

{Radiology 1 - 54360A}

I. GENERAL

SCHOOL	HEALTH SCIENCES		
ACADEMIC UNIT	SCHOOL OF MEDICINE		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	54360A	SEMESTER	6th
COURSE TITLE	Radiology 1		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	CREDITS (ECTS)	
LECTURES	6hr (lectures, including workshops)	4	
LABORATORY TRAINING	3hr (last class of the course)		
CLINICAL PRACTICE	-		
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	OBLIGATORY / <i>SPECIALISED GENERAL KNOWLEDGE</i>		
PREREQUISITE COURSES:	NONE		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	ENGLISH		
COURSE WEBSITE (URL)	https://eclass.uoa.gr/courses/MEDICEN141/		

Course Director / Head Professor:

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Course Secretary

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Faculty & Guest Speakers

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II. COURSE DESCRIPTION

COURSE DESCRIPTION
<ul style="list-style-type: none">● Basic concepts of Medical Physics and Radiation protection● Organization of a Radiology Department (DICOM images, PACS, RIS)● Basic concepts of different imaging modalities (function, clinical applications, terminology)● Imaging of the Chest (normal anatomy and basic pathology)● Imaging of the Abdomen and Gastrointestinal system (normal anatomy and basic pathology)● Imaging of the Urogenital System (normal anatomy and basic pathology)● Basic concepts and applications of Nuclear Medicine, including hybrid imaging
TIMETABLE AND LOCATION
Lectures
Monday 2.00-5.00pm, Small Amphitheatre, Aretaieion Hospital
Wednesday 1.00-2.00pm, Magginion Amphitheatre, Aretaieion Hospital, 2.00-4.00pm, Small Amphitheatre, Aretaieion Hospital

II. LEARNING OUTCOMES

LEARNING OBJECTIVES - SYLLABUS
At the end of the semester the students should:
1. Be acquainted with basic principles of different imaging techniques and radiation protection, production, communication and storage of digital images and basic functions of imaging workstations

2. Be able to recognize different imaging studies and normal anatomy
3. Know how to choose the appropriate imaging modality depending on current symptomatology, patient history and laboratory findings
4. Be able to detect common or life-threatening imaging findings on different imaging examinations of the chest, abdomen and urogenital system
5. Know basic indications and contraindications of diagnostic or interventional imaging techniques and application of contrast media
6. Be able to recognize the importance of imaging protocols and structured reporting and the role of multidisciplinary meetings with radiologists and colleagues of different clinical and laboratory specialties

THEMATIC SECTIONS

SECTION 1: INTRODUCTION TO RADIOLOGY – HISTORY, CONTENT AND TERMINOLOGY

Introduction to medical imaging and various imaging techniques and teaching of basic terminology used to describe normal anatomy and abnormal findings on each modality.

Learning objectives

- What is ionizing radiation?
- Which imaging modalities utilize ionizing radiation?
- How are images transferred and stored in a Radiology Department?
- What do DICOM, PACS and RIS stand for?
- What are the advantages and disadvantages of conventional radiographs?
- What are the five basic densities of conventional radiographs?
- Applications of fluoroscopy. How does it work?
- How does sonography work? Terminology used with ultrasound.
- Density measurements on CT (Hounsfield scale). Windows, levels and CT terminology.
- How does MRI work? Which are the basic sequences? MRI terminology.
- What is whole body imaging?
- What are the indications and contraindications of contrast media?
- What are the different phases of dynamic contrast-enhanced imaging?
- How do we define the quality of a medical image?

General educational goals

Students should become accustomed with common imaging techniques, their advantages and disadvantages and the basic terminology used with each one of them.

SECTION 2: MEDICAL PHYSICS IN RADIOLOGY – UNDERSTANDING THE BASICS

Learning objectives

- Understand the basic principles of radiation protection
- Know the sources and properties of ionising radiation
- Understand the mechanisms of radioactive decay
- Understand the phenomenon of X-ray interaction with matter the process of image generation, the principles of image quality and radiation exposure
- Understand the function of filters and diaphragms
- Understand radiation effects on tissues and organs
- Understand differences in the effect of radiation on healthy tissue and tumours as the basis for radiation treatment
- Understand the concepts of dose determination and measurement for patients, occupationally exposed personnel and the public
- Define As Low As Reasonably Achievable (ALARA) and its applicability to diagnostic radiology settings
- Acquire knowledge of the concepts and tools for dose management in diagnostic radiology, both in the adult and pediatric population
- Understand the factors influencing image quality and dose in diagnostic radiology

General educational goals

To learn the basic concepts of patient dose calculation for different modalities in diagnostic radiology. To list the key components of image quality and their relation to patient exposure for different imaging modalities using ionising radiation.

SECTION 3: CHEST

Learning objectives

- Learn how, when and why to obtain a chest X-ray
Go through the normal imaging anatomy of the chest cavity, including lungs and mediastinum
- Learn how to report a chest X-ray

- Go through the normal imaging anatomy of the lungs using computed tomography (CT)
- Recognize the most common anatomical variations in the thorax
- Become familiar with chest trauma and critical care imaging of the chest (tubes and lines)
- Learn about radiation doses for conventional chest radiographs and chest CT
- Recognize causes of increased lung opacity such as air space disease, opacified hemithorax, atelectasis, pleural effusion and pneumonia, on plain films and CT examinations
- Recognize causes of decreased lung opacity such as COPD, bullae, pneumothorax, emphysema and bronchiectasis, on plain films and CT examinations
- Become familiar with pulmonary nodule identification and characterization including guidelines for lung cancer screening
- Go through major pathology of the mediastinum including the cardiovascular system depicted on chest imaging
- Understand the indications and basic techniques for interventional procedures within the chest

General educational goals

To be able to identify a chest imaging study (CXR, CT), know when a CXR was adequately obtained, be familiar with basic chest CT technical characteristics (windowing, different densities, intravenous contrast presence) and identify major pathology in the lungs (increased/decreased opacity) and the mediastinum.

SECTION 4: ABDOMEN

Learning objectives

- **Become familiar with normal anatomy of the abdomen on plain abdominal films, Ultrasound, CT and MRI examinations**
- **Go through the most common causes of acute) abdominal pain**
- **Become familiar with normal liver, pancreas, spleen and biliary tree anatomy on ultrasound**
- **Go through a list of most common indications for abdominal solid viscera ultrasound examination**
- **Obtain a fundamental understanding of liver and abdominal vessel anatomy, including variants that may affect surgical planning on cross sectional imaging**

- Describe the typical imaging features of most common benign and malignant focal liver lesions
- Describe the key imaging features of primary liver tumors
- Describe the imaging features of homogeneous and heterogeneous liver steatosis (diffuse and focal) on ultrasound, CT and MRI
- Go through different clinical uses of hepato-biliary contrast agents used in MRI of the liver
- Acquire basic information on Magnetic Resonance Cholangio Pancreatography (MRCP) examination
- Go through imaging features of cholecystitis on ultrasound and CT
- Become familiar with the imaging protocol for pancreatic cancer
- Learn the basics about imaging of pancreatic cystic lesions
- Understand the main indications and techniques of interventional radiology as applied to abdominal diseases

General educational goals

To become familiar with the normal anatomy of the abdominal solid viscera and different imaging modalities/techniques available for abdominal imaging. To learn about different focal liver lesions and pancreaticobiliary diseases, requiring MRI for their differential diagnosis. Understand the rationale and basic principles of MRI sequences for the evaluation of abdominal diseases, including diffusion weighted imaging

SECTION 5: GASTROINTESTINAL SYSTEM (GI)

Learning objectives

- Become familiar with normal bowel anatomy on imaging
- Introduction to available imaging techniques for the dedicated study of diseases affecting the upper gastrointestinal system (esophagus, stomach and duodenum)
- Go through the imaging features of upper GI cancers and the role of CT and hybrid imaging (PET/CT) in staging and follow up
- Introduction to available imaging techniques for the dedicated study of diseases affecting the lower gastrointestinal system, including CT colonography
- Learn about available imaging techniques for assessment of small bowel diseases (CT/MR enterography and enteroclysis) and their indications
- Go through main characteristic imaging findings of Crohn's disease
- Go through the dedicated MRI protocols for imaging rectal cancer and anorectal squamous carcinoma
- List the most common causes of enteric acute abdomen and go through key imaging findings leading to the diagnosis
- Learn about post-surgical abdomen imaging indications and major complications depicted by CT imaging

General educational goals

To become familiar with the role of imaging in the detection and characterization of bowel pathology (from inflammatory to neoplastic) and go through the dedicated imaging protocols available to achieve this.

SECTION 6: UROGENITAL SYSTEM (GU)

Learning objectives

- Go through the different imaging techniques for the study of common disease entities of the kidneys, ureters and urinary bladder
- Learn about congenital and acquired diseases of the kidneys, ureters and urinary bladder, with emphasis on calculi, inflammatory conditions and neoplasms
- Go through the normal imaging findings of the adrenal glands and discuss common adrenal pathology
- Describe normal imaging anatomy of the male and female pelvis using different imaging modalities
- Become familiar with age-related uterine and ovarian changes using sonography and MRI
- Identify common uterine congenital malformations and discuss how they affect fertility
- Become familiar with variable imaging features of common gynecological entities including fibroids, endometriosis and neoplasms
- Understand the indications for imaging in common disease entities of the testes and learn basic diagnostic imaging findings
- List the most common causes of gynecological and scrotal emergencies and learn key imaging findings suggesting the appropriate diagnosis
- Become familiar with ultrasound and MRI examination for prostate cancer detection and surveillance
- Discuss indications/contraindications and safety issues of different imaging techniques in the pregnant population
- Understand the role of imaging in the diagnostic work-up of abdominal pain in pregnancy

General educational goals

To be able to recognize imaging findings of common congenital and acquired diseases of the urinary system.

To become familiar with the role of different imaging modalities in detection and characterization of common acute or chronic conditions of the male and female reproductive system.

GENERAL COMPETENCES Taking into consideration the general competences that the degree-holder must acquire at which of the following does the course aim?

Examples are given below

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations Decision-making

- Working independently / Teamwork
- Working in an international environment Working in an interdisciplinary environment Production of new research ideas

III. TEACHING and LEARNING METHODS

TEACHING METHODS <i>Face-to-face, Distance learning, etc.</i>	Lectures/interactive teaching	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	Use of computer and audiovisual methods in classroom Support	
TEACHING METHODS <i>Lectures, seminars, laboratory practice, study and analysis of reference material, clinical practice, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i> <i>The student's study hours for each learning activity are given as well as the hours of non- directed study according to the principles of the ECTS</i>	<i>Activity</i>	<i>Semester workload</i>
	Lectures/interactive teaching	72
	Clinical/ Lab practice	3hr
	Examination duration	45 min
	Individual study/preparation	50
	Course total	125hr 45min

LEARNING MANAGEMENT SYSTEM	All course materials and announcements will be posted on eClass. It is your responsibility to monitor your eClass notifications.
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IV. STUDENT PERFORMANCE EVALUATION

LANGUAGE OF EXAMINATION	ENGLISH
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<p>DESCRIPTION OF THE EVALUATION PROCEDURE</p> <p><i>Specifically defined evaluation criteria are given, and if and where they are accessible to students.</i></p>	<p>Attendance and punctuality are mandatory. The evaluation is based on the final examination.</p>
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<p>Examination period</p>	<p>Spring and September Examination</p>
<p>METHODS OF EVALUATION (detailed)</p>	<p><i>20 MCQs with a single correct answer and 4 images with short description of the modality shown, abnormal finding and possible diagnosis</i></p> <p><i>Duration: 45min</i></p>
<p>GRADING POLICY</p>	<p>Each MCQ receives 4 points and each image with short description 5 points, for a total of 100 points</p> <p>Passing grade: 50/100</p>

V. REFERENCE MATERIAL / BOOKS REQUIRED

The supply of books is the responsibility of the student and the cost is not included in the tuition fees.

Recommended Textbooks

Herring William. Learning Radiology. Recognizing the basics. Philadelphia. Elsevier, 2024, 5th edition.

Suggested articles or other free (or nearly free) resources

ESR Modern Radiology eBook, <https://www.myesr.org/education/modern-radiology-ebook>

VI. ATTENDANCE AND OTHER STUDENT RESPONSIBILITIES

A. ATTENDANCE POLICY

Attendance is mandatory for both lectures and labs/clinical practice.

Students are allowed to be absent up to 23 hours of lectures (which corresponds to a maximum of 30% of the total course hours). Specifically, in lectures of the specific course you are allowed to miss **up to 8**.

B. STUDENT RESPONSIBILITIES & EXPECTATIONS:

- Please make sure to participate in lectures and exam days. In the event of an emergency or illness, kindly notify the central administration promptly via email to medicen@uoa.gr as well as the secretariat of the course Evi Alevizaki via email radiology1_student@aretaieio.uoa.gr
- Please ensure punctuality for the lectures, and in return, the Professor will conclude the class as scheduled. Kindly note that students will not be allowed to enter the class in case the doors close and the lecture has started; they will be marked as absent.
- Maintain a sense of curiosity and be proactive in seeking clarification. If you are unclear about something, chances are that others in the class share the same confusion. Support your peers by posing questions and seeking clarity.

C. DRESS CODE

Physicians are expected to be groomed and dressed in a manner that presents a professional and neat appearance to their patients. Maintaining personal hygiene and wearing appropriate attire help to establish rapport with patients and are important to good patient care. These factors may have impact on the dress code policy at our institution. Dress code requirements in clinical settings are also influenced by personal and patient safety needs.

Shorts are not allowed.

While on clinical rotations, medical students must be dressed in accordance with the dress code of the site in which they are working. Medical students are expected to wear professional attire and white coats when appropriate. Closed-toed shoes are required in the clinical setting.

VII. DETAILED TIMETABLE FOR THE ACADEMIC YEAR 2025-26

The detailed timetable of the course for the Academic Year 2025-2026 will be uploaded on eClass.