NEAR EAST UNIVERSITY
Faculty of Veterinary Medicine Course Teaching Plan

1.	**Name of the Course**	MEDICAL PHYSICS
2.	**Course Code**	VTE107
3.	**Course Type**	Compulsory
4.	**Course Level**	Undergraduate
5.	**Year**	1
6.	**Semester/Term**	Fall, 1VET
7.	**ECTS credits**	1
8.	**National Credits**	1
9.	**Theory (hours/week)**	1h/week
10.	**Practice (hours/week)**	-
11.	**Prerequisites**	None
12.	**Other Recommended Considerations for the Course**	None
13.	**Course Language**	English
14.	**Teaching type**	Face to face
15.	**Course Coordinator**	Prof. Dr. Deniz SEYREK-İNTAŞ
16.	**Other Lecturers**	None
17.	**Coordinator's Contact Information**	Near East University, Faculty of Veterinary Medicine Surgery Department, Nicosia / TRNC Cell phone: 0532 856 49 12, e-mail: deniz.seyrekintas@neu.edu.tr
18.	**Website of the course**	https://uzem.neu.edu.tr/course/view.php?id=18918
19.	**Objectives of the Course**	The aim of this course is to provide students with a better understanding of vocational courses in the medical field and especially in subjects including diagnostic imaging techniques, and to increase the knowledge and skills they will acquire in both theoretical and practical courses. Within the scope of the course, medical imaging methods, the use of nuclear radiation and its effects on living organisms, radiation protection; optical and biological vision; acoustics, biological hearing and sound; topics such as electricity, magnetism and electromagnetism and their use for diagnostic and therapeutic purposes are covered.

20.	**Contribution of the Course to Professional Development**	As imaging techniques are an indispensable part of disease diagnosis in veterinary medicine, the topics covered in this course provide the basic information necessary to obtain good quality and diagnostic images and allow for correction of errors.

21.	**Students' Learning Outcomes**	**LO1**	Will be able to understand related concepts / theories
		LO2	Will be able to discuss the validity of related concepts / theories
		LO3	Will be able to discuss possible real-life applications of related concepts / theories and offer suggestions
		LO4	Will be able to apply relevant concepts / theories to real life / other given situations / cases
		LO5	Will be able to critically analyse the real-life applications of related concepts / theories
		LO6	Will be able to synthesize different concepts and theories to create their own unique approaches
		LO7	Will be able to develop an original approach to related concepts
		LO8	Preparation for presentation(s)
		LO9	Will be able to evaluate their own work according to the given criteria
		LO10	Will be able to develop / create a new approach
		LO11	Will be able to carry out the given work independently
		LO12	Will be able to work in a group on a given topic
		LO13	Will be able to enumerate and explain related concepts
		LO14	Will appreciate the value of learning
		LO15	Will be able to develop targeted skills

21.	**Course Content**	**WEEK**	**THEORETICAL COURSE CONTENT**	**PRACTICE CONTENT**
		1.	An overview and introduction to the topics covered in the course content. Definition of radiology, brief history, properties of electromagnetic radiation, x-ray properties, characteristic x-ray, Bremsstrahlung, Compton scattering, photoelectric effect	
		2.	X-ray formation, the structure of an x-ray tube, its components and functions, anode types, focuses, collimator. Effect of X-rays on radiographic film (opacities)	

		3.	Interaction of radiation with matter; Anode heel effect; factors affecting x-ray absorption: kV, mAs, thickness, distance, effect of projection angle. Working principle of conventional radiography; film structure; film processing technique	
		4.	Comparison of conventional and digital radiography; resolution; image quality; features of conventional radiography; features of digital radiography; features and comparison of different digital radiography systems; comparison of CR and DR; grids and their properties	
		5.	Types of ionizing radiation and its properties (alpha, beta, gamma, x and neutron rays properties); radiation sources in nature; radiation and contamination; daily use of radiation; measurement of radiation; acute and chronic exposure	
		6.	The effect of radiation on living organisms and DNA; acute and chronic exposure, early and late effects; The structure of the veterinary radiology unit with respect to radiation protection; precautions to be taken in terms of exposure technique and auxiliary personnel, Dosimetry	
		7.	Ultrasonography (US) physics: Brief history of US, formation of sound, properties of ultrasound and its behaviour in tissue; US modes and frequencies, structure and properties of US device and probes; Doppler, use and examination method of the US machine; Formation, interpretation and prevention of artefacts	
		8.	Computed Tomography: indications of the technique, working principle, image formation, description and interpretation of the image, artefacts.	
		9.	Magnetic resonance tomography: indications of the technique, working principle, image formation, description and interpretation of the image, artefacts	

		10.	PET, SPECT, Scintigraphy: indications of the technique, working principle, image formation, description and interpretation of the image, artefacts	
		11.	Endoscopy, Thermography: indications of the technique, working principle, image formation, description and interpretation of the image, artefacts	
		12.	Vision, Lenses, ophthalmoscopy (direct/indirect), hearing.	
		13.	Different treatment methods: working principle and application of treatment methods such as radiation oncology, physiotherapy, ultrasound therapy, shock wave therapy, laser, magnetic field, acupuncture, effects on tissues	
		14.	Topic repetition, Q & A	
22.	**Textbooks, References and/or Other Sources**	1. Bushberg JT, Seibert JA, Leidholdt EM, Boone JM. The Essential Physics of Medical Imaging. Williams & Wilkins (3rd Ed), 2012. 2. Curry TS, Dowdey JE, Murry RC. Christensen's Physics of Radiology. Lea & Febiger (4th Ed), 1990. 3. Khan, Faiz M., Gibbons, John P. Khan's The Physics of Radiation Therapy 5th Edition, Lippincott Williams & Wilkins; (April 9, 2014), ISBN-13 : 978-1451182453 UZEM also provides links to some useful information and videos that can be found on the internet.		

		SEMESTER STUDIES	**NUMBER**	**PERCENTAGE OF CONTRIBUTION**
		Midterm exam	1	40
		Quiz	-	
		Assignments, Performances	-	
	Evaluation	Final exam	1	60
		Total	2	100
23.		Evaluation Approaches	Exams are made in written form as multiple choice and/or classic (short answer) questions.	

		Activity	**NUMBER**	**Time [hours]**	**Total workload [hours]**
		Class hours (theoretical)	14	1	14
		Practical hours	-	-	-
	ECTS / Student's workload	Out of Class Study Time (Pre-study, reinforcement)	14	1	14
		Assignments, Performances	-	-	-
24.		Projects	-	-	-

		Field studies	-	-	-
		Midterm exams	1	1	1
		Other	-	-	-
		Final exams	1	1	1
		Total workload			30
		Total workload / 30 hours			30/30
		ECTS credits of the lecture			1