



Deputy of Education, Ahvaz Jundishapur University of Medical Sciences

Center for Medical Education Studies and Development

Course Title: Physics of CT Imaging Field of Study: Medical Imaging Technology
Course Code: 33
Prerequisites: Diagnostic Radio physics, Theoretical Foundations of Medical Image Formation
Credit Units: 2 Units (1.5 Theoretical + 0.5 Practical)

Faculty: Paramedical faculty Academic Year: 2024-2025 (1404-1405) Semester: Second Semester
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Class Schedule : Sundays 1:00 PM – 4:00 PM Instructor: Dr. Jafar Fattahi Asl Email: fatahi.j49@gmail.com

Course Objective: To gain awareness of concepts related to the image formation process and to become familiar with Computed Tomography (CT) scanning methods.
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Course Description: Introduction to the physical principles of CT scanners and the physical mechanisms of data acquisition and image processing across different generations; study of contrast, image quality, and influencing factors; introduction to the capabilities and working mechanisms of single-slice and multi-slice spiral scanners; physical characteristics and clinical applications; and an introduction to specific imaging features and diagnostic possibilities offered by multi-slice CT systems.

Weekly Lesson Plan

Row	Topics (Expected Learning Outcomes)	Teaching Method	Student Activities	Session
1	Introduction, course overview, CT resources, and familiarity with radiography limitations	Virtual Education	Active participation, Q&A, Presentation	First
2	Introduction to the physical principles of Computed Tomography	Virtual Education	Active participation, Q&A, Presentation	Second
3	General concept of data acquisition	Virtual Education	Active participation, Q&A, Presentation	Third
4	Introduction to image reconstruction	Virtual Education	Active participation, Q&A, Presentation	Fourth
5	Introduction to CT equipment	Virtual Education	Active participation, Q&A, Presentation	Fifth
6	Introduction to Image Manipulation	Virtual Education	Active participation, Q&A, Presentation	Sixth
7	Introduction to Electron Beam Computed Tomography (EBCT)	Virtual Education	Active participation, Q&A, Presentation	Seventh
8	*Midterm Exam*	Virtual Education	Active participation, Q&A, Presentation	Eighth
9	Introduction to Mobile Computed Tomography	Virtual Education	Active participation, Q&A, Presentation	Ninth
10	Introduction to CT Image Quality	Virtual Education	Active participation, Q&A, Presentation	Tenth



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11	Introduction to Patient Dose Measurement in CT scanners	Virtual Education	Active participation, Q&A, Presentation	Eleventh
12	Introduction to Single-slice Spiral (Helical) Computed Tomography	Virtual Education	Active participation, Q&A, Presentation	Twelfth
13	Introduction to Multi-slice Spiral (Helical) Computed Tomography	Virtual Education	Active participation, Q&A, Presentation	Thirteenth
14	Introduction to advancements in Volumetric and 3D imaging	Virtual Education	Active participation, Q&A, Presentation	Fourteenth
15	Introduction to continuous imaging: Real-time CT Fluoroscopy	Virtual Education	Active participation, Q&A, Presentation	Fifteenth
16	Continued: CT Angiography	Virtual Education	Active participation, Q&A, Presentation	Sixteenth
17	Practical	Practical work with CT scan machines	Active presence at Hospital	seventeenth

Student Assignments:

Evaluation Method: Assignments, Midterm Exam, Final Exam

Grading Breakdown:

- Assignments: 2 Points - Midterm Exam: 6 Points -Final Exam: 12 Points - Total: 20 Points

References :

1. Euclid Seeram, Computed Tomography: Principles, clinical applications and quality control, W.B. SANDERS Company
2. Christensen's Physics of Diagnostic Radiology, Thomas S Curry, James E Dowdey, Roert C Murry
3. Computed Tomography for Technologists – Louis Romans