



For any questions please
send an email to:

eutempe.ferrara@fe.infn.it

Useful links:

- ⇒ www.unife.it/international/home
- ⇒ www.unife.it/scienze/lm.physics
- ⇒ www.unife.it/international/student-life
- ⇒ www.elettra.eu/
- ⇒ www.elettra.eu/elettra-beamlines/syrmep.html



Information For Applicants

- ⇒ No course fee
- ⇒ 10 free lodgings during the face-to-face part
 - ⇒ Participants who want to be considered for the free lodging should send a separate request together with the application to the local organiser with a justification for the request
 - ⇒ Travel and meal costs are covered by each participant
- ⇒ Transfer to Trieste is covered by the organiser
- ⇒ Accreditation requested for the Italian CPD (ECM) and EFOMP CPD systems

Application Form

People wishing to enroll should download the form from:

<http://www.eutempe-rx.eu/index.php/more-news/109-enrolment-form>

and submit it to: info@eutempe-rx.org

with copy, including the request for free lodging, to the module leaders, Prof. **Angelo Taibi** and Prof. **Mauro Gambaccini** at:

eutempe.ferrara@fe.infn.it

The deadline for applications is

15th May 2015

- ⇒ confirmation of the acceptance to the course and of the free lodging will be sent to the applicant
- ⇒ place in the module is held by the organiser if the applicant confirms his participation



**Become a Medical Physics Expert in Radiology
with**



**EUTEMPE-RX provides a series of teaching
modules expected to be accredited for the award
of Medical Physics Expert in Radiology in all EU
Member States**

4th teaching module

***Innovation - Advanced X-ray
physics for imaging device and
user protocol innovation in
D&IR***

Online Phase

Available from the 12th June 2015

to be completed before the

Face-to-Face Phase

13th - 17th July 2015

**Department of Physics and Earth Sciences
University of Ferrara**

Via Saragat 1, Ferrara, Italy

Elettra Synchrotron Facility

Strada statale 14, Basovizza (Trieste), Italy

Course open in particular to:

**Diagnostic Medical Physicists, medical device
companies and radiation protection authorities**



Module Content

Aim

This module aims to help the future Medical Physics Expert (MPE) in Diagnostic Radiology to acquire the knowledge, the skills and the competences necessary for a thorough understanding of the **latest research results in X-ray imaging**.

The course will discuss how to take advantage of **energy** and **phase characteristics**: physical principles, new X-ray sources and novel imaging modalities.

Learning Outcomes

- ⇒ Assess, evaluate and optimise X-ray imaging systems based on the use of **energy dependence** of X-ray attenuation, **monochromatic radiation** and **phase-contrast**
- ⇒ For each imaging modality explain strength and limitations, their impact on image quality and their effects on patient's safety
- ⇒ Take responsibility for requirements for Medical Physics Services in Diagnostic and Interventional Radiology with respect to **innovation** and the introduction of new devices into the clinical practice



Course Structure

Online Phase

It will be online from the 12th June 2015.

It will consist of a series of sets of compulsory readings for self-learning on the defined topics. An asynchronous online forum for difficulties and questions will accompany each topic. Online course requires about 48 hours of reading and effort by the participants.

The e-learning course is a prerequisite for the face-to-face phase.

Face-to-Face Phase

This phase will consist of daily sessions followed by a round-table discussion.

Practical Sessions

Two hours of technical demonstrations and two hours of laboratory/clinical exercises will be provided.

Candidate Assessment

A written, closed-book, exam with case-study questions followed by an oral discussion on Friday, 17th July 2015.



Topics

E-learning Topics

- ⇒ Spectral imaging: the use of energy spectrum
- ⇒ Detectors: photon counting vs integration
- ⇒ Introduction to particle accelerator technology
- ⇒ Exotic radiation sources
- ⇒ Accelerators in diagnostic radiology
- ⇒ State-of-the-art of X-ray sources based on particle-laser interaction
- ⇒ Accelerated particle interaction with crystalline structures
- ⇒ Synchrotron radiation and Phase-Contrast Imaging

Face-to-Face Topics

- ⇒ Fundamental physics of X-rays for innovation
- ⇒ Spectral Imaging, such as Dual-Energy Imaging
- ⇒ Quasi monochromatic X-rays
- ⇒ Table-top accelerators in diagnostic radiology
- ⇒ High-brilliance X-ray sources based on particle accelerators: theoretical background and potential application in D&IR
- ⇒ Introduction to Synchrotron Radiation and fundamentals of Phase-Contrast Imaging
- ⇒ Diagnostic applications of Phase-Contrast

Practical Topics

- ⇒ Beam energy selection, spectrum and photon fluence measurements
- ⇒ Monochromatic X-ray absorption radiography
- ⇒ Phase-Contrast evidence