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**Department of Physics**

**College of Science**

**University of Salahaddin**

**Subject: Medical Instrumentes**

**Course Book – (4 Year - Applied physics)**

**Lecturer's name *Abdulrhman.KH.Suliman***

**Academic Year: 2022/2023**

**Course Book**

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| **1. Course name** | **Medical Instrumentes** | |
| **2. Lecturer in charge** | **Abdulrhman.KH.Suliman** | |
| **3. Department/ College** | **Scince/ physics** | |
| **4. Contact** | **e-mail:** [abdulrahman.suliman@su.edu.krd](mailto:abdulrahman.suliman@su.edu.krd)  **Tel: 0750 143 8216** | |
| **5. Time (in hours) per week** | **Theory: 3**  **Practical: 6** | |
| **6. Office hours** | **8** | |
| **7. Course code** |  | |
| **8. Teacher's academic profile** | **I have more than 20 year experience teaching of different subjects such as;-HEAT AND THERMODYNAMIC, MEDICAL PHYSICS and METHOD OF RESEARCH, Medical intrumentesthermodynamic lab, atomic lab, nuclear lab, electricity lab, electrical measurement lab and physiology lab. also I have four(5) papers are published in different foreign journals.. Participation in different conferences and meeting. I worked in radiology filed too,**  **B.Sc. of Physics from 1994**  **M.Sc. of Nanosince from 2006**  **Assist Lecturer** Oct 2006 – March 2011  **Instructor** Feb 2012 – up to date  **Assist Prof.** …2018………. | |
| **9. Keywords** | **Medical instruments, Physics of body, Concepts And Applications** | |
| **10. Course overview:** These course give the student the usefulness of physics in understanding the behavior of the human body, and medical instrumentes It involves measurement of biological signals like ECG, EMG, or any electrical signals generated in the human body. Biomedical Instrumentation helps physicians to diagnose the problem and provide treatment. | | |
| **11. Course objective:**  **Develop basic understanding of medical instruments concepts, and application**  **Learn to integrate and apply various medical physics device and concepts to a function of human organs, and detection treatments of patients.**  Develop scientific communication skills.. | | |
| **12. Student's obligation**  **By the end of the course, students will be expected to be able to…**  **Describe an imaging system and break it down into its components and physical principles,**  **for each of the imaging modalities covered (ECG, DEXA, HEAT THERAPY, SPIROMETER, AND ENDOSCOPY);**  **** The application of physics principle to the understanding of the function of the human body in health and disease  **Learn to communicate the physical principles behind medical technology, radiation safety,**  **Radition protection, and relevant applications..**  لێره‌ مامۆستا به‌رپرسیارێتی قوتابی خوێندکار ڕوونده‌کاته‌وه‌ سه‌باره‌ت به‌ کۆرسه‌که‌ بۆ نموونه‌ ئاماده‌بوونی قوتابیان له‌ وانه‌کاندا، له‌ تاقیکردنه‌وه‌کاندا، راپۆرت و ووتار نووسین... هتد. | | |
| **13. Forms of teaching**  **Our lecture is depend directly on showing the strong point in the lecture via data show depending on the power point program… seminar for different subject of medical physics**  لێره‌ مامۆستا ڕێگه‌ی وانه‌‌ ووتنه‌وه‌ ده‌نووسێت، بۆ نموونه‌:‌ داتاشۆ و پاوه‌رپۆینت، ‌سه‌ر ته‌خته‌ڕه‌ش، ته‌خته‌ی سپی، سمارتبۆرد یان‌ مه‌لزه‌مه‌... هتد | | |
| **14. Assessment scheme**  **All exams have 60 marks, QUAIZE has 5 marks, the classroom activities count and for attendance 5 Marks. So that the final grade will be based upon the following criteria:**  **Mid- semester exam: 30%**  **Classroom participation and assignments: 5%**  **QUIAZE: 5%**  **Final Exam: 60% .**  Breakdown of overall assessment and examination  لێره‌ مامۆستا جۆری هه‌ڵسه‌نگاندن (تاقیکردنه‌وه‌کان یان ئه‌زموونه‌کان) ده‌نووسێت بۆ نموونه‌ تاقیکردنه‌وه‌ی مانگانه‌، کویزه‌کان، بیرکردنه‌وه‌ی ڕه‌خنه‌گرانه (پریزه‌نته‌یشن)، ڕاپۆرت نووسین، ووتار نووسین‌ یان ئاماده‌نه‌بوونی خوێندکار له‌ پۆلدا...هتد. ئامانه‌ چه‌ند نمره‌ی له‌سه‌رده‌بێت و مامۆستا چۆن نمره‌کان دابه‌شده‌کات؟‌ | | |
| **15. Student learning outcome:**  Medical physics plays a very important role in the Physics field, during the years I teaching medical physics, Medical equipment is used for the specific purposes of diagnosis and treatment of disease or rehabilitation following disease or injury; it can be used either alone or in combination with any accessory, consumable or other piece of medical equipment.  پڕکردنه‌وه‌ی ئه‌م خانه‌یه‌ زۆر گرنگه‌، مامۆستا ده‌رئه‌نجامه‌کانی فێربوون ده‌نووسێت. بۆ نموونه‌: ڕوونی ئامانجه‌ سه‌ره‌کیه‌کانی کۆرسه‌که‌ (بابه‌ته‌که‌) بۆ خوێندکار‌  گونجاندنی ناوه‌ڕۆکی کۆرسه‌که‌ به‌ پێویستی ده‌ره‌وه‌ و بازاڕی کار  قوتابی چی نوێ فێرده‌بێت له‌ ڕێگه‌ی پێدانی ئه‌م کۆرسه‌وه‌؟  This should not be less than 100 words | | |
| 16. Course Reading List and References‌:  Books: There are many good introductory texts on medical physics, for example:  1- "Medical instrumentation application and device" (2005) by John G Awiely- intersince puplication  2- "Atext book of medical istrumentes" (2012), S.Analtili, new age publishing  ▪ Key references:  ▪ Useful references:  ▪ Magazines and review (internet): | | |
| 17. The Topics: | | **Lecturer's name** |
| Week 1:- 14/1/ 2023 [Gamma knife]  1.1 Modeling.  1.2 the radiation unit.  1.3 the beam-focusing technology  1.4, the patient couch  1.5 an electric bed system  1.6 the control console, and the planning computer system.  Week 2:- 15/2/2023 [Cyberknife]   * 2.1. Patient table. * 2.2The CyberKnife has a unique patient table and positioning system called RoboCouch. ... * 2.3Linear accelerator. ... * 2.4Robotic manipulator. ... * 2.5X-ray. ... * 2.6Floor image detectors.   Week 3:- 1/3/2023 [TRUEBEAM]  3.1 TrueBeam radiotherapy device consists of two main  3.2 components: a beam-producing system for producing photon,  3.3electron, and diagnostic X-ray radiation,  3.4 control panel  Week 4:- 1/4/2023 [BIOMEDICAL INSTRUMENTRS  4.1 The main components are :  4.2 (1) Subject (Human being)  4.3(2) Stimulus  4.4(3) Transducers  4.5(4) Signal conditioning equipment  4.6(5) Display equipment  4.7(6) Recording data processing unit  4.8(7) Control Device.  Week 4:- 25/12/2018 [FLOROSCOPY]  5.1. The key components include an X-ray tube,  5.2 spectral shaping filters,  5.3a field restriction device (aka collimator),  5.4an anti-scatter grid, an image receptor,  5.5an image processing computer  5.6 and a display device. | | Abdulrhman alassafee  ex: (3 hrs)  ex: 14/1/202023 |
| **18. Practical Topics (If there is any)** | |  |
| In this section The lecturer shall write titles of all practical topics he/she is going to give during the term. This also includes a brief description of the objectives of each topic, date and time of the lecture | | Lecturer's name; Abdulrhman alassafee  ex: (3-4 hrs)  ex: 14/1/2023 |
| EXAM  **Q1/ A/ Write full name of the following device;-**  **1- TEM**  **2- ERCP**  **3- CMOS. 4- CCD**  **B/ For video capsule;- Show the electrode positions on the human body.**    **C/ What is the function of air channel in the Endoscopy.**  **D/ connect by arrow between two column.**    **E/ Named two type of Endoscopy used lasers.**  **1-**  2-  **Q2/A/ write the full name of each region around tumor;-**    **B/ Why cancer cells show up as (Bright Spots) on PET scans as shown in the figure below.**    **C. what is mean each following parameter of the Gamma knife ;** | |  |
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| 21. Peer review پێداچوونه‌وه‌ی هاوه‌ڵ  This course book has to be reviewed and signed by a peer. The peer approves the contents of your course book by writing few sentences in this section.  (A peer is person who has enough knowledge about the subject you are teaching, he/she has to be a professor, assistant professor, a lecturer or an expert in the field of your subject).  ئه‌م کۆرسبووکه‌ ده‌بێت له‌لایه‌ن هاوه‌ڵێکی ئه‌کادیمیه‌وه‌ سه‌یر بکرێت و ناوه‌ڕۆکی بابه‌ته‌کانی کۆرسه‌که‌ په‌سه‌ند بکات و جه‌ند ووشه‌یه‌ک بنووسێت له‌سه‌ر شیاوی ناوه‌ڕۆکی کۆرسه‌که و واژووی له‌سه‌ر بکات.  هاوه‌ڵ ئه‌و که‌سه‌یه‌ که‌ زانیاری هه‌بێت له‌سه‌ر کۆرسه‌که‌ و ده‌بیت پله‌ی زانستی له‌ مامۆستا که‌متر نه‌بێت.‌‌ | |  |
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