



# Program Specification

— (Postgraduate)

Program Name: Master of Science in Medical Physics

Program Code (as per the Saudi Standard Classification of Educational Levels and Specializations): 53308

Qualification Level: Seven

Department: Physics

College: Science

Institution: King Khalid University

Program Specification: New  updated\*

Last Review Date: 07/10/2023

\*Attach the previous version of the Program Specification.



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## A. Program Identification and General Information:

### 1. Program's Main Location:

King Khalid University main campus

### 2. Branches Offering the Program (if any):

None

### 3. System of Study:

Coursework & Thesis

Course work

### 4. Mode of Study:

On Campus

Distance Education

Other .....(specify)

### 5. Partnerships with other parties (if any) and the nature of each:

- Partnership Arrangement: Under investigations
- Type of Partnership: Under investigations
- Duration of Partnership: Under investigations

### 6. Professions/jobs for which students are qualified:

#### Industry

- Computational Physics
- Health Physics Consulting
- Industrial Physics
- Medical technology
- Power and Generation Utilities
- Research and development in Medical Imaging
- Research and development in Radiation Therapy

#### Health

- Medical Diagnostics / Imaging / Therapy
- Medical Dosimetry
- Medical Informatics
- Medical Physics/Assistance
- Radiation Therapy

#### Government

- Environmental Science
- National Defense
- Quality Assurance and Control
- Regulatory Authorities
- Science Policy
- Technological Innovation

### 7. Relevant occupational/ Professional sectors:

University

Clinical Centers

Research centers

Industrial Sectors

### 8. Major Tracks/Pathways (if any):





Major track/pathway	Credit hours (For each track)	Professions/jobs (For each track)
1. None		
2.		
3.		
4.		
<b>9. Total credit hours: (43)</b>		



## B. Mission, Goals, and Program Learning Outcomes

### 1. Program Mission:

Innovation and excellence in higher education and scientific research in the field of medical physics, the training highly qualified students, and the contribution to the service and development of the community.

### 2. Program Goals:

- Providing students with basic knowledge and skills in medical physics.
- Graduates will gain theoretical and practical knowledge in radiation dosimetry, radiation biology, radiation therapy, medical imaging, and health physics.
- Developing professional competency in medical physics by providing a framework in which students progressively develop mastery of the current state of medical physics and an ability to synthesize this information and apply it in a clinical setting.

### 3. Program Learning Outcomes: \*

#### Knowledge and Understanding:

K1	Describe scientific abilities of the human body and its major organ systems, as well as imaging and radiation oncology.
K2	Explain scientific facts and acquire advanced concepts of radiation, its properties, units of measurement, dosimetry concepts, and techniques.
K3	Describe scientific abilities and methods Characterize safety measures and procedures for control and the radiation shielding requirements.
K4	Outline thinking and practical research of the systems and procedures associated with various clinical imaging and therapeutic interventions.

#### Skills:

S1	Demonstrate independence and teamwork skills to define the routine clinical support duties of a medical physicist.
S2	Apply statistically concepts and theories to analyze and fulfil the requirement of any medical physics-related research project.
S3	Develop the ability to use some handle oral and written communication to colleagues, academic institutions, and funding agencies.
S4	Develop the ability to retrieve, store, organize, and apply information for solving problems or implementing operational procedures.
S5	Identify, select, plan for (including resource planning), use and evaluate IT technologies related to medical physics practice, such as PACS facilities, and strategies to enhance the achievement of aims and desired outcomes

#### Values, Autonomy, and Responsibility:

V1	Design, develop, uphold ethical, responsible, dependable, responsible, and trustworthy behavior in all areas of their professional responsibilities and be committed to the profession.
V2	Approach all colleagues, research subjects, and others with integrity.
V3	Develop the ability to Solve the treat patients and research subjects with compassion and respect, and never infringe on their privacy or dignity.
V4	Comply with all applicable regulations and requirements of health and safety for him/herself and for others.

\* \* Add a table for each track (if any)





## C. Curriculum:

### 1. Curriculum Structure:

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
<b>Course</b>	Required	12	33	77
	Elective	0	0	0
Graduation Project (if any)		2	7	16
Thesis (if any)				
Field Experience (if any)		1	3	7
Others (....)				
<b>Total</b>		15	43	100

\* Add a separate table for each track (if any).

### 2. Program Courses:

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	Phys-6111	Basic Principles of Radiation Physics	Required	---	3	Program
	Phys-6112	Radiation Detection and Measurements	Required	---	3	Program
	Rad-6111	Radiation Biology	Required	---	2	Program
	Phys-6113	Radiation Protection and Safety	Required	---	3	Program
Level 2	Phys-6124	Biostatistics and Research Methodologies	Required	---	2	Program
	Rad-6122	Physics of Nuclear Medicine	Required	---	3	Program
	Rad-6123	Physic of Medical Imaging – Ionizing Radiation	Required	---	3	Program
	Rad-6124	Physic of Medical Imaging – Non-ionizing Radiation	Required	---	3	Program
Level 3	Rad-6135	Principles of Physics in Radiation Oncology	Required	---	3	Program
	Phys-6135	Advanced Bioinstrumentation and Microscopes	Required	---	3	Program
	Rad-6136	Imaging of Radiation Oncology	Required	---	2	Program





Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
	Rad-6137	Advances Nuclear Medicine Technologies	Required	---	3	Program
Level 4	Rad-6148	Clinical Practice	Required	---	3	Program
	Phys-6146	Research Project 1	Required	---	2	Program
	Phys-6147	Research Project 2	Required	---	5	Program

\* Include additional levels (for three semesters option or if needed).

\*\* Add a table for the courses of each track (if any)

### 3. Course Specifications:

Insert hyperlink for all course specifications using NCAAA template (T-104)

Basic Principles of Radiation Physics	
Radiation Detection and Measurements	
Radiation Biology	
Radiation Protection and Safety	
Biostatistics and Research Methodologies	
Physics of Nuclear Medicine	
Physic of Medical Imaging – Ionizing Radiation	
Physic of Medical Imaging – Non-ionizing Radiation	
Principles of Physics in Radiation Oncology	
Advanced Bioinstrumentation and Microscopes	
Imaging of Radiation Oncology	
Advances Nuclear Medicine Technologies	
Clinical Practice	
Research Project 1	





Research Project 2

#### 4. Program learning Outcomes Mapping Matrix:

Align the program learning outcomes with program courses, according to the following desired levels of performance  
(I = Introduced P = Practiced M = Mastered).

Course code & No.	Program Learning Outcomes												
	Knowledge and understanding				Skills					Values, Autonomy, and Responsibility			
	K1	K2	K3	K4	S1	S2	S3	S4	S4	V1	V2	V3	V4
Phys-6111	I	I	I	I	I	I	I	I	I	I	I	I	I
Phys-6112	I	I	I	I	I	I	I	I	I	I	I	I	I
Rad-6111	I	I	I	I	I	I	P	P	I	I	I	P	P
Phys-6113	P	P	P	P	I	I	P	P	I	I	I	P	P
Phys-6124	I	I	I	I	I	I	I	I	P	P	P	M	M
Rad-6122	P	P	P	P	P	P	M	P	P	P	P	M	M
Rad-6123	P	P	P	P	P	P	M	P	P	P	P	M	M
Rad-6124	I	I	I	I	I	I	P	P	P	P	P	M	M
Rad-6137	I	I	I	I	I	I	P	P	P	P	P	M	M
Phys-6135	I	I	I	I	I	I	P	P	P	P	P	M	M
Rad-6148	I	I	I	I	I	I	P	P	P	P	P	M	M
Phys-6146	I	I	I	I	P	P	M	P	P	P	P	M	M
Phys-6147	I	I	I	I	P	P	M	M	I	I	I	I	I

\* Add a separated table for each track (if any).

#### 5. Teaching and learning strategies applied to achieve program learning outcomes:

Describe teaching and learning strategies, to achieve the program learning outcomes in all areas.

1. Disseminate up-to-date knowledge via: lectures, up-to-date textbooks, hand-outs, develop skills in using library and other learning resources, use of the Internet.
2. Develop the capability to use ideas and information via: case studies, projects, demonstrations, group working, simulations (e.g., computer based), problem-solving, discussion and debate, essay-writing.
3. Develop the students' ability to test ideas and evidence via: seminar and tutorials, supervision, presentations, essays, feedback on written work, literature reviewing, exam papers, critical assessment, peer assessment, self-assessment.
4. Provide hands-on sessions on the radiological technologies used in for diagnostic and therapeutic purposes.
5. Develop the student's ability to generate ideas and evidence via: research projects, workshops on techniques of creative problem solving, group working, lateral thinking, brainstorming, Mind-mapping, problem solving.





6. Facilitate the personal development of students via: feedback, experiential learning, learning logs, structured experiences in groups, self-assessment, profiling.
7. Develop the capacity of students to plan and manage own learning via: projects, workshops, mentors, independent study, dissertations, work placement, portfolio development.

## 6. Assessment Methods for program learning outcomes:

Describe assessment methods (Direct and Indirect) that can be used to measure the achievement of program learning outcomes in all areas.

The program should devise a plan for assessing Program Learning Outcomes (all learning outcomes should be assessed at least once in the program's cycle).

Reports, seminar and tutorials, supervision, presentations, essays, feedback on written work and homework, exam papers, critical assessment, peer assessment, self-assessment

## D. Thesis and Its Requirements (if any):

### 1. Registration of the thesis:

(Requirements/conditions and procedures for registration of the thesis as well as controls, responsibilities and procedures of scientific guidance)

**Not Applicable**

### 2. Scientific Supervision:

(The regulations of the selection of the scientific supervisor and his/her responsibilities, as well as the procedures/mechanisms of the scientific supervision and follow-up)

**Not Applicable**

### 3. Thesis Defense/Examination:

(The regulations for selection of the defense/examination committee and the requirements to proceed for thesis defense, the procedures for defense and approval of the thesis, and criteria for evaluation of the thesis)

**Not Applicable**

## H. Student Admission and Support:

### 1. Student Admission Requirements:

The department of physics is committed to the **Standard List of Postgraduate Studies at the Saudi Universities** and its **Executive Regulations at King Khalid University**.  
And especially, **Article 15 for the entrance exam**, and **Article 18 for the complementary courses**.

Particularly, the department requires:

- A bachelor's degree in medicine, diagnostic radiology, radiation therapy, medical physics, biomedical engineering, environmental health, biophysics, physics, applied physics, radiation biology or any relevant specialties.
- Basic background in calculus, statistics, and basic physics principles.





- Intermediate level in English verified through one of the following:

Test	Required level
TOEFL-PBT	450
TOEFL-CBT	133
TOEFL-IBT	45
STEP	67
IELTS	4

## 2. Guidance and Orientation Programs for New Students:

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level).

- Introductory meetings at the beginning of each semester.
- Distribution of leaflets and brochures on the program to faculty members.
- Utilize the expertise of the experienced and efficient faculty members.
- Prepare a web page to introduce new faculty members.
- Holding periodic meetings to encourage the interaction of new faculty members in the department.

## 3. Student Counseling Services:

(Academic, professional, psychological, and social)

(Include only the exceptional needs offered to the students of the program that differ from those provided at the institutional level)

- Assign a **program coordinator**.
- Assign an academic advisor from faculty members for each group of students from enrollment until graduation.
- Monitoring the academic performance of students through the Academic Guidance Unit in the Department.
- Provide students with the necessary advice on specialization and employment after graduation, providing personal, social, and educational counseling, and contribute to the development of appropriate solutions to academic problems encountered by students.
- Will continuously monitor and evaluate the program and its outcome.
- Assign specific office hours in each faculty member's weekly schedule and announce them in a clear and dedicated place for students to provide academic assistance and guidance.
- The Department is committed to the Student Rights Policy approved by the King Khalid University.
- The establishment of the Student Affairs Committee in the Department, whose task is to study students' complaints and find appropriate solutions.

## 4. Special Support:

(Low achievers, disabled, and talented students).

The Department of physics is committed to the Special Need Student Rights Policy approved by the King Khalid University.

## E. Faculty and Administrative Staff:

### 1. Needed Teaching and Administrative Staff:

Academic Rank	Specialty		Required Numbers
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	General	Specific	Special Requirements / Skills (if any)	M	F	T
Professor	Medical Physics	Nuclear Medicine Physics		1	1	2
Associate Professor	Radiation Physics	Ultrasound physics		1	0	1
Assistant Professor	Health Physics	Radiation Protection		1	0	1
Technicians and Laboratory Assistant	Software experts	Software experts	Ability to download, fix, repair any required software in teaching	1	1	2
Administrative and Supportive Staff	None	None	None	0	0	0
Others (specify)						

## F. Learning Resources, Facilities, and Equipment:

### 1. Learning Resources:

Learning resources required by the Program (textbooks, references, and e-learning resources and web-based resources, etc.)

- Coordinating with the Deanship of Library Affairs to provide books, references, and e-learning resources in the field of specialization.
- The use of books and references appropriate to the content with the description of the courses, with the continuous update of those references periodically by the educational committee in the department.
- Encouraging the translation of specialized books and supporting joint authoring between members of the department and members of the same specialization in other Saudi colleges and universities.

### 2. Facilities and Equipment:

(Library, laboratories, classrooms, etc.)

Coordinate with the Deanship to provide the required laboratories, equipment and classrooms.

### 3. Procedures to ensure a healthy and safe learning environment:

(According to the nature of the program)

The department is committed to the Healthy and Safe Environment Policy approved by the University.

## G. Program Quality Assurance:

### 1. Program Quality Assurance System:

Provide a link to the quality assurance manual.



The department of physics is committed to the **Standard List of Postgraduate Studies at the Saudi Universities** and its **Executive Regulations at King Khalid University**.

<https://dps.kku.edu.sa/ar/content/261>

and to the **List of Students Rights and Duties** adopted by the University

<http://bit.do/eQJt3>

and to the **List of Rights and Duties for Graduate Students** adopted by the University

<http://bit.do/eQJtA>

## 2. Program Quality Monitoring Procedures:

The department of physics is committed to the **Standard List of Postgraduate Studies at the Saudi Universities** and its **Executive Regulations at King Khalid University**.

<https://dps.kku.edu.sa/ar/content/261>

and to the **List of Students Rights and Duties** adopted by the University

<http://bit.do/eQJt3>

and to the **List of Rights and Duties for Graduate Students** adopted by the University

<http://bit.do/eQJtA>

## 3. Procedures to Monitor Quality of Courses Taught by other Departments:

The Department will coordinate with the radiological sciences department to coordinate courses taught by them.

## 4. Procedures Used to Ensure the Consistency between within the main campus:

(including male and female sections).

**Not Applicable**

## 5. Assessment Plan for Program Learning Outcomes (PLOs):

The MSc program committee will collect feedback from:

- Results of academic achievement.
- Cases of excellence.
- Extracurricular activities.
- Periodic interviews with students.
- Self-assessment by the student through an objective evaluation model.
- An annual test to measure the levels of students in each section of students separately.
- Evaluation by the Deanship of Academic Development and Quality at the University.
- Evaluation by the National Assessment and Accreditation Authority.
- Evaluation by the Deanship of Graduate Studies.
- Review of suggestions from employers to address deficiencies in graduates.

The MSc program committee will use the following strategies:

- Information and data obtained from evaluation models.
- Evaluation by the MSc program committee of the department for the extent to which learning outcomes have been achieved in the program.
- An annual test to measure the levels of students in each section of students separately.
- Preparation and review of various evaluation models.
- Setting timetables for evaluations.
- The quality and development committee in the department monitors the evaluation and quality of the program.
- Study the proposals submitted by students, graduates and employers to improve and evaluate the program.



## 6. Program Evaluation Matrix:

Evaluation Areas/Aspects	Evaluation Sources/References	Evaluation Methods	Evaluation Time
effectiveness of teaching & assessment	Students and Faculty	Surveys & Interviews	At the end of each semester.
Learning resources	Students and Faculty	Surveys & Interviews	At the end of each semester.
Objectives of the operational plan	Students and Faculty	Surveys & Interviews	At the end of each semester.

**Evaluation Areas/Aspects** (e.g., leadership, effectiveness of teaching & assessment, learning resources, services, partnerships, etc.)

**Evaluation Sources** (students, graduates, alumni, faculty, program leaders, administrative staff, employers, independent reviewers, and others.)

**Evaluation Methods** (e.g., Surveys, interviews, visits, etc.)

**Evaluation Time** (e.g., beginning of semesters, end of the academic year, etc.)

## 7. Program KPIs:\*

The period to achieve the target (2) year(s).

No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
1	KPI-P-01	Percentage of attained objectives of the operational plan.	75%	Survey of student's opinions. Survey of teaching staff's opinions.	Graduation of the first batch.
2	KPI-P-02	Students' evaluation of the quality of the learning experiences.	3/5	Survey of student's opinions.	At the end of each academic year.
3	KPI-P-03	Students' evaluation of the quality of the learning experiences in each course.	3/5	Survey of student's opinions.	At the end of each semester.
4	KPI-P-05	Rate of students' retention after the first year.	75%	Students results.	At the end of each 1 <sup>st</sup> year of a batch.
5	KPI-P-08	Percentage of attendance.	80%	Absence sheet.	End of each semester.
6	KPI-P-10	Student satisfaction with the services provided.	3/5	Survey of student's opinions.	Yearly
7	KPI-P-11	Ratio of students to teaching staff	1/1	Numeric comparison	Yearly
8	KPI-P-12	Percentage of faculty distribution by grades	1/5 each	Numeric comparison	Yearly





No.	KPIs Code	KPIs	Targeted Level	Measurement Methods	Measurement Time
9	KPI-P-13	Dropout rate of faculty.	<10%	Numeric comparison	Yearly
10	KPI-P-14	Percentage of scientific publication	80%	Ratio of teaching staff publishing 1 paper to the other teaching staff.	Yearly
11	KPI-P-15	Ratio of scientific publication to the teaching staff	2 each	Average number of publications.	Yearly
12	KPI-P-16	Citation rate of published research.	10	Average number of citations per published paper.	Yearly
13	KPI-P-17	Students' satisfaction about learning resources.	3/5	Survey of student's opinions.	Yearly

\*including KPIs required by NCAAA

## H. Specification Approval Data:

Council / Committee	Plans and Curricula Committee & Development and Quality Committee/ Physics Department Council
Reference No.	Minutes of the fourth meeting- (2-2-45)
Date	11-3-1445 AH

Council / Committee	Physics Department Council
Reference No.	Minutes of the fourth meeting- (5-4-45)
Date	24-3-1445 AH

Council / Committee	Science College Council
Reference No.	Minutes of the fifteenth meeting- (5-15-45)
Date	25-8-1445 AH

