



MEDICAL PHYSICS PROGRAM

HANDBOOK (2019-2020)

KING ABDULAZIZ

PREFACE

The field of Medical Physics has drawn immense attention in the last decade in view of the scientific and technological boom that was applied in the medical sector. It is one of the most demanding disciplines worldwide and radiation therapists are among the most paid jobs. Nuclear medicine is expanding and developing very fast. Leading hospitals in the world use cyclotrons and synchrotrons as well as linear accelerators to accelerate charged particles in hospital settings for the purpose of cancer therapy and/or radio-isotopes production in site, with an increasing demand for new fast growing generations and techniques. The Kingdom of Saudi Arabia (KSA) also witnessed the unprecedented demands of qualified graduates in Medical Physics from both the Health sector and radiation related research. Several employment opportunities for Medical Physics graduates are available in different sectors: hospitals, industry, government, research centers, radiation related laboratories and agencies.

ABOUT THE PROGRAM

Medical Physics is a branch of applied physics, which focuses on the application of physical concepts and methods in medicine and health care profession. It explores the ways in which physics concepts are applied in the diagnosis and treatment of human disease using different types of radiation and physics concepts. It combines between Biophysics and Biomedical Engineering, focusing on the application of medical radiation physics. Students admitted in the program will learn how to apply physics-based concepts and methodologies to procedures such as medical imaging (medical diagnosis), radiation therapy, nuclear medicine, radiation protection and dosimetry. Medical Physics provides important information for physicians in diagnostic radiology and radiation oncology. It also includes several medical physics professional activities such as the calibration and testing of equipment, assistance in the clinical procedures, calculation of radiation doses to the patient and supervision of technical programs to ensure the quality of equipment.



Vision &
Mission



PROGRAM VISION

Internationally accredited BSc medical physics program.

PROGRAM MISSION

Prepare graduates in medical physics with high scientific and skill standards capable of serving efficiently the labor market and community by providing stimulating learning and research environment.

PROGRAM EDUCATIONAL OBJECTIVES



PEO-1

(Professionalism):

Serve competently in the national and international market/industry/academia by demonstrating high-quality knowledge and skills in their field.



PEO-2

(Life Experience & Scientific Advancement):

Exhibit quest for learning and initiative through an elevation in education or growth in professional status.



PEO-3

(Leadership):

Contribute as effective team members and managers in their organizations.



PEO-4

(Responsibility and ethics):

Demonstrate commitment to social responsibilities, moral/ethical values and community services.

PROGRAM GOALS



1. Provide public and private sectors with graduates able to work successfully in healthcare and radiation related fields.
2. Provide graduates capable of succeeding in graduate studies for supporting research laboratories in medical physics or radiation related fields.
3. Provide graduates with teamwork and collaboration skills that enable them to work in various environment.
4. Provide graduates ethically responsible to be self-earner with written and oral communication skills and to serve community.



STUDENT OUTCOMES

1

An ability to identify, formulate, and solve broadly-defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.

An ability to formulate or design a system, process, procedure or program to meet desired needs.

2**3**

An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.

An ability to communicate effectively with a range of audiences.

4**5**

An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.

An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

6

Head of Physics Department

Clerical Section

Supervisor of the Department
of Physics branch of
Sulaymaniyah

Subcommittees

Departmental
Council

Graduate Studies
Committee

Advisory Committee

Secretary of the council

Executive Committee for
Structuring and
Development of
educational programs

Academic
Accreditation and
Strategic Planning
Committee

Committee for the
Distribution of Courses

Contracting
Committee

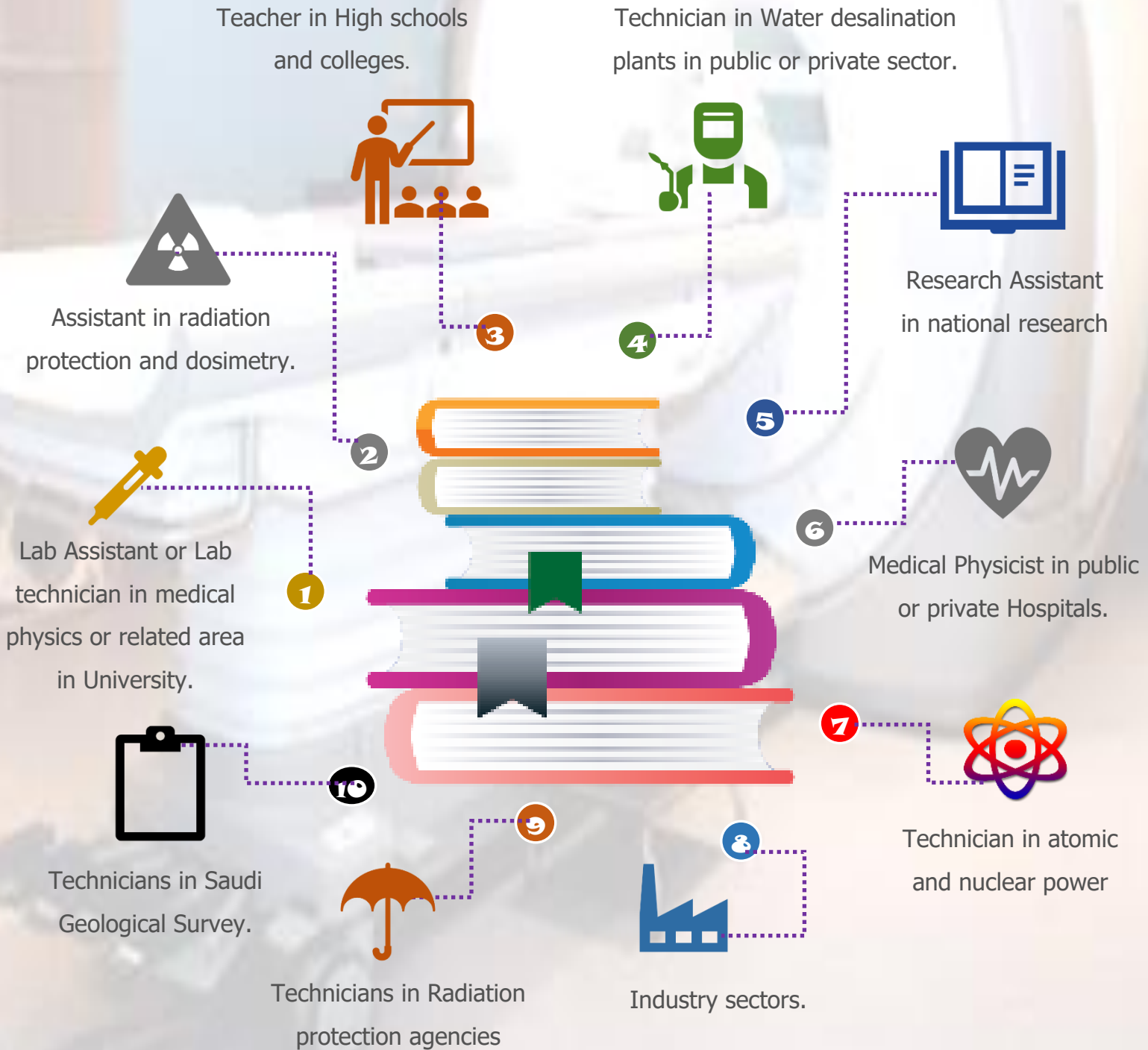
Academic Advisory
Committee

Committee on Budget
and Purchases

Committee of
Laboratories and Clean
Room

Media Committee

FUTURE CAREER



BACHELOR'S DEGREE ADMISSION

King Abdulaziz University allows male and female students the opportunity to join different university facilities and obtain a bachelor's degree through the regular system. For more information about the admission and regulations, please visit the following link:

- <https://admission.kau.edu.sa/Pages-260945-2.aspx>

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, Faculty or Department)
Level 1	PHYS 110	General Physics I	Required		3	Department
	MATH 110	Calculus I	Required		3	Faculty
	ELI 101	English Language (1)	Required		0	Institution
	ELI 102	English Language (2)	Required		3	Institution
	CPIT 100	Computer skills	Required		3	Institution
Level 2	STAT 110	Statistics	Required		3	Faculty
	BIO 110	Biology	Required		3	Faculty
	CHEM 110	General Chemistry	Required		3	Faculty
	COMM 101	Communication Skills	Required		3	Faculty
	ELI 103	English Language (3)	Required	ELI 102	2	Institution
	ELI 104	English Language	Required	ELI 103	2	Institution
Level 3	PHYS 200	Lab. Safety	Required		1	Department
	PHYS 202	General Physics II	Required	PHYS110, MATH110	4	Department
	MPHY 205	Introductory Biophysics	Required	PHYS 110, BIO222	3	Department
	PHYS 281	General Physics Lab	Required	PHYS110	1	Department
	MATH 202	Calculus II	Required	MATH 110	3	Faculty
	BIO 222	Cell Biology	Required	BIO 110	3	Faculty
	ISLS 101	Islamic Culture (1)	Required		2	Institution

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, Faculty or Department)
Level 4	MPHY 242	Modern Physics	Required	PHYS202 MATH202	3	Department
	MPHY 255	Mathematical Methods for Medical Physics	Required	PHYS202, MATH202	3	Department
	MPHY 261	Health Physics	Required	PHYS 110, BIO222	3	Department
	BIOC 201	General Biochemistry	Required	BIO 110, CHEM110	4	Department
	ARAB 101	Arabic Language (1)	Required	-	3	Institution
	CHEM 281	General Chemistry Lab.	Required	CHEM 110	1	Faculty
	CHEM 200	Lab. Safety	Required		1	Faculty
Level 5	MPHY 344	Atomic and Molecular Spectra	Required	MPHY255, MPHY242	2	Department
	MPHY 323	Waves and Ultrasound	Required	MPHY242, MPHY255	2	Department
	MPHY 313	Concepts of Electronics	Required	PHYS202, MATH202	2	Department
	MPHY 361	Physics of Living Systems	Required	MPHY 261	3	Department
	MPHY 363	Nuclear & Radiation Physics I	Required	MPHY 242, MPHY 261	3	Department
	MPHY 385	Nuclear & Spectroscopy Lab.	Required	MPHY 363	1	Department
	ISLS 201	Islamic Culture (2)	Required	ISLS 101	2	Institution
Level 6	MPHY 314	Bioelectronics	Required	MPHY313, MPHY255	2	Department
	MPHY 315	Optics and Laser	Required	MPHY 255, MPHY344	3	Department
	MPHY 384	Bioelectronics Lab.	Required	PHYS200 MPHY313	1	Department
	MPHY 357	Medical Statistics	Required	MPHY 255, MPHY242	2	Department
	MPHY 394	Computer and image Modeling	Required	PIT100, MPHY 205, MPHY 255	2	Department
	ARAB 201	Arabic Language (2)	Required	ARAB 101	3	Institution
	ISLS 301	Islamic Culture (3)	Required	ISLS201	2	Institution
Summer	PHYS 390	TRAINING I	Required	Approval of the Department	2	Hospital
Level 7	MPHY 434	Magnetic Resonance and Medical Imaging	Required	MPHY 363	2	Department
	MPHY 474	Calibration and Quality Control	Required	MPHY 363	2	Department
	MPHY 475	Physics of Biosensors	Required	MPHY 313	2	Department

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, Faculty or Department)
	MPHY 487	Imaging Lab.	Required	MPHY 434, MPHY394	1	Department
	MPHY 465	Radiation Therapy Physics	Required	MPHY 363	2	Department
	MPHY 4XX	Elective from Dept. I	Elective		3	Department
	MPHY 464	Radiation Dosimetry	Required	MPHY 363	2	Department
	XXXXXX	Elective from outside the Dept.	Elective		3	Faculty
Level 8	MPHY 415	Laser Applications in Medical Physics	Required	Laser Applications in Medical Physics	2	Department
	MPHY 490	Training II	Required	Approval of the Department	2	Hospital
	MPHY 4XX	Elective from Dept. II	Elective	Elective from Dept. II	3	Department
	MPHY 4XX	Elective from Dept. III	Elective	Elective from Dept. III	3	Department
	MPHY 476	Nano Science in Medical Physics	Required	Nano Science in Medical Physics	2	Department
	ISLS 401	Islamic Culture (4)	Required	Islamic Culture (4)	2	Institution
	XXXXXX	Elective from outside the Dept.	Elective	Elective from outside the Dept.	3	Faculty

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements Institution, Faculty or Department)
ELECTIVES	MPHY 467	Radiation Protection	Elective		2	Department
	MPHY 477	Physics of Drug Delivery	Elective		3	Department
	MPHY 478	Introductory Neuro-physics	Elective		2	Department
	MPHY 479	Theory of Heart	Elective		3	Department
	MPHY 482	Laser application Lab.	Elective		1	Department
	MPHY 491	Special Topics in Medical physics	Elective		2	Department

GRADUATION

The B.Sc. in Medical Physics is a four-year program (8 semesters). In order to qualify for a B.Sc. Students must successfully complete 128 credit hours consists of university and preparatory year, faculty, departmental and program courses.



GRADUATE ATTRIBUTES

Medical Physics graduate should be able to be:

- 1. Knowledgeable:** Provided with broad knowledge in physics and medical physics.
- 2. Work ready:** Provided with adequate problem-solving, experimental, computer, communication and team-work skills ant to be able to implement the clinical measures required from the medical physicist.
- 3. Academic:** Able to perform basics of scientific research and development work using an enquiring mind.
- 4. Responsible:** Able to comply with high levels of responsibility and to be aware of risk assessment and safety observation when dealing with various equipment at various fields.
- 5. Professional:** Able to work with a professional approach (accuracy and attention to detail, high levels of concentration) with high ethical standards.
- 6. Competent:** Able to demonstrate autonomy, confidence, perseverance, accountability, interpersonal skills and leadership when appropriate.



CURRICULUM STRUCTURE

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required		26	20%
	Elective			
Faculty Requirements	Required		24	18.8%
	Elective		6	4.7%
Program Requirements	Required		63	49.2%
	Elective		9	7%
Capstone Course/Project*				
Total			128	100%

***Important note: TRAINING 2 MPHY 490-2 is a required training course in hospital along with TRAINING 1 MPHY 390.**

GUIDANCE AND ORIENTATION PLAN FOR NEW STUDENTS

As part of Deanship of Admission and Registration strategic plan at King Abdulaziz University in activating the academic guidance on electronic system, the following webpages explains the information that helps as a guide to the process of Academic advising and university regulations:

- <https://prod.kau.edu.sa/admission/Guides/STUDENT.PDF>
- <https://admission.kau.edu.sa/Default-210-EN>
- <https://admission.kau.edu.sa/Pages-262080.aspx>
- https://prod.kau.edu.sa/admission/er1436/for_std.pdf

STUDENT COUNSELING SERVICES

ACADEMIC SERVICES

At the beginning of each academic year, the faculty organizes an orientation program to inform the newly coming students about the departments, programs offered and curricula. Moreover, the Medical Physics program assigned academic advisor for each undergraduate student. For more information about the academic services please visit following webpages:

- <https://admission.kau.edu.sa/Default-210-EN>
- <https://admission.kau.edu.sa/Pages-262080.aspx>
- <https://phys.kau.edu.sa/Default-13005-EN>

CAREER SERVICES

For information in this regard, visit the following webpage:

- <https://studentaffairs.kau.edu.sa/Pages-271777.aspx>

PSYCHOLOGICAL SERVICES

The Student Affairs Deanship introduces a package of useful services for special need students, including the psychological counsel, in the following webpage:

- <https://studentaffairs.kau.edu.sa>

SOCIAL SERVICES

Information about these services is available in the following webpages:

- <https://community.kau.edu.sa/Default-185-AR>
- <https://community.kau.edu.sa/Default-185-EN>

Individual consultations between instructors and students during courses are achieved during scheduled office hours.

Information for this task is available in the following webpage:

- <https://studentaffairs.kau.edu.sa/Pages-271835.aspx>

SUPPORT FOR SPECIAL NEED STUDENTS

LEARNING RESOURCES

COURSE'S MATERIALS:

Information for this task is available in the following webpage <https://phys.kau.edu.sa/Pages-Medical->

INTERACTIVE TRAINING SITE:

Information for this task is available in the following webpage <https://sciences.kau.edu.sa/Pages-Physics->

LIBRARY:

Information for this task is available in the following webpage <https://library.kau.edu.sa>

CLASSROOMS:

Classrooms are located in building 90A for Male section and in building 7 for Female section.

MEDICAL FACILITIES

Information for this task is available in the following webpage:

- <https://medical-admin.kau.edu.sa/Default-407-AR>

GPA CALCULATION

The cumulative GPA is a numerical standard from 1 to 5 representing the student's achievement level in a set of courses in all completed semesters and is calculated by dividing the total points earned by the total number of credits for all courses in all semesters. For calculating the GPA, please visit the following website:

- <https://admission.kau.edu.sa/>

Here is an example of how grades are calculated.



STUDENT RIGHTS AND DUTIES

This task is constructed and presented to inform all those who have a relationship with the student inside the university about the student's rights and duties.

STUDENT RIGHTS

It refers to the guaranteed rights by university regulations in the academic and non-academic fields to provide a supportive educational environment that ensures a stable university life in accordance to its capacity.

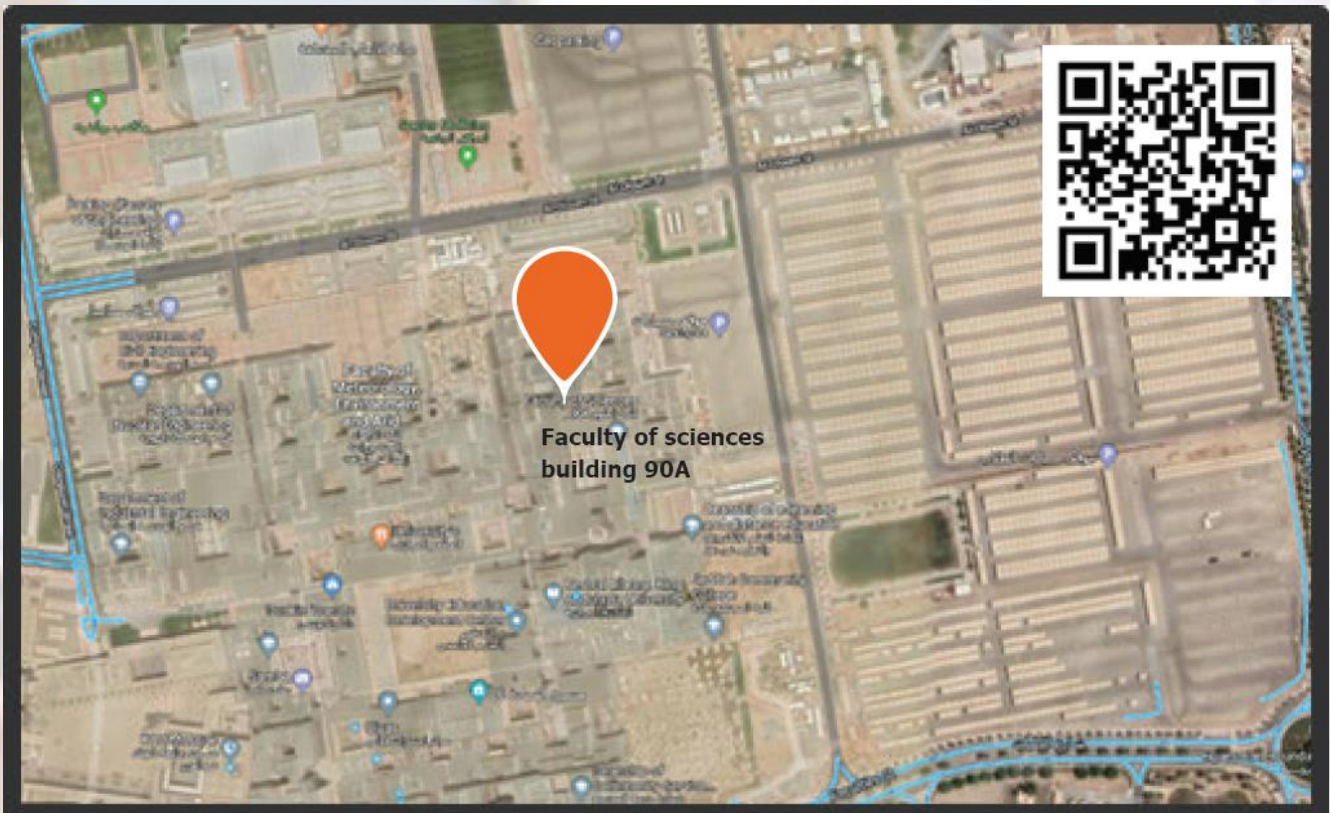
STUDENT RIGHTS

They are the academic and non-academic duties that a students must abide in the university, to enhance the quality of the academic matters and work on strengthening the relation between the student and staff member and other university sectors.

CONTACT US

<https://sciences.kau.edu.sa/Content-130-EN-1471>

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THE PROGRAM FOLLOWS THE UNIVERSITY REGULATIONS OF THE STUDENT RIGHTS AND OBLIGATIONS. FOR MORE INFORMATION, PLEASE VISIT THE WEBSITE:

<https://studentaffairs.kau.edu.sa/>





Medical Physics Program Handbook

(2019-2020)

(Dr Sadek ZEGHIB)

