

6. List of References

6.1- Essential Books (Text Books)

1-Maxy-Rosenau Public health and preventive medicine, 2008.,Robert Wallace, publisher McGraw-Hill Medical; 15 edition.

6.2- Recommended Books

- 1- Dimensions of Community Based projects in Health Care, 2018. Arxer, Steven L., Murphy, John W.; 1st edition.
- 2- Parks Text Book of Preventive & Social Medicine. 2017., K. Park. BanarsidasBhanot Publishers; 23 edition.
- 3- Clinical Epidemiology: The Essentials, 2013, Robert F., Suzanne W. Fletcher, Grant S., publisher Lippincott Williams & Wilkins; 5 edition.

6.3- Periodicals, Web Sites, ...etc

- 1-American Journal of Epidemiology
- 2-British Journal of Epidemiology and Community Health

3- WWW. CDC and WHO sites

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure: including testching class, comfortable desks, good areation, bathrooms, good illumination, safty & security tools.
- b. Teatching tools: including screens, computers, data shows, projectors, flip charts, white boards, video player, digital video camera, scanner, copier, colour& laser printers.

Course Coordinator: Dr/Rasha Abd El- Hameed

Head of Department: Prof/ Ahmed Fathy Hammed

Date: 18/12/2011, **Revised:**1/9/2012, **Revised:**1/12/2013, **Revised:** 1/12/2018

Course Specification Of General Surgery in Master degree in Nuclear Medicine

Sohag University

Faculty of Medicine

- 1- Program on which the course is given: master degree in Nuclear Medicine
- 2- Major or minor element of program: Minor
- 3- Department offering the program: Clinical Oncology & Nuclear Medicine Department.
- 4- Department offering the course: General Surgery Department.
- 5- Academic year / level: 2nd part of master degree in Nuclear Medicine.
- 6- Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Course Specification of General Surgery in MD degree in Nuclear Medicine

Code: SUR0521-200

Module	Lectures	Practical	Tutorial	Total hours
Surgery	15	30	-	45

B. Professional Information

1. Overall Aims of Course

By the end of the course the post graduate students should be able to:

- Apply the basic principles of radiation protection to reduce exposure to patients and staff.
- Apply the techniques of radiation monitoring of the area and the personnel
- Practice the techniques of decontamination and radioactive waste disposal

2. Intended Learning Outcomes of Course (ILOs)

a) Knowledge and Understanding:

By the end of the program, the student is expected to:-

- a1. Enumerate basics of general surgery (shock, haemoperitoneum, ascites, and peritonitis.
- a2. Enumerate update in management of head injury.
- a3. Mention update in management of jaw swelling.
- a4. Mention update in management of oesophageal cancer, non malignant obstructions.
- a5. Mention of G.I.T. diseases.
- a6. Mention of abdominal masses.
- a7. Mention of portal hypertension.

b) Intellectual Skills:

By the end of the program, the student is expected to:-

- b1. Understand scientific thinking.
- b2. Understand skills of observation.
- b3. Understand skills of description and interpretation of what he observes.

c) Professional and Practical Skills:-

By the end of the program, the student is expected to:-
 c1. Understand treatment options done to cancer patients.

d) General and Transferable Skills:-

By the end of the program the student is expected to:-

d1. Understand skills of observation and description.

d2. Acquire skills of working within team.

d3. Acquire skills of logical and scientific thinking..

3. Course contents:

Topic	No. of hours	Lecture	Practical
General surgery	9	3	6
Head injury	6	2	4
Jaw swelling	6	2	4
Oesophageal cancer, non malignant obstructions.	6	2	4
G.I.T. diseases	6	2	4
Abdominal masses	6	2	4
Portal hypertension	6	2	4
Total	45	15	30
Credit Hours	2	1	1

4. Teaching and Learning Methods

- 4.1. Lectures.
- 4.2. Practical learning on clinical cases.
- 4.3. case presentations.
- 4.3. Figures, tables & presentations.
- 4.5. The internet.

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2-Written Exams:	- Knowledge
-Short essay: 40%	- Knowledge
-structured questions: 25%	- Knowledge, intellectual skills
-MCQs: 20%	- Intellectual skills, General transferable skills,
-Commentary, Problem solving: 15%	- Practical skills, intellectual skills
5.3-Structured Oral Exams	- Knowledge

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
- Assessment 2, Final Clinical examination: week 96
- Assessment 2. Final Written examination: week 96
- Assessment 3. Final Oral examination: week 96

Weighting of Assessments

Final-term Examination	separate exam
Passing in the written exam is a condition to attend the following exams:	
Oral Examination	% 50%
clinical Examination & attendance and absenteeism	% 50%
Total	100%

formative only assesment:simple research assignment, log book, attendance and absenteeism.

6. List of References

6.1- Course Notes

Department books

6.2- Essential Books (Text Books)

1-Baily and Love

2-Schwartz

6.3- Periodicals, Web Sites, ... etc

Freemedical journals.com

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure: including testching class, comfortable desks, good aeration, bathrooms, good illumination, safty & security tools.
- b. Teaching tools: including screens, computers, data shows, projectors, flip charts, white boards, video player, digital video camera, scanner, copier, color & laser printers.

Course Coordinator: Prof. Dr. Alaa M. Elsoty

Head of Department. Prof. Nabil Y. Abo Eldahab

Date: 18/12/2011, **Revised:**1/9/2012, **Revised:**1/12/2013, **Revised:**1/12/2018

Course Specification Of Nuclear Medicine Technology , Therapeutic Nuclear Medicine, Diagnostic Nuclear Medicine , PET In Diagnosis Of Cancers & Clinical Training In Diagnosis And Therapy in master degree in Nuclear Medicine

Sohag University

Faculty of Medicine

- 1- Program on which the course is given: master degree in Nuclear Medicine
- 2- Major or minor element of program: Major
- 3- Department offering the program: Oncology & Nuclear Medicine Department
- 4- Department offering the course: Oncology & Nuclear Medicine Department
- 5- Academic year /level :2nd part of Master degree in Nuclear Medicine
- 6- Date of specification approval: Faculty council No. "317", decree No. "1533" dated 17/12/2018

A. Basic Information

Title: Course Specification Of Nuclear Medicine Technology in master degree in Nuclear Medicine

Code: ONC - NUC 0521-200

Credit Hours: 4 hours

Module	Lectures	Practical	Tutorial	Total hours
Nuclear Medicine technology	45	45	-	90
Therapeutic Nuclear Medicine	15	90	-	105
Diagnostic Nuclear Medicine	45	180	-	125
PET in diagnosis of cancer	10	15	-	25
Clinical training in diagnosis and therapy	30	45	-	75

B. Professional Information:-

1. Overall Aims of Course

Nuclear Medicine Technology

- a. To have standard clinical skills in diagnosis of different diseases using different diagnostic modalities using the radionuclide.
- b. To have special skills in different diagnostic nuclear medicine techniques.
- c. Application of nuclear medicine technology in different health care services.
- d. Provide the candidates with the master degree to start professional careers as specialists in Egypt and to be recognized as specialists abroad.
- e. Provide the candidates with the skills to enable them to obtain higher degrees in Egypt and abroad.

Therapeutic Nuclear Medicine

- a. To have standard clinical skills in of radionuclide therapy in endocrine and malignant diseases.
- b. To have special skills in different therapeutic nuclear medicine techniques.
- c. Application of nuclear medicine technology in different health care services.
- d. Provide the candidates with the master degree to start professional careers as specialists in Egypt and to be recognized as specialists abroad.
- e. Provide the candidates with the skills to enable them to obtain higher degrees in Egypt and abroad.

Diagnostic Nuclear Medicine

- a. To have standard clinical skills in diagnosis of different diseases using different diagnostic modalities with the radionuclide.
- b. To have standard knowledge about different radionuclides used in diagnosis of diseases in the field of nuclear medicine.
- c. To have special skills in different diagnostic nuclear medicine technique.
- d. Application of diagnostic nuclear medicine in different health care services.
- e. Provide the candidates with the master degree to start professional careers as specialists in Egypt and to be recognized as specialists abroad.
- f. Provide the candidates with the skills to enable them to obtain higher degrees in Egypt and abroad.

PET In Diagnosis Of Cancers

- a. To have standard clinical skills in diagnosis of different diseases using PET scan using the suitable radionuclide.
- b. To have standard clinical skills suitable radionuclide for diagnosis of endocrinal and malignant diseases using PET scan.
- c. To have special skills in different diagnostic techniques by PET scanners.
- d. Application of PET scans in different health care services.
- e. Provide the candidates with the master degree to start professional careers as specialists in Egypt and to be recognized as specialists abroad.
- f. Provide the candidates with the skills to enable them to obtain higher degrees in Egypt and abroad.

Clinical Training In Diagnosis And Therapy

- a. To have standard clinical skills in diagnosis of different diseases using different diagnostic modalities using the radionuclide.
- b. To have standard clinical skills in of radionuclide therapy in endocrine and malignant diseases.
- c. To have special skills in different diagnostic and therapeutic nuclear medicine technique.
- d. Application of nuclear medicine technology in different health care services.
- e. Provide the candidates with the master degree to start professional careers as specialists in Egypt and to be recognized as specialists abroad.
- f. Provide the candidates with the skills to enable them to obtain higher degrees in Egypt and abroad.

2. Intended Learning Outcomes of Course (ILOs)

Nuclear Medicine Technology

a) Knowledge and Understanding:

By the end of the course the student should have

- a1. To have standard knowledge about techniques used in diagnosis of different diseases using different diagnostic modalities of nuclear medicine.

b) Intellectual Skills:

By the end of the course the student should have

- b1. To have standard clinical skills in diagnosis of different diseases using different diagnostic techniques using the radionuclide.
- b2. To have special skills in different diagnostic and therapeutic nuclear medicine technique.
- b3. Application of nuclear medicine technology in different health care services.

c) Professional and Practical Skills:

By the end of the course the student should have

- c1. To have standard clinical skills in diagnosis of different diseases using different diagnostic techniques using the radionuclide.
- c2. To have special skills in different diagnostic nuclear medicine technique.
- c3. Application of nuclear medicine technology in different health care services.

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

- d1. Appreciate the importance of life long learning and show a strong commitment to it.
- d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.
- d3. Write a report commenting on a diagnostic Nuclear Medicine study.
- d4. Use data analysis and communication skills
- d5. Respect, be willing to work through systems, collaborate with other members of the students.
- d6. Effectively utilize various computer based instruction tools and E-learning of Nuclear Medicine and utilize a variety of computer-based self assessment tools.

Therapeutic Nuclear Medicine

a) Knowledge and Understanding:

By the end of the course the student should have

- a1. To have standard knowledge about therapy of different diseases using different therapeutic radionuclides in the field of nuclear medicine.

b) Intellectual Skills:

By the end of the course the student should have

- b1. To have standard clinical skills in treatment of different diseases using different therapeutic modalities using the radionuclide.
- b2. To have standard clinical skills in of radionuclide therapy in endocrine and malignant diseases.
- b3. To have special skills in different therapeutic nuclear medicine technique

c) Professional and Practical Skills:

By the end of the course the student should have

- c1. To have standard clinical skills in treatment of different diseases using different therapeutic modalities using the suitable radionuclides.

c2. To have standard clinical skills in of radionuclide therapy in endocrine and malignant diseases.

c3. To have special skills in different therapeutic nuclear medicine technique.

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

d1. Appreciate the importance of life long learning and show a strong commitment to it.

d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.

d3. Write a report commenting on a diagnostic Nuclear Medicine study.

d4. Use data analysis and communication skills

d5. Respect, be willing to work through systems, collaborate with other members of the students.

d6. Effectively utilize various computer based instruction tools and E-learning of Nuclear Medicine and utilize a variety of computer-based self assessment tools.

Diagnostic Nuclear Medicine

a) Knowledge and Understanding:

By the end of the course the student should have

a1. To have standard knowledge about diagnosis of different diseases using different diagnostic modalities of nuclear medicine.

b) Intellectual Skills:

By the end of the course the student should have

b1. To have standard clinical skills in diagnosis of different diseases using different diagnostic modalities using the radionuclide.

b2. To have special skills in different diagnostic nuclear medicine technique.

b3. Application of diagnostic nuclear medicine in different health care services.

c) Professional and Practical Skills:

By the end of the course the student should have

c1. To have standard clinical skills in diagnosis of different diseases using different diagnostic modalities using the radionuclide.

c2. To have special skills in different diagnostic nuclear medicine technique.

c3. Application of therapeutic nuclear medicine in different health care services.

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

d1. Appreciate the importance of life long learning and show a strong commitment to it.

d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.

d3. Write a report commenting on a diagnostic Nuclear Medicine study.

d4. Use data analysis and communication skills

d5. Respect, be willing to work through systems, collaborate with other members of the students.

- d6. Effectively utilize various computer based instruction tools and E-learning of Nuclear Medicine and utilize a variety of computer-based self assessment tools.

PET In Diagnosis Of Cancers

a) Knowledge and Understanding:

By the end of the course the student should have

- a1. To have standard knowledge about diagnosis of different diseases using the PET scanner .

b) Intellectual Skills:

By the end of the course the student should have

- b1. To have standard clinical skills in application of PET scans for diagnosis of different diseases.
- b2. To have special skills in different diagnostic medicine techniques used by PET scanners.
- b3. Application of PET scans in different health care services.

c) Professional and Practical Skills:

By the end of the course the student should have

- c1. To have standard clinical skills in diagnosis of different diseases using PET scan using the suitable radionuclide.
- c2. To have special skills in different diagnostic nuclear medicine techniques using PET scanners.
- c3. Application of PET scans in different health care services.

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

- d1. Appreciate the importance of life long learning and show a strong commitment to it.
- d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.
- d3. Write a report commenting on a diagnostic Nuclear Medicine study.
- d4. Use data analysis and communication skills
- d5. Respect, be willing to work through systems, collaborate with other members of the students.
- d6. Effectively utilize various computer based instruction tools and E-learning of Nuclear Medicine and utilize a variety of computer-based self assessment tools.

Clinical Training In Diagnosis And Therapy

a) Knowledge and Understanding:

By the end of the course the student should have

- a1. To have standard knowledge about diagnosis of different internal medicine diseases using different diagnostic modalities of nuclear medicine.

b) Intellectual Skills:

By the end of the course the student should have

- b1. To have standard clinical skills in diagnosis of different diseases using different diagnostic modalities using the radionuclide.
- b2. To have standard clinical skills in of radionuclide therapy in endocrine and malignant diseases.
- b3. To have special skills in different diagnostic and therapeutic nuclear medicine technique.
- b4. Application of nuclear medicine technology in different health care services.

c) Professional and Practical Skills:

By the end of the course the student should have

- c1.To have standard clinical skills in diagnosis of different diseases using different diagnostic modalities using the radionuclide.
- c2.To have standard clinical skills in of radionuclide therapy in endocrine and malignant diseases.
- c3.To have special skills in different diagnostic and therapeutic nuclear medicine technique.
- c4.Application of nuclear medicine technology in different health care services.

d) General and Transferable Skills:

By the end of the course the student should have the ability to:

- d1. Appreciate the importance of life long learning and show a strong commitment to it.
- d2. Use the sources of biomedical information to remain current with the advances in knowledge and practice.
- d3. Write a report commenting on a diagnostic Nuclear Medicine study.
- d4. Use data analysis and communication skills
- d5. Respect, be willing to work through systems, collaborate with other members of the students.
- d6. Effectively utilize various computer based instruction tools and E-learning of Nuclear Medicine and utilize a variety of computer-based self assessment tools.

3. Course contents:

Nuclear Medicine Technology

Topic	No. of hours	Lecture	clinical
<u>Technology of:</u>			
<u>A.Endocrinal system:</u>	12	6	6
1-Thyroid scan.			
2-Parathyroid scan.			
3-Suprarenal scan.			
<u>B.Skeletal System:</u>	10	5	5
1-Bone scan.			
2-Bone Marrow scan.			
<u>C.Hepatobiliary system:</u>	14	7	7
1-Cholescintigraphy.			
2-Tc99m RBCs liver scintigraphy.			
3-Tc99m Sulfur Colloid Liver-Spleen scan.			
4-Spleen scan.			
<u>D.Genitourinary System:</u>	10	5	5
1-Renal Scan.			
2-Scrotal Scintigraphy			
<u>E.Gastrointestinal System:</u>	12	6	6
1-Oesophageal motility disorders scanning.			
2-Oesophageal rflux scan.			
3-Gastric motility disorders scanning.			
<u>F.Central Nervous System:</u>	8	4	4

1-Cerebral Blood Flow scintigraphy. 2-Cisrternography.			
<u>G.Cardiac System:</u> 1-Radionuclide ventriculography 2-Myocardial perfusions scan	12	6	6
<u>H.Pulmonary System:</u> V-Q Lung scan.	4	2	2
<u>I-Tumour Imaging</u>	8	4	4
Total	90	15	45
Credit Hours	2.5	1	1.5

Therapeutic Nuclear Medicine

Topic	No. of hours	Lecture	Clinical
1-MIBG therapy in Neuroendocrinal tumours.	14	2	12
2-I131 therapy in Differentiated Cancer Thyroid.	14	2	12
3-Radionuclide joint therapy.	14	2	12
4-Palliation of bone pain from osteoplastic metastasis.	14	2	12
5-Radioimmunotherapy in:	14	2	12
-Solid tumours.	7	1	6
-Lymphoma.	7	1	6
6-Therapy with Phosphorus132 in:	14	2	12
- Polycythemia Vera.	7	1	6
-Pleural effusion.	7	1	6
7-I131 therapy of begnin thyroid diseases.	14	2	12
8- Radionuclide intracoronary brachytherapy.	7	1	6
Total	105	15	90
Credit Hours	4	1	3

Diagnostic Nuclear Medicine

Topic	No. of hours	Lecture	Clinical
<u>A.Endocrinal system:</u> 1-Thyrotoxicosis. 2-Hypothyroidism. 3-Thyroid nodules. 4-Thyroid cancers. 5-Parathyroid adenomas. 6-Suprarenal gland disorders.	30	6	24
<u>B.Skeletal System:</u> 1-Bone secondaries. 2-Osteomyelitis. 3-Iry Bone tumours. 4-Metabolic bone diseases. 5-Skeletal trauma. 6-Osteonecrosis & Infarction.	35	7	28
<u>C.Hepatobiliary system:</u> 1-Cholecystitis. 2-Biliary duct obstruction. 3-Choledocal cyst.	30	6	24

4-Biliary atresia. 5-Postoperative biliary tract complications. 6-Liver Haemangiomas. 7-Hepatoma..			
<u>D.Genitourinary System:</u> 1-Urinary tract obstruction. 2-Urinary tract infection. 3-Hydronephrosis. 4-Renovascular hypertension. 5-Vesico-uretric reflux. 6-Renal transplant evaluation. 7-Testicular torsion. 8-Epididymitis.	35	7	28
<u>E.Gastrointestinal System:</u> 1-Esophageal motility disorders. 2-Gastro-esophageal reflux . 3-Gastric motility disorders. 4-GIT bleeding. 5-Heterotopic gastric mucosa.	30	6	24
<u>F.Central Nervous System:</u> 1-Dementia. 2-Stroke&cerebrovascular diseases. 3-Brain death. 4-Movement disorders. 5-Hydrocephalus. 6-tumour imaging.	27.5	5.5	22
<u>G.Cardiac System:</u> 1-Ischemic heart disease 2-Congenital heart disease	25	5	20
<u>H.Pulmonary System:</u> Pulmonary embolism.	12.5	2.5	10
Total	125	45	180
Credit Hours	9	3	6

PET In Diagnosis Of Cancers

Topic	No. of hours	Lecture	Practical
1-Normal distribution&variants of F18-FDG.	2	2	1
2-Pattern of malignancies.	1.5	1	1
3-Lung carcinoma.	3.5	2	2
4-Head&Neck carcinoma	3	2	2
5-Thyroid carcinoma.	1.5	1	1
6-Esophageal carcinoma.	2	1	1
7-Colorectal carcinoma.	2	1	1
8-Lymphoma.	3.5	2	2
9-Melanoma.	3	1.5	2
10-Breast carcinoma.	3	1	2
Total	30	15	15
Credit Hours	1.5	1	0.5

Clinical Training In Diagnosis And Therapy

Topic	No. of hours	Lecture	Practical
1-DIAGNOSIS:			
<u>A.Endocrinal system:</u>	7	3	4
1-Thyrotoxicosis.			
2-Hypothyroidism.			
3-Thyroid nodules.			
4-Thyroid cancers.			
5-Parathyroid adenomas.			
6-Suprarenal gland disorders.			
<u>B.Skeletal System:</u>	5	2	3
1-Bone secondaries.			
2-Osteomyelitis.			
3-1ry Bone tumours.			
4-Metabolic bone diseases.			
5-Skeletal trauma.			
6-Osteonecrosis & Infarction.			
<u>C.Hepatobiliary system:</u>	5	2	3
1-Cholecystitis.			
2-Biliary duct obstruction.			
3-Choledocal cyst.			
4-Biliary atrisia.			
5-Postoperative biliary tract complications.			
6-Liver Haemangiomas.			
7-Hepatoma..			
<u>D.Genitourinary System:</u>	5	2	3
1-Urinaty tract obstruction.			
2-Urinary tract infection.			
3-Hydronephrosis.			
4-Renovascular hypertension.			
5-Vesico-uretric reflux.			
6-Renal transplant evaluation.			
7-Testicular torsion.			
8-Epididymitis.			
<u>E.Gastrointestinal System:</u>	5	2	3
1-Esophageal motility disorders.			
2-Gasro-esophageal rflux .			
3-Gastric motility disorders.			
4-GIT bleeding.			
5-Heterotopic gastric mucosa.			
<u>F.Central Nervous System:</u>	5	2	3
1-Dementia.			
2-Stroke&cerebrovascular diseases.			
3-Brain death.			
4-Movement disorders.			
5-Hydrocephalus.			
6-tumour imaging.			
<u>G.Cardiac System:</u>	5	2	3
1-Ischemic heart diseases.			

2-Congenital heart diseases. <u>H.Pulmonary System:</u> Pulmonary embolism	3	1	2
<u>2-Therapy:</u> 1-MIBG therapy in Neuroendocrinal tumours.	5	2	3
2-I131 therapy in Differentiated Cancer Thyroid.	5	2	3
3-Radionuclide joint therapy.	3	1	2
4-Palliation of bone pain from osteoplastic metastasis.	5	2	3
5-Radioimmunotherapy in: -Solid tumours. -Lymphoma.	5	2	3
6-Therapy with Phosphorus132 in: - Polycythemia Vera. -Pleural effusion.	5	2	3
7-I131 therapy of benign thyroid diseases	5	2	3
8-Radionuclide intracoronary brachytherapy.	2	1	1
Total	75	30	45
Credit Hours	3.5	2	1.5

4. Teaching and Learning Methods

- 4.1. Lectures.
- 4.2. Clinical Practice.
- 4.3. Images and films review.
- 4.3. Seminars, presentations, graphs, pictures, tables, etc...

5. Student Assessment Methods

Method of assessment	The assessed ILOs
5.1- Observation of attendance and absenteeism.	- General transferable skills, intellectual skills
5.2-Written Exams: -Short essay: 40% -structured questions: 25% -MCQs: 20% -Commentary, Problem solving: 15%	- Knowledge - Knowledge - Knowledge, intellectual skills - Intellectual skills, General transferable skills, - Practical skills, intellectual skills
5.3-Structured Oral Exams	- Knowledge

Assessment Schedule

- Assessment 1. Attendance and absenteeism (formative)
- Assessment 2. Final Clinical examination: week 96
- Assessment 3. Final Written examination: week 96
- Assessment 4. Final Oral examination: week 96

Weighting of Assessments

Final-term Examination separate exam
 Passing in the written exam is a condition to attend the following exams:

Oral Examination	50%
clinical Examination & attendance and absenteeism	50%
Total	100%

formative only assesment:simple research assignment,log book,attendance and absenteeism.

6. List of References

6.1- Course Notes:

6.2- Essential Books (Text Books):

- Nuclear Medicine: The Requisites.
- Alexander Gottschalk: Diagnostic Nuclear Medicine.
- Peter Ell: Clinical Nuclear Medicine.

6.3- Recommended Books:

- Mazzaferri: Essentials of thyroid cancer.

6.4- Periodicals, Web Sites, etc...

7. Facilities Required for Teaching and Learning:

- a. Adequate Infrastructure:including testching class,comfortable desks,good areation,bathrooms,good illumination,safty & security tools.
- b. Teatching tools:including screens,computers,data shows,projectors,flip charts,white boards,video player,digital video camera,scanner,copier,colour&laser printers.

Course Coordinator: Dr. Wafa Abd El-Hameed

Head of Department: Prof. Dr. El-Sayed Moustafa

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