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University of Al-Qadisiyah جامعة القادسية



*First Cycle – Bachelor's Degree (B.Sc.) – Medical
physics science*

بكالوريوس – علوم فيزياء طبية

#



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1. Overview

This catalogue is about the courses (modules) given by the program of Medical physics science to gain the Bachelor of Science degree. The program delivers (48) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الفيزياء الطبية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (٤٨) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
MPH 1101	Mechanics1	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
The basic concepts of all the way to valid conclusion and discuss the fundamental concepts in classical mechanics (1) through a broad range of interesting application to the real world. Clearly and logically discuss the scalar, vector, gradient, divergence, curl, application of operator, vector integration, and derivative of a vector. Analyze coordinates systems (curvilinear, differential vector operator, Cartesian, spherical and cylindrical) in physics General motion of the particles in the three dimensions. Discuss the non-inertial reference systems. Discuss the gravitation and central forces.			

Module 2

Code	Course/Module Title	ECTS	Semester
MPH 1102	Electricity and Magnetism	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
<p>The aim is to familiarize the students with the fundamental concepts and laws in electricity and magnetism, and establish a grounding in electromagnetism in preparation for more advanced electronic engineering courses. Also to provide them with analytical tools to understand and analyse the interactions between time-varying electric and magnetic fields.</p>			

Module 3

Code	Course/Module Title	ECTS	Semester
COS 1103	Mathematics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3/0/0/0	60	65
Description			
<p>الرياضيات (تفاضل وتكامل) التفاضل والتكامل هو فرع من فروع الرياضيات يدرس الحدود والدوال والاشتقاق والتكامل والمتسلسلات يمثل أساسا للعديد من المعادلات التي تصور الفيزياء والميكانيك. تهدف دراسته الى: التعرف على المفاهيم الأساسية لحساب التفاضل والتكامل - التعرف على اتصال الدوال وعلاقتها بالنهايات - التعرف على قابلية اشتقاق الدوال وتكامل الدوال المختلفة وعلاقتها بالاستمرارية - معرفة تطبيقات التفاضل والتكامل في مختلف العلوم - القدرة على استخدام التفاضل والتكامل في حل المعضلات الرياضية</p>			

Module 4

Code	Course/Module Title	ECTS	Semester
UOD 1104	Arabic	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	45
Description			
<p>This section includes a description of the module, 100-150 words</p>			

Module 5

Code	Course/Module Title	ECTS	Semester
UOD 1105	Human Rights and Democracy	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	45
Description			
This section includes a description of the module, 100-150 words			

Module 6

Code	Course/Module Title	ECTS	Semester
COS 1106	Analytic Chemistry	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
This section includes a description of the module, 100-150 words			

Module 7

Code	Course/Module Title	ECTS	Semester
MPH 1217	Mechanics 2	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
This section includes a description of the module, 100-150 words			

Module 8

Code	Course/Module Title	ECTS	Semester
MPH 1208	Biophysics	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65

Description
Review in detail several important modern physical science concepts, models, laws, tools and techniques that can be applied to addressing real biological questions. Using of the Physical science methods providing enormous breakthroughs in our understanding of fundamental biology - stemming from the early development of optical microscopy in understanding the cellular nature of life, through to complex structural biology techniques to elucidate the shape of vital biomolecules including proteins and DNA.

Module 9

Code	Course/Module Title	ECTS	Semester
COS 1209	General Biology	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
This section includes a description of the module, 100-150 words			

Module 10

Code	Course/Module Title	ECTS	Semester
UOD 12010	Computer Science	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
<p>Computer Course#1</p> <p>Introduce students to the digital world by considering fundamental computer hardware and the most popular microcomputer applications. Explain systems and applications software.</p> <p>Introduce and practice file management, data storage and security principles. Consider basic operating system features (using the Windows environment). This Microsoft Word training course aims to provide new users with the essential skills needed to create, edit and print professional looking documents using text, tables, lists and pictures as well as covering simple mail merge</p>			

Module 11

Code	Course/Module Title	ECTS	Semester
UOD 12011	English (1)	4	2

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
<p>English (1) To develop students' general English. To develop the skills of reading, writing, listening and speaking. Each unit is organized to enhance students' basic knowledge of vocabulary and grammar through reading texts. Students will heighten their awareness of correct usage of English grammar in writing and speaking. Students will improve their speaking ability in English both in terms of fluency and comprehensibility. Students will learn how to form sentences. Students will give oral presentations and receive feedback on their performance. Encouraging the student to participate in speaking by presenting phrases and examples similar to those in the lecture.</p>			

Module 12

Code	Course/Module Title	ECTS	Semester
COS 12012	Organic Chemistry	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
<p>This section includes a description of the module, 100-150 words</p>			

Module 13

Code	Course/Module Title	ECTS	Semester
MPH 21013	Heat and Thermodynamic	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
<p>Module Title: - Heat and Thermodynamic The course on Heat and Thermodynamics for covers the fundamental principles of thermodynamics, including heat transfer, temperature, energy, and entropy. The course is designed to provide students with the necessary understanding and skills to apply these principles to problems in medical physics and related fields. Topics covered include the laws of thermodynamics, thermal equilibrium, energy conversion, heat transfer mechanisms, and thermodynamic cycles. The course also explores the use of thermodynamics in medical imaging and radiation therapy, and how thermodynamics can be used to analyze and optimize medical devices and systems. By the end of this course, students will have a solid foundation in thermodynamics and how it applies to the field of medical physics.</p>			

Module 14

Code	Course/Module Title	ECTS	Semester
MPH 21014	Optics	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
<p>Module Title: - Optics optics is an exciting course that explores the fascinating world of vision and the mechanisms that enable us to see. In this course, students will delve into the science of light, how it interacts with the eye, and how the brain interprets the resulting signals to form a clear image. This course covers topics such as refraction, lenses, image formation, and visual perception, as well as the latest advancements in optics technology. Students will learn about the different types of errors that can occur in the visual system and how to correct them with glasses or contact lenses. By the end of this course, students will have a deep understanding of the complex process of sight and the important role that optics plays in our everyday lives.</p>			

Module 15

Code	Course/Module Title	ECTS	Semester
COS 21015	Biostatistics	3	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	45
Description			
<p>This section includes a description of the module, 100-150 words</p>			

Module 16

Code	Course/Module Title	ECTS	Semester
MPH 21016	Atomic Physics	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
<p>Atomic physics Interested in studying the atom and its structure from the nucleus and the electron shell, as well as studying the interactions between atoms and ions with neighboring atoms or ions, as well as the influence of electromagnetic waves and electric and magnetic fields and aims to clarification and knowledge of atomic models and how to study and structure atoms, explain the relative and perturbation theory, also distinguish between permitted and prohibited transfers. Understand the Stark effect on the electric field, Hund's rules and atomic orbitals. Explain the line spectrum of the hydrogen atom.</p>			

Module 17

Code	Course/Module Title	ECTS	Semester
COS 21017	Physiology	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
This section includes a description of the module, 100-150 words			

Module 18

Code	Course/Module Title	ECTS	Semester
MPH 21018	Electromagnetic Waves	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3/0/0/0	60	65
Description			
Electromagnetic Waves introduces the fundamental mathematical concepts that are used to describe electromagnetic wave behavior, provides a review of vector algebra and coordinate transformations, and covers the principal concepts of electromagnetism, electric field, polarization, Poisson's equation, and Laplace's equation.			

Module 19

Code	Course/Module Title	ECTS	Semester
MPH 22019	Medical Imaging	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
This section includes a description of the module, 100-150 words			

Module 20

Code	Course/Module Title	ECTS	Semester
COS 22020	Molecular Biology	5	4

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
This section includes a description of the module, 100-150 words			

Module 21

Code	Course/Module Title	ECTS	Semester
COS 22021	Healthy Culture	3	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	45
Description			
<p>Module Title: - Healthy Culture The Healthy Culture course is designed to provide students with a comprehensive understanding of the importance of maintaining a healthy lifestyle. This course covers a range of topics, including nutrition, exercise, stress management, and disease prevention. Through interactive lectures, discussions, and hands-on activities, students will learn how to create and maintain a healthy lifestyle that supports physical, emotional, and mental well-being. In addition to learning about the science behind health and wellness, students will also gain practical skills, such as meal planning, exercise programming, and stress reduction techniques. By the end of the course, students will be equipped with the knowledge and skills to make informed decisions about their own health and wellness, as well as to help others do the same.</p>			

Module 22

Code	Course/Module Title	ECTS	Semester
UOD 22022	Computer Science	5	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
<p>PowerPoint gives you the ability to share your presentation with others in real time on the web. You would supply the user with a link to the presentation. After selecting the link, the user(s) will be able to follow you and your presentation online. Custom animation, Add photos, videos and sound effects, ave as a webpage, rint presentations as handouts, Embed YouTube videos This course aims to provide new Excel users with a foundation knowledge of Excel's core features such as formulas, formatting, navigation, printing and creating charts.</p>			

Module 23

Code	Course/Module Title	ECTS	Semester
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UOD 22023	English (2)	4	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
<p>English (2) Writing a series of sentences using linking words such as but, although, however, so, because and while to link ideas and events together. Allowing students to extend their knowledge of the language. To develop students' new vocabulary and practice activities. Reading a medium-length general interest article, locate new vocabulary items, and deduce their meaning from the context. Fluently relate a straightforward narrative or description as a linear sequence of events. Expressing and responding to opinions on familiar topics using synonyms and antonyms of familiar words to avoid repetition. Listening to short recorded passages and inferring what it meant or referred to from contextual details.</p>			

Module 24

Code	Course/Module Title	ECTS	Semester
MPH 22024	Phonetics Science	4	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
<p>This module introduces students to the phonetic and phonological analysis of language, starting with phonetics and moving on to phonology. The phonetics part covers the basics of articulatory and impressionistic phonetics. The phonology part covers the position of phonology within the human linguistic system, recurrent phonological phenomena in the world's languages and the phonological notation most commonly used by linguists. introduce the skill of applying theoretical concepts of phonetics and phonology to clinical data</p>			

Module 25

Code	Course/Module Title	ECTS	Semester
MPH 31125	Medical Physics	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
<p>Medical physics 1 A series of lectures covering the static and mechanical characteristics of the body's muscles and metabolism: energy, heat, work, and power of the body; fluid pressure, fluid flow in the body, and motion in the fluids; the cardiovascular system, lung function, and breathing are also considered in detail.</p>			

Module 26

Code	Course/Module Title	ECTS	Semester
MPH 31026	Quantum Mechanics in Medicine	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3/0/0/0	60	65
Description			
<p>Quantum Mechanics in Medicine Use quantum mechanics to understand and design the principles of operation of elementary devices such as transistors and lasers in traditional information technologies, also in relation to studying the behavior of very small objects. Also, an application of the principle of superposition of waves (constructive interference) within quantum mechanics, where the principle of superposition is one of its basic principles. Solve problems related to the Schrödinger equation & Solve problems related to the Hamiltonian effect, eigenvalue and eigenvalue problems, and the quantum harmonic oscillator.</p>			

Module 27

Code	Course/Module Title	ECTS	Semester
COS 31027	Medical Terminology	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
<p>This section includes a description of the module, 100-150 words</p>			

Module 28

Code	Course/Module Title	ECTS	Semester
MPH 31128	Physics of Diagnostic Radiology	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
<p>Physics of Diagnostic Radiology Studying methods of diagnostic imaging inside the body and to know the locations of diseases in it, where imaging methods are not subject to surgery. Where imaging methods using X-rays are studied, as well as the development of medical imaging using computed tomography, ultrasound imaging, magnetic resonance imaging, nuclear imaging and other methods of imaging.</p>			

Module 29

Code	Course/Module Title	ECTS	Semester
MPH 31129	Laser Basics	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
Laser Basics Studying the concepts and basics of lasers, the principle of its science, the characteristics and advantages of lasers such as (directivity and brightness, mono-wavelength and diffraction) and its scientific applications and pumping methods such as (electrical, chemical and optical pumping), laser components and types of lasers (solid and liquid state lasers and invasive). Aims to distinguish between pulsed and continuous lasers, understand the meaning of spontaneous and catalytic absorption and emission the program's skill objectives.			

Module 30

Code	Course/Module Title	ECTS	Semester
MPH 31030	Optional 1	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
This section includes a description of the module, 100-150 words			

Module 31

Code	Course/Module Title	ECTS	Semester
COS 32031	Anatomy	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
This section includes a description of the module, 100-150 words			

Module 32

Code	Course/Module Title	ECTS	Semester
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COS 32032	Biochemistry	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
This section includes a description of the module, 100-150 words			

Module 33

Code	Course/Module Title	ECTS	Semester
MPH 32033	Physics of Nuclear Medicine	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
<p>This course offers the introduction of various types of nuclear medicine counting equipment such as gas-filled detector, scintillation detector and semiconductor detector as well as using appropriated nuclear counting statistic method. Students will develop a beginning understanding of nuclear medicine equipment, imaging quality and image noise analysis in nuclear medicine. Explored in this course are the basic principles of non-imaging equipment in nuclear medicine, gamma camera, SPECT, PET, hybrid imaging (e.g. SPECT/CT and PET/CT) and BMD.</p>			

Module 34

Code	Course/Module Title	ECTS	Semester
MPH 32134	Medical Laser Applications	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
<p>Medical Laser Applications Studying the applications of lasers in medicine, to know these applications represented in ophthalmology surgery, to know the common diseases that affect the eye and how to treat them using lasers, as well as to know the advanced and modern techniques in treatment. And also study. The uses of lasers in dentistry and knowledge of diseases that are treated by lasers, such as gum disease, regular and root fillings, oral bone surgery such as the use of orthodontics, as well as cosmetic operations, tattoo removal and cancerous tumors, as well as studying the interaction of lasers with tissues, understanding how light is absorbed by tissues, as well as understanding thermal properties The tissue enables the student to understand laser surgery, urology, cardiology, and neurology.</p>			

Module 35

Code	Course/Module Title	ECTS	Semester
UOD 32035	English (3)	4	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
<p>English (3) To address grammar issues that students encounter in their daily speech, writing, reading, and listening. To improve reading skills through the practice of vocabulary enrichment, reading comprehension exercises. To address the issue of grammatical errors that affect effective communication. To recognize the structure and organization of paragraphs, use strategies to think critically about reading. To develop students' new vocabulary and practice activities. Distinguish between main ideas and supporting details, locate specific information. Communicating orally with some confidence on routine matters associated with priorities, alternatives, needs, and precise quantities needed. Students can Explore and examine the entire reading process, and become more confident, independent, effective, and efficient readers.</p>			

Module 36

Code	Course/Module Title	ECTS	Semester
MPH 32136	Optional 2	4	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
<p>This section includes a description of the module, 100-150 words</p>			

Module 37

Code	Course/Module Title	ECTS	Semester
MPH 41137	Medical Physics 2	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
<p>Medical physics 2 Fundamental information about the forces in and on the body, as well as the physical mechanics and their applications in the body. An overview of radioactivity and radiation protection.</p>			

Module 38

Code	Course/Module Title	ECTS	Semester
MPH 41138	Medical Image Processing and Analysis	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
This section includes a description of the module, 100-150 words			

Module 39

Code	Course/Module Title	ECTS	Semester
MPH 41039	Medical Instrumentation Physics	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	65
Description			
<p>Module Title: - Medical Instrumentation Physics The course of Medical Instrumentation Physics is designed to provide students with an in-depth understanding of the physics principles underlying the design and operation of medical instruments used in clinical settings. Throughout the course, students will learn about the physics of various types of instruments, including imaging devices, radiation therapy machines, and monitoring equipment. Students will also be introduced to concepts such as signal processing, data analysis, and measurement techniques used in medical instrumentation. Topics covered in the course may include electromagnetism, optics, and acoustics, as well as electronics, digital signal processing, and computer programming. By the end of the course, students will have a comprehensive understanding of the physics principles underlying medical instrumentation, enabling them to design and operate instruments effectively and contribute to the development of new medical technologies.</p>			

Module 40

Code	Course/Module Title	ECTS	Semester
MPH 41140	Radiotherapy Physics	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
<p>Module Title: - Radiotherapy Physics The course of Radiotherapy Physics is designed to provide students with a comprehensive understanding of the physical principles behind radiation therapy and its clinical applications. This course combines the fields of medical physics, radiobiology, and radiation oncology to explore the latest advances in radiation therapy. Students will learn about the basic principles of radiation</p>			

physics, including radiation interactions with matter, radiation dosimetry, and radiation safety. They will also explore the various imaging modalities used for radiation therapy planning, as well as the different types of radiation therapy, including external beam radiation therapy, brachytherapy, and proton therapy. Throughout the course, students will gain hands-on experience in treatment planning, quality assurance, and patient safety. They will also explore the latest research and developments in radiation therapy, including the use of artificial intelligence, machine learning, and big data analytics. Overall, this course is ideal for students interested in a career in radiation therapy physics, medical physics, or radiation oncology, and provides a solid foundation for further study or research in this exciting field.

Module 41

Code	Course/Module Title	ECTS	Semester
UOD 41041	English (4)	4	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
This section includes a description of the module, 100-150 words			

Module 42

Code	Course/Module Title	ECTS	Semester
MPH 41142	Research Project	4	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
This section includes a description of the module, 100-150 words			

Module 43

Code	Course/Module Title	ECTS	Semester
MPH 42143	Medical Physics 3	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			

Medical physics 3

gives an overview of diagnostic imaging modalities, covering physical concepts and diagnostic imaging equipment instruments. The course covers radiographic and fluoroscopic imaging systems, x-ray computed tomography, ultrasound, MRI, and the fundamentals of nuclear medicine. The course expands on fundamental examinations of atomic and nuclear characteristics, x-ray generation, and radiation interaction with matter.

Module 44

Code	Course/Module Title	ECTS	Semester
MPH 42044	Neuro physics	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2/2/0/0	60	90
Description			
Neurophysics focuses on the electrical mechanisms of the nervous system and on the principles of electric current flow exploited by the nervous system; the basis of the resting potential of neurons; the structure and function of voltage-gated and neurotransmitter-gated ion channels; and the generation and propagation of action potentials.			

Module 45

Code	Course/Module Title	ECTS	Semester
MPH 42045	Material Science and Nanotechnology	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3/0/0/0	60	65
Description			
Module Title: - Material Science and Nanotechnology The course of Material Science and Nanotechnology is designed to provide students with an in-depth understanding of the principles and applications of nanotechnology in medicine and healthcare. This interdisciplinary course combines the fields of materials science, biology, chemistry, physics, and engineering to explore the latest advances in drug delivery, diagnostics, and medical devices. Students will learn about the unique properties and behavior of materials at the nanoscale, as well as the various techniques used for their synthesis, characterization, and manipulation. They will also explore the ethical and social implications of nanotechnology in healthcare, and how it can be used to address global health challenges. Overall, this course is ideal for students interested in a career in the healthcare industry, particularly in research and development, medical device design, or as a healthcare professional.			

Module 46

Code	Course/Module Title	ECTS	Semester
COS 42046	Biomaterials	5	8

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3/0/0/0	60	65
Description			
This section includes a description of the module, 100-150 words			

Module 47

Code	Course/Module Title	ECTS	Semester
MPH 42147	Research Project	4	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
This section includes a description of the module, 100-150 words			

Module 48

Code	Course/Module Title	ECTS	Semester
MPH 42048	Optional 3	4	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2/0/0/0	30	70
Description			
This section includes a description of the module, 100-150 words			

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