Faculty: Faculty of Science	
Department: Service Courses Unit	**Program: Bachelor in Dentistry**
Semester:	**Academic year:**

Course Plan

First: Course Information

Course No.: 0300184	***Course Title: Medical Physics***	***Credit Hours: 2***
Prerequisite:	***Section No.:***	***Lecture Time:***
Type Of Course:	■ ***Obligatory Faculty Requirement*** ☐ ***Elective University Requirement*** ☐ ***Obligatory University Requirement*** ☐ ***Faculty Requirement*** ☐ ***Course Elective Specialty Requirement*** ☐ ***Obligatory Specialization requirement***	
Type of Learning:	■ ***Face-to-Face Learning*** ☐ ***Blended Learning (2 Face-to-Face + 1Asynchronous)*** ☐ ***Online Learning (2 Synchronous+1 Asynchronous)***	

Second: Instructor's Information

Name:	***Academic Rank:***	
Office Number:	***Phone Number:***	***Email:***
Office Hours:		

Third: Short Description of the Course

This is an introductory course in physics. The physical concepts to be studied includes: Applications of Newton's laws; Flow in tubes: Blood flow, Surface tension and capillarity; Pumps, and the heart; Kinetic theory and the molecular interpretation of temperature; Electric forces in molecular biology: DNA structure and replication; Reflection and refraction of light; Radioactivity and uses of radiation

Fourth: Course objectives

By the end of the course the students should be able to:

1. Become familiar with the basic physical concepts in mechanics, electricity, thermal, optics and radiation.
2. Provide a description of how to solve a problem, justifying their choices.
3. Provide different representations for a problem. photoelectric effect, Rutherford scattering, Compton scattering, optical emission and absorption spectra of atoms, X-ray emission spectra, diffraction of electrons.

Fifth: Learning Outcomes

***K: knowledge, S: skills, C: competencies.**

**** P.K: Program Learning Outcome Knowledge, P.S: Program Learning Outcome Skill, P.C: Program Learning Outcome Competence.**

Number	***Course learning output***	***Associated Program Outcome Code***	***Assessment method**** *Choose at least two methods*	***Scores out of 100*** State the total score identified for each CILO	***Minimum acceptable Score/percentage (%)*** *The percentage should not be less than 50%* ***
CILOs Code					
**K1	**Basic knowledge** : Basic knowledge about the fundamentals of mechanics, electricity, fluids, thermal, optics and radiation.	*PK1	Mid-Exam Final	20	10(50%)
K2	**Basic Factual Knowledge:** -Understanding Newton's laws, Frictional force -To deal with: the equations of continuity, Bernoulli's Principle -Scaling Thermometers, Understanding Ideal gases -Demonstration of Coulombs law -The Knowledge of electrical current and resistivity -To understand the basic rules of reflections and refractions - The principle of X-Ray Diffraction - The knowledge of Radioactivity -The application of radiations	PK2	Mid-Exam Final	20	10(50%)

K3	**Concepts and Theories:** To understand the basic concepts, Postulations, fundamental principles, and the related theories of Mechanics, fluids, optics, temperature, optical instruments and radioactivity	PK3	Mid-Exam Final	20	10(50)
K4	**Professional Responsibility:** Students can earn critical-thinking skills	PK4	Mid-Exam Final		
Skills					
***S1	**Problem solving skills:** Students solve problems on the board. I give them group assignments and homework and encourage group projects, but I can say that technology has become an integral part of their lives, and use computer programs to draw and solve mathematical equations, derivation and integration and they feel confident in this area.	PS1	Mid-Exam Final		
S2	**Modeling and Design:** -Blood Flow; Surface Tension and Capillarity; Pumps, and the Heart - Electric Forces in Molecular Biology: DNA Structure and Replication. - Electrical Conduction in the Human Nervous System - X-Ray Imaging and Computed Tomography (CT Scan) - Resonance (NMR) and Magnetic Resonance Imaging (MRI).	PS2	Mid-Exam Final	10	5(5%)
S3	**Application of Methods and Tools:** Applying mathematical and computational technique to solve problems of	PS3	Mid-Exam Final	20	10(50%)

S4	**Specific cognitions skill:** a range of cognitive and practical skills required to generate solutions to specific problems in one of the physical fields.	PS4	Mid-Exam Final	10	5(50%)
S5	**Comprehensive cognition skills**: a comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems	PS5	Mid-Exam Final		
Competences					
****C1	**Analytic skills:** Relate the theoretical information to practical work to increase the understandings of the basic knowledge	PC1	Mid-Exam Final		
C2	**Strategic thinking**: Demonstrate critical thinking/analytical reasoning ability by using the mathematical descriptions of physical systems and to calculate measurable quantities that provide an understanding of the physical environment in terms of the concepts listed in the course content.	PC2	Mid-Exam Final		

C3	**Creative thinking and innovation:** -Thinking of more than one answer. - Respond the questions with many alternative questions - Generate ideas, answers, or varied questions - See a problem from different perspective. - Look for many different alternatives or directions. - Able to change the way of approach or thought. - Think of unusual ways to express their selves - Work and develop a product or idea - Add or detail of object, idea or situation so that it becomes more interesting	PC3	Mid-Exam Final		
C4	**Communication**: -Apply different physical principles in different disciplines of science and medicine. - Enhance the observation of individual to the natural phenomena. - Assist the student to participate in life science studies -Collaboration (contribution to a positive social environment).	PC4	Mid-Exam Final		
C5	**Teamwork and Leadership:** -Increase the cooperative behavior between the different research groups of different applications. -To work in stressful environment and within constraints. - To communicate effectively. - a learner performs within the process of a particular learning or assessment activity, such as extracting	PC5	Mid-Exam Final		

	relevant information from a complex situation, drawing vector or force diagrams, creating other illustrations, or making an inference based on a previously achieved result -Use the efficient IT capabilities. - Management the tasks efficiently. -To acquire entrepreneurial skills. - Refer to relevant literature effectively. - Searching for the information and going to self-learning a new topic				

Sixth: Learning Source

Designated Book:	, "**Physics "Principle with applications**", **7th** Edition, Pearson, 2015.	***Seventh Edition***
Author: Douglas C. Giancoli	***Print:*** *Douglas C. Giancoli, published by Pearson Education, Inc., publishing as Pearson Prentice Hall © 2015.*	***Year: 2015***
Additional Sources: ***Website:***	1.Joseph W. Kane and Morton M. Sternheim, "**physics**", **3rd** Edition, (John Wiley & Sons, 1988).	
	2. Raymond A. Serway and John W. Jewett Jr., "**Physics for Scientists and Engineers with Modern Physics**" **9th** Edition, (Thomson Learning, Belmont, CA, USA, 2014).	
Teaching Type:	■ ***Classroom*** ☐ ***Laboratory*** ☐ ***Workshop*** ☐ **MS Teams** ☐ **Moodle**	

Seventh: Course Structure

Week no.	Teaching Outcome	Topics	Teaching *Procedures	Teaching ***Methods	References***
	PK1, PK2, PS1, PS3, PC1	**Dynamics: Newton's Laws of Motion** Force; Newton's First Law; Mass; Newton's Second Law;	Direct teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 4** **Sec. no** 4.1 – 4.4
	PK1, PK2, PS1, PS3, PC1	Newton's Third Law; Weight and the Normal Force;	Face-to-Face teaching	Lecturing Discussion Whiteboard	**Ch. 4** **Sec. no** 4.5 , 4.6

				Power point You tube videos	
	PK1, PK2, PS1, PS3, PC1	Solving Problems with Newton's Laws; Problems Involving Friction, Inclines	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 4** **Sec. no** 4.7 , 4.8
	PK1, PK2, PS1, PS3, PC1	Solving Problems with Newton's Laws; Problems Involving Friction, Inclines	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 4** **Sec. no** 4.7 , 4.8
	PK1, PK2, PS1, PS3, PC3, PC5	**Fluids** Phases of Matter; Density; Pressure in Fluids; Atmospheric Pressure and Gauge Pressure	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 10** **Sec. no.** 10.1 – 10.4
	PK1, PK2, PS1, PS3, PC3, PC5	Pascal's Principle; Buoyancy and Archimedes' Principle	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 10** **Sec. no.** 10.5 – 10.7
	PK1, PK2, PS1, PS3, PC3, PC5	Flow Rate and the Equation of Continuity; Bernoulli's Equation; Applications of Bernoulli's Principle; Viscosity	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 10** **Sec. no.** 10.8 -10.11
	PK1, PK2, PS1, PS3, PC3, PC5	Flow in Tubes:Poiseuille's Equation, Blood Flow; Surface Tension and Capillarity; Pumps, and the Heart.	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 10** **Sec. no.** 10.12 – 10.14
	PK1, PK2, PS1, PS3, PC1	**Temperature and Kinetic Theory** Temperature and Thermometers; Thermal Equilibrium; Thermal Expansion	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 13** **Sec. no.** 13.1 – 13.4
	PK1, PK2, PS1, PS3, PC1	The Gas Laws and the Absolute Temperature; The Ideal Gas Law	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 13** **Sec. no.** 13.5 , 13.6
	PK1, PK2, PS1, PS3, PC1	Problem Solving with the Ideal Gas Law Vapor Pressure and Humidity; Diffusion	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 13** **Sec. no.** 13.7 **Ch. 13** **Sec. no.** 13.12 , 13.7
	PK1, PK2, PS1, PS2, PC1	**Static Electricity; Insulators and Conductors**; Coulomb's law, Solving Problems; The	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point	**Ch. 16** **Sec. no.** 16.5 – 16.8

		Electric Field; Electric Field lines; Electric Fields and Conductors		You tube videos	
	PK1, PK2, PS1, PS2, PC1	**Electrical Currents** Electric Current ,Ohm's Law: Resistance and Resistors , Resistivity Electrical Conduction in the Human Nervous System	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 16** **Sec. no.** 16.5 – 16.8 **Ch. 16** **Sec. no.** 16.9
	PK1, PK2, PS1, PS3, PC1	**Light: Geometric Optics** Reflection; Image Formation by Plane and Spherical Mirror; Index of Refraction; Snell's Law; The Thin Lens Equation **Optical Instruments** X-Rays and X-Ray Diffraction X-Ray Imaging and Computed Tomography (CT Scan)	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 23** **Sec. no.** 23 **Ch. 23** **Sec. no.** 23.4 – 23.8.2 – 23.3 **Ch. 25** **Sec. no.** 25.11 **Ch. 25** **Sec. no.** 25.12
	PK1, PK2, PK3, PS2, PC1	**Nuclear Physics and Radioactivity** Structure and Properties of the Nucleus; Binding Energy and Nuclear Forces	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 30** **Sec. no.** 30.1 - 30.9
	PK1, PK2, PK3, PS2, PC1	Radioactivity; Alpha Decay; Beta Decay; Gamma Decay	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 30** **Sec. no.** 30.3 - 30.6
	PK1, PK2, PK3, PS2, PC1	Conservation of Nucleon Number and Other Conservation Laws	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 30** **Sec. no.** 30.7
	PK1, PK2, PK3, PS2, PC1	Half-Life and Rate of Decay; Calculations Involving Decay Rates and Half-Life	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 30** **Sec. no.** 30.8
	PK1, PK2, PK3, PS2, PC1	**Nuclear Energy; Effects and Uses of Radiation** Passage of Radiation Through Matter; Biological Damage; Measurement of Radiation Dosimetry	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 31** **Sec. no.** 31.4 – 31.5

	PK1, PK2, PK3, PS2, PC1	Radiation Therapy; Tracers in Research and Medicine; Emission Tomography: PET and SPECT; Nuclear Magnetic Resonance (NMR) and Magnetic Resonance Imaging (MRI).	Face-to-Face teaching	Lecturing Discussion Whiteboard Power point You tube videos	**Ch. 31** **Sec. no.** 31.6 – 31.9

Education procedures: (Direct, synchronous, asynchronous). * * Teaching methods: Lecture, video…..). * * Reference: .(Pages of the book, recorded lecture, video….)

Eighth: Assessment methods

Methods	Fully Electronic Education	Integrated Teaching	Direct Teaching						
				K1	K2	K3	S2	S3	S4
Mid Exam			**40**	**20**			**5**	**10**	**5**
Final			**60**		**20**	**20**	**5**	**10**	**5**
Total out of 100			**100**	**20**	**20**	**20**	**10**	**20**	**10**

Ninth: Course Polices

- Meeting the deadline for the lecture.
- Commitment to interaction and participation.
- Interactive lectures will be given through a platform (MS Teams).
- Duties and tests will be given through a platform (Moodle).
- Commitment to the right appearance in front of the camera with the proper background.
- University regulations for attendance and absence from lectures and examinations are in force.
- Academic Integrity: Fraud or moral impersonation are unacceptable and are punishable according to university regulations and instructions.

- All course policies are applied on all teaching patterns (online, blended, and face-to-face Learning) as follows:
  a. Punctuality.
  b. Participation and interaction.
  c. Attendance and exams.
- Academic integrity: (cheating and plagiarism are prohibited).

Approval	Name	Date	Signature
Head of Department			
Faculty Dean			