

EUTEMPE Module 11

Artificial Intelligence in Patient Dosimetry for X-ray Diagnostic and Therapeutic Imaging

University of Crete, School of Medicine, Heraklion, Crete, Greece

<https://med.uoc.gr/en/medschool-en/>



1. Module description

This intensive EUTEMPE module is designed to provide participants with a comprehensive understanding of the application of Artificial Intelligence (AI) in patient dosimetry for X-ray diagnostic and therapeutic imaging. Participants will gain hands-on experience with AI tools and algorithms used in medical X-ray dosimetry, explore the integration of AI into clinical workflows, and discuss the ethical and regulatory considerations of AI in medical imaging. The course will also highlight the latest research trends and future directions in AI-driven dosimetry.

2. Key topics

Online phase, July 14, 2025 – August 31, 2025

Online material & 5 webinars:

An Overview of Dosimetry and Image quality in X-ray imaging

Dual Energy CT: The basics

Neural Networks Explained

Introduction to Python for ML, Part I

Introduction to Python for ML, Part II

On site phase, September 1, 2025 - September 5, 2025

University of Crete, Heraklion, Crete

Basics of AI & Machine Learning in Medical Imaging

Python for Machine Learning

Hands-on: Introduction to AI Development with Google Colab

Hands-on: Data Preprocessing for AI Models

Patient Dose Estimation Methods in Diagnostic X-ray Imaging. Specific Considerations for Pregnant and Paediatric patients

Patient Dose Estimation Methods in Therapeutic Imaging. Specific Considerations for Pregnant and Paediatric Patients

Dual Energy CT: Advanced Topics, Dosimetry

Radiation Protection Optimization in Diagnostic & Therapeutic Imaging

Hands-on: Pregnancy and Dose Optimization Strategies (hospital)

Hands-on: Building an AI Model for organ dose estimation

AI Model Validation & Performance Metrics

Hands-on: Building an AI Model for Image Classification

Introduction to AI-powered Image Segmentation

Image Segmentation: Discussion & Real-world Applications

Hands-on: Building an AI Model for Image Segmentation

Hands-on: Training a Denoising Autoencoder for Low-Dose Imaging

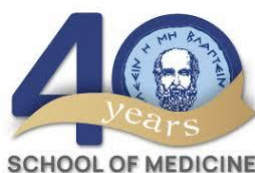
Hands-on: Dual Energy CT Dosimetry (hospital)

Demo: Use of an AI-powered tool: iDose

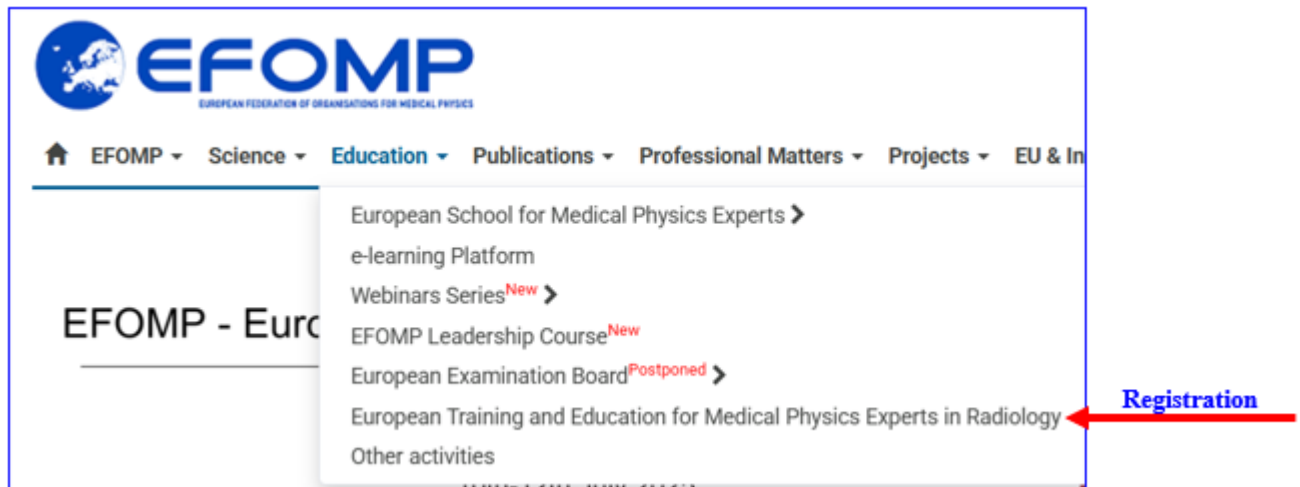
Generative AI and Medical Physics

AI Applications in Education and Training

Regulatory, Ethical, and Legal Aspects of AI in Medicine



3. Online registration, EFOMP website:



4. Prerequisites:

- Good understanding of dosimetry in X-ray imaging
- Familiarity with computer programming (e.g., Python) is beneficial but not required

