Anbar University/ College of Applied Sciences- Heet

جامعة الأنبار- كلية العلوم التطبيقية-هيت

First Cycle – Bachelor's degree (B.Sc.) – Medical Physics

بكالوريوس علوم - الفيزياء الطبية

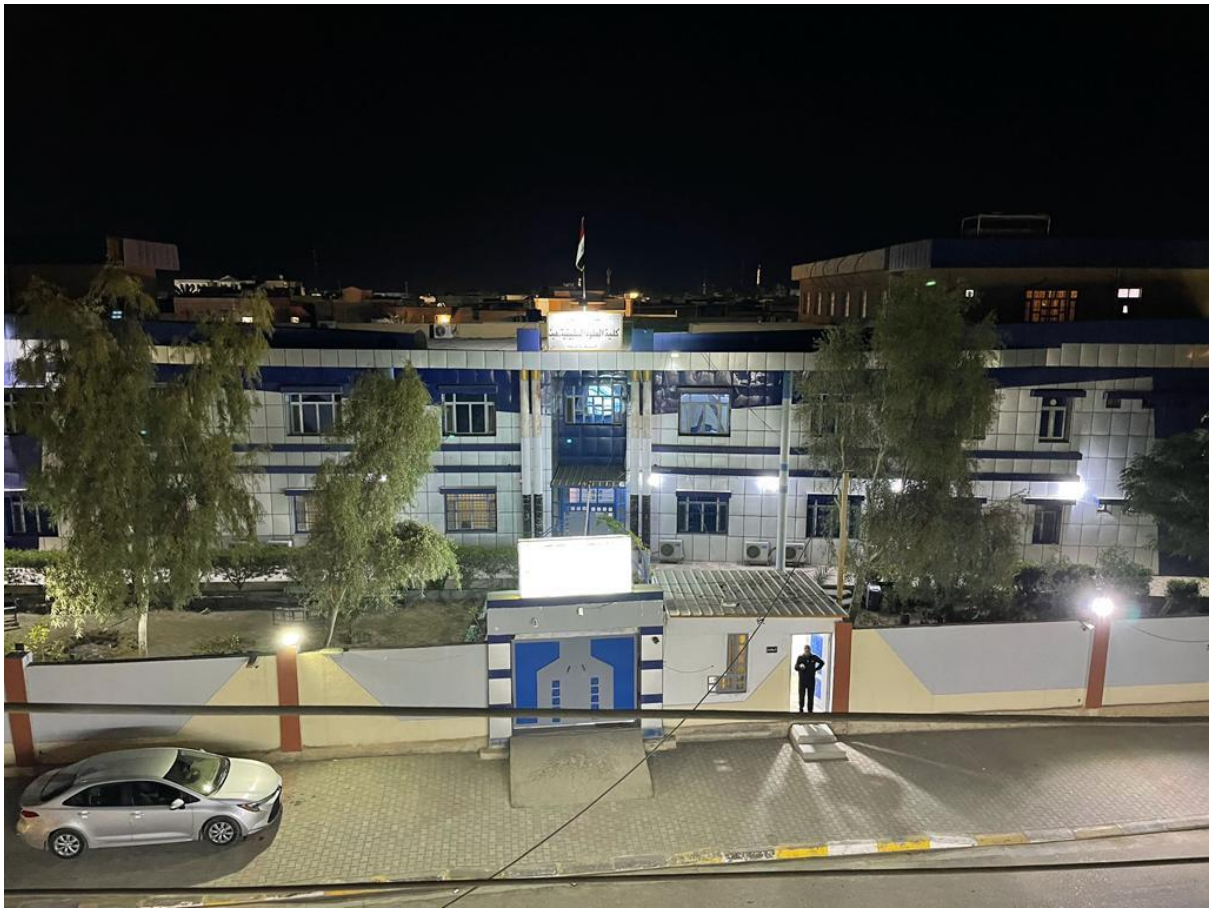

Table of Contents | جدول المحتويات

1. Mission & Vision Statement

Vision Statement

The vision of medical physics is to improve healthcare outcomes by applying physics principles and techniques to medical diagnosis, treatment, and research. Medical physics is a multidisciplinary field that combines physics, mathematics, engineering, and biology to address challenges in medicine and healthcare.

The overarching goal of medical physics is to ensure the safe and effective use of ionizing and non-ionizing radiation in healthcare. Medical physicists work with other healthcare professionals to develop and optimize medical imaging techniques, radiation therapy treatment plans, and radiation safety protocols. They also conduct research to develop new technologies and treatment approaches that can improve patient outcomes.

The vision of medical physics includes:

- Enhancing patient care by providing accurate and precise diagnostic and treatment methods.
- Improving healthcare quality by ensuring the safe and effective use of medical radiation.
- Developing new technologies and approaches to healthcare that can improve healthcare outcomes.
- Advancing scientific knowledge and understanding of the human body and disease processes through research.
- Promoting the education and training of medical physicists and other healthcare professionals to ensure the highest standards of practice.

- Ultimately, the vision of medical physics is to contribute to the advancement of healthcare and improve the lives of patients around the world.

Mission Statement

The mission of medical physics is to apply the principles of physics to improve and advance the practice of medicine and healthcare. The field of medical physics involves the application of physics principles, techniques, and technologies to medical imaging, radiation therapy, nuclear medicine, and other areas of healthcare.

The mission of medical physics includes:

- Ensuring the safe and effective use of ionizing and non-ionizing radiation in medical diagnosis and treatment.
- Developing and implementing new technologies and techniques to improve patient outcomes and quality of care.
- Providing accurate and precise measurements and calculations in medical imaging and radiation therapy.
- Conducting research to advance scientific knowledge and understanding of the human body and disease processes.
- Training and educating medical physicists and other healthcare professionals to ensure the highest standards of practice and patient care.
- Medical physicists work closely with other healthcare professionals, such as radiologists, radiation oncologists, and nuclear medicine specialists, to provide safe, accurate, and effective healthcare. They apply their expertise in physics, mathematics, engineering, and biology to facilitate the development of new and innovative solutions to medical problems.
- The mission of medical physics is ultimately to improve the lives of patients by contributing to the advancement of healthcare and the development of new and more effective medical technologies and treatments.

2. Program Specification

Programme code:	BSc-MPH	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

The program specification outlines the key details and requirements for the Medical Physics Department program. This department focuses on the application of physics principles and techniques in the field of medicine to ensure safe and effective use of radiation and other imaging modalities. The program aims to educate students in the theoretical and practical aspects of medical physics, preparing them for careers in healthcare institutions, research, and academia.

- **Duration:** The program is typically structured as a four-year undergraduate degree, followed by a two-year postgraduate master's degree or a three-year doctoral degree.
- **Core Courses**: Students will take a combination of core courses covering topics such as radiation physics, radiation biology, medical imaging, radiation therapy, radiation safety, anatomy, physiology, and statistics.
- **Elective Courses**: Students may have the opportunity to choose elective courses based on their interests and career goals. Elective options may include advanced topics in medical imaging, radiation therapy techniques, nuclear medicine, dosimetry, or research methods.
- **Practical Training**: The program will include hands-on practical training components, including laboratory work, clinical internships, and research projects. These experiences will allow students to apply theoretical knowledge in real-world settings.
- **Research Opportunities**: Students will have the opportunity to engage in research projects, collaborate with faculty, and contribute to the advancement of medical physics through scientific publications and presentations.

3. Program Objectives

1. Provide students with a solid foundation in physics, mathematics, and relevant biomedical sciences.
2. Develop an understanding of the principles and applications of medical physics in diagnostic imaging, radiation therapy, nuclear medicine, and radiation safety.
3. Equip students with the necessary knowledge and skills to perform quality assurance, calibration, and optimization of medical imaging and radiation therapy equipment.
4. Foster critical thinking, problem-solving, and analytical skills required for research and development in medical physics.
5. Promote ethical and professional behavior, emphasizing patient safety and radiation protection.

4. Student Learning Outcomes

Upon completion of the Medical Physics Department program, students should be able to demonstrate the following learning outcomes

Outcome 1

Knowledge and Understanding:

- *Understand the fundamental principles of physics and their application in medical imaging, radiation therapy, and nuclear medicine.*
- *Demonstrate knowledge of human anatomy, physiology, and relevant biomedical sciences related to medical physics.*
- *Comprehend the principles of radiation physics, radiation biology, and radiation safety, including the effects of radiation on biological systems.*

- *Understand the principles and techniques of various medical imaging modalities, such as X-ray imaging, computed tomography (CT), magnetic resonance imaging (MRI), and ultrasound.*
- *Demonstrate knowledge of radiation therapy techniques, treatment planning, and quality assurance processes.*
- *Understand the principles and applications of nuclear medicine, including radiopharmaceuticals and imaging techniques.*

Outcome 2

Practical Skills:

- *Apply mathematical and statistical techniques to analyze and interpret data in medical physics.*
- *Perform quality assurance procedures, calibration, and optimization of medical imaging and radiation therapy equipment.*
- *Safely operate and maintain medical imaging and radiation therapy equipment.*
- *Utilize imaging software and computational tools for data analysis and image reconstruction.*
- *Apply radiation safety protocols and principles to ensure patient and staff protection.*
- *Conduct research projects, including experimental design, data collection, analysis, and interpretation.*

Outcome 3

Critical Thinking and Problem-Solving:

- *Analyze and evaluate medical images to make accurate diagnoses and treatment plans.*
- *Identify and solve problems related to the performance of medical imaging and radiation therapy equipment.*
- *Evaluate radiation dose and risks to patients and staff, and implement appropriate radiation protection measures.*
- *Critically evaluate scientific literature, research findings, and technological advancements in medical physics.*
- *Develop innovative solutions and techniques to enhance the field of medical physics.*

Outcome 4

Communication and Collaboration:

- *Communicate effectively with patients, medical professionals, and interdisciplinary teams.*
- *Present scientific information and research findings in written reports, oral presentations, and visual media.*
- *Collaborate with healthcare professionals, physicists, and engineers in the clinical and research settings.*
- *Demonstrate professionalism, ethical conduct, and sensitivity when working with patients and colleagues.*

Outcome 5

Lifelong Learning and Professional Development:

- *Demonstrate a commitment to continuous learning and staying updated with advances in medical physics.*
- *Engage in professional development activities, such as attending conferences, workshops, and seminars.*
- *Pursue further education and certifications to specialize in specific areas of medical physics.*
- *Adhere to ethical standards, codes of conduct, and regulations governing the practice of medical physics.*

5. Academic Staff

Marwan M. Salih | Ph.D. in Biology | Lect. Dr.
Email: ah.marwan_bio@uoanbar.edu.iq
Mobile no.: 07810844884

Ahmed Saadon Jaloot | Ph.D. in Biology | Assist. Prof.
Email: asjaloot@uoanbar.edu.iq
Mobile no.: 07831047896

Ahmed Ahmed Sarhan | Ph.D. in Materials Science Engineering | Lect. Dr.
Email: aas_alhity@uoanbar.edu.iq
Mobile no.: 07826332232

Mawlood Maajal Ali | Ph.D. in Applied Sciences | Lect. Dr.
Email: mawloodmali@uoanbar.edu.iq
Mobile no.: 07513151787

Ammar Abulrazzaq Tawfeeq | M.Sc. Animal physiology | Assist. Lect.
Email: ammarabta@uoanbar.edu.iq
Mobile no.: 0780954748

Burhhan M. Nassar | M.Sc in Biology | Assist. Lect.
Email: Burhanmn@uoanbar.edu.iq
Mobile no.: 07802325807

Mohammed Qasim Taha | M.Sc in Electrical Engineering | Assist. Lect.
Email: as.mohammed_taha@uoanbar.edu.iq
Mobile no.: 07816496713

Mohammed Assad Anaz | M.Sc. in physics | Assist. Lect.
Email: mohammedaa1988@uoanbar.edu.iq
Mobile no.: 07906497870

Ahmed Thair Shakir | M.Sc. Communications Engineering | Assist. Lect.
Email: ahmedthair@@uoanbar.edu.iq
Mobile no.: 07852994606

Laith Saleh Muhammed | M.Sc. Physics | Assist. Lect.
Email: laith2011alhiti@uoanbar.edu.iq
Mobile no.: 07830473868

Rafaa Abdulkarim Abdulwaheed | M.Sc. Physics | Assist. Lect.
Email: R68829553@gmail.com
Mobile no.: 07809879245

6. Credits, Grading and GPA

Credits

Anabr University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded

(0 – 49)	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

   CGPA of a 4-year B.Sc. degree:

   CGPA = [(1st ᵐodule score x ECTS) + (2nd ᵐodule score x ECTS) + ……] / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPH-111	Electricity and magnetism	94	56	6.00	C	
MPH-112	Analytical chemistry	94	56	6.00	C	
MPH-113	Mathematics 1	79	96	7.00	B	
MPH-114	General Biology 1	64	86	6.00	B	
SCI-101	Computers 1	48	27	3.00	S	
UNI-101	English Language 1	32	18	2.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPH-121	Mechanics	109	91	8.00	C	
MPH-122	Mathematics 2	79	121	8.00	B	MPH-113
MPH-123	General Biology 2	79	71	6.00	B	MPH-114
UNI-101	Human Rights and democracy	32	18	2.00	S	
UNI-102	English Language 2	32	18	2.00	S	
SCI-102	Computer 2	48	52	4.00	S	SCI-101

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPH-211	Heat and Thermodynamic	79	46	5.00	C	
MPH-212	Optics	79	46	5.00	C	MPH-121
MPH-213	Atomic physics	79	46	5.00	C	
MPH-214	Physiology	79	46	5.00	B	MPH-123
MPH-215	Electromagnetic waves	63	62	5.00	C	MPH-111
MPH-126	Organic Chemistry	79	46	5.00	B	MPH-112

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPH-221	Medical imaging	79	71	6.00	C	
MPH-222	Molecular biology	79	46	5.00	C	MPH-123
MPH-223	Bioelectronics	79	71	6.00	C	MPH-213
MPH-224	Healthy culture	48	27	3.00	C	
MPH-225	Biophysics	79	46	5.00	C	
MPH-226	Phonetics Science	48	77	5.00	B	MPH-121

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPH-311	Medical Physics 1	79	46	5.00	C	
MPH-312	Anatomy 1	79	46	5.00	C	MPH-214
MPH-313	Medical Terminology	33	67	4.00	B	
MPH-314	Physics of Diagnostic radiology	94	56	6.00	C	MPH-213
MPH-315	Laser Basics	94	56	6.00	C	MPH-215
MPH-316	Optional 1	48	52	4.00	E	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPH-321	Biostatics	79	21	4.00	B	
MPH-322	Biochemistry	79	46	5.00	C	MPH-126
MPH-323	Physics of nuclear medicine	79	71	6.00	C	
MPH-324	Medical laser applications	79	71	6.00	C	MPH-315
MPH-325	Analoge electronics	79	46	5.00	C	MPH-223
MPH-326	Optional 2	48	52	4.00	E	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPH-411	Medical image processing and analysis	79	71	6.00	C	MPH-314
MPH-412	Medical instrumentation physics	79	46	5.00	C	
MPH-413	Radiotherapy Physics	79	71	6.00	B	MPH-323
MPH-414	Digital electronics	79	46	5.00		MPH-325
MPH-415	Optional 3	48	52	4.00	E	
MPH-416	Research project	33	67	4.00	C	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MPH-421	Medical Physics 2	79	71	6.00	C	MPH-311
MPH-422	Neurophysics	79	71	6.00	C	MPH-312
MPH-423	Material science and nanotechnology	49	76	5.00	C	
MPH-424	Biomaterials	49	76	5.00	C	
MPH-425	Optional 4	48	52	4.00	C	
MPH-426	Research project	48	52	4.00	E	MPH-416

8. Contact

Program Manager:

Ahmed Saadon Jaloot | Ph.D. in Biology | Assist. Prof.
Email: asjaloot@uoanbar.edu.iq
Mobile no.: 07831047896

Mawlood Maajal Ali | Ph.D. in Applied Sciences | Lect. Dr.
Email: mawloodmali@uoanbar.edu.iq
Mobile no.: 07513151787

Ahmed Ahmed Sarhan | Ph.D. in Materials Science Engineering | Lect. Dr.
Email: aas_alhity@uoanbar.edu.iq
Mobile no.: 07826332232

Burhhan M. Nassar | M.Sc in Biology | Assist. Lect.
Email: Burhanmn@uoanbar.edu.iq
Mobile no.: 07802325807

Dalal Yarup SSarhan | B.Sc. Biophysics | Biophysics researcher
Email: dalal1996yarab@gamil.com
Mobile no.: 07802325807