Experience from a EUTEMPE-RX module on dose management of pregnant patients, pregnant staff and pediatric patients in diagnostic and interventional radiology

J. Damilakis, MSc, PhD, FIOMP

Professor of Medical Physics and Chairman

Faculty of Medicine, University of Crete

EFOMP President

Aim

- To discuss methods to estimate

a) conceptus doses and radiogenic risks and

b) paediatric doses and radiogenic risks

associated with diagnostic and interventional X-ray procedures

Aim

- To learn how to develop optimized diagnostic and interventional radiology protocols for pregnant and paediatric patients

Aim

- To learn how to develop research protocols focused on conceptus and paediatric dosimetry

Minimum entry qualifications

BSc Physics or equivalent

MSc Medical Physics or equivalent

2 year equivalent clinical training in D&IR for clinical Medical Physicists
or
2 year equivalent Industry/Radiation Authority experience

EUROPEAN COMMISSION

RADIATION PROTECTION

No. 174

EUROPEAN GUIDELINES ON MEDICAL PHYSICS EXPERT

Delivery of the module

- Combination of online and face-to-face teaching

Dates

- Online phase: February 15, 2016 – March 31, 2016
- Face-to-face phase: 16-20 May 2016

Venue

University Hospital of Iraklion

University of Crete, Faculty of Medicine

Radiation dose management of pregnant patients, pregnant staff and paediatric patients in diagnostic and interventional radiology

EUTEMPE-RX

Teaching method:
Blended learning
(online and face-to-face learning).

Module duration: approx. 10 working days online teaching + 5 working days face-to-face teaching

Venue (face-to-face teaching): University of Crete, Faculty of Medicine, Heraklion, Crete, Greece

Teaching objectives: By the end of this module the participants would be able to:

1. Assess and evaluate conceptus doses and radiogenic risks associated with diagnostic and interventional examinations performed on the mother
2. Assess, evaluate and minimize conceptus dose for pregnant staff working in an interventional suite
3. Assess and evaluate paediatric patient doses and radiogenic risks from diagnostic and interventional radiology procedures
4. Manage exposure of pregnant patients requiring diagnostic and interventional procedures
5. Develop new optimized diagnostic and interventional radiology protocols for pregnant patients
6. Develop new optimized diagnostic and interventional radiology protocols for paediatric patients
7. Develop research protocols focused on conceptus and paediatric dosimetry using TLDs and anthropomorphic physical phantoms or Monte Carlo simulation and mathematical phantoms

Teaching staff: John Damilakis, Kostas Perisinakis, John Stratakis, Antonios Papadakis, Virginia Tsapaki, Georgia Solomou, invited speakers (tba)

LEADER OF THE MODULE

John Damilakis, A full professor and chairman in the Department of Medical Physics of the University of Crete, Greece, John Damilakis has focused his research interests on radiation protection in diagnostic and interventional radiology. He has published more than 200 publications in leading peer-reviewed journals and conference proceedings. He is a leader in the application of medical radiation protection in clinical everyday practice with about 30 years of clinical experience. John Damilakis is vice president and president elect of EFOMP and chairman of the Education and Training Committee of IOMP

John Stratakis, received his BSc in Physics from the University of Crete in 1997, his MSc in Medical Physics from the University of Surrey, UK, in 1998 and his PhD in Medical Physics from the Medical School of the University of Crete. He is a research associate of the Laboratory of Medical Physics at University of Crete. His research interests include Monte Carlo dosimetry applied to radiographic and interventional procedures.

Kostas Perisinakis, BSc, MSc, PhD joined the Medical Physics Department, Medical School, University of Crete in 1996 where he serves ever since. He is author in more than 85 scientific papers published in peer-review journals, which have received more than 1350 citations. He was invited speaker in more than 50 international and domestic congresses. His main research interests relate to quantification of radiogenic risks from medical radiation procedures.

Antonios Papadakis has been a medical physicist and radiation protection consultant with the Medical Physics Department of the University Hospital of Heraklion, Greece, since 2004. He received the PhD degree in medical physics in 2003 from the University of Patras, Greece. From 2003 to 2004 he had been a research fellow with the Massachusetts General Hospital, Boston, USA. He has published several articles in peer-reviewed scientific journals and conference proceedings.

Georgia Solomou received her B.Sc. in Applied Mathematics and Physics from National Technical University of Athens and M.Sc in Medical Physics from the Aristotle University of Thessaloniki. Since 2012 she has been a PhD candidate in Medical Physics with the University of Crete and has been working as a Medical Physicist in the research project entitled "Conceptus Radiation Doses and Risks from Imaging with Ionizing Radiation".

Virginia Tsapaki, more than 25 years experience in Diagnostic and Interventional Radiology, Computed Tomography and Nuclear Medicine. Iinvolved in several missions organised by the IAEA and in multiple European and IAEA research projects. More than 100 publications in various national and international journals and conference proceedings and more than 150 presentations and posters in national and international conferences. President of the Hellenic Association of Medical Physicists. Actively involved in the board of EFOMP and IOMP.

EUTEMPE-RX

Course enrollment is FREE

Minimum entrance requirements are:
EQF level 7 = master + 2 years of experience in medical physics for radiological applications

www.eutempe-rx.eu

Participants

Number of applications: 43

Participants: 17 from 11 countries

Austria, Belgium, Czech Republic, Greece, Ireland, Italy, Portugal,

Switzerland, Poland, Sweden, Turkey

On line phase

Anatomy-Physiology-Pathology

Pregnant patients: Anatomy, physiology and pathology for MPs

Pediatric patients: Anatomy, physiology and pathology for MPs

Biological Effects

Biological effects to a conceptus from ionizing radiation

Biological effects to children from ionizing radiation

On line phase

Parameters that influence conceptus dose

Radiography and fluoroscopy parameters that influence conceptus dose

CT parameters that influence conceptus dose

Parameters that influence paediatric patient dose

Radiography and fluoroscopy parameters that influence the dose

CT parameters that influence the dose

On line phase

Conceptus dose/Paediatric dose: Critical review of studies
Amount of dose absorbed by the conceptus from diagnostic and interventional x-ray examinations: Critical review of studies

Amount of dose absorbed by pediatric patients from diagnostic and interventional x-ray examinations : Critical review of studies

On line phase

Optimization of examinations performed during pregnancy

Radiography/Fluoroscopy during pregnancy: Methods for dose optimization

CT during pregnancy: Methods for dose optimization

Optimization of examinations performed on paediatric patients

Radiography/Fluoroscopy: Methods for dose optimization

CT: Methods for dose optimization

On line phase

Dose management

The radiation dose management of pregnant patients requiring medical imaging

The radiation dose management of pregnant personnel

Face-to-face phase

DAY 1: Pregnant patient: Calculation of conceptus absorbed dose

Morning: Learn how to estimate conceptus dose in clinical routine

09:00-10:00 Normalized doses and software available to estimate conceptus dose from DR/IR examinations performed on pregnant patients

10:00-11:00 Isodose curves and software available to anticipate conceptus dose for pregnant personnel

Special session

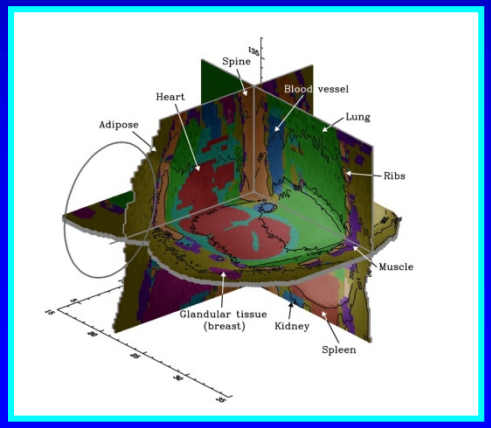
11:00-13:00 Discussion of research studies on conceptus dose estimation and research methodology

Face-to-face phase

DAY 1: Pregnant patient: Calculation of conceptus absorbed dose

Afternoon: Learn how to estimate conceptus dose for research purposes

14:00-17:00 Monte Carlo Simulation using MCNP

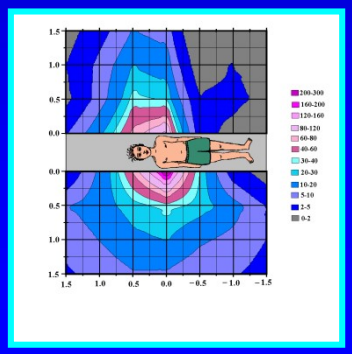


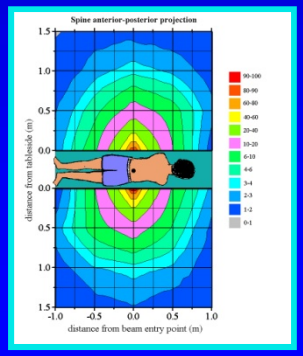
Face-to-face phase

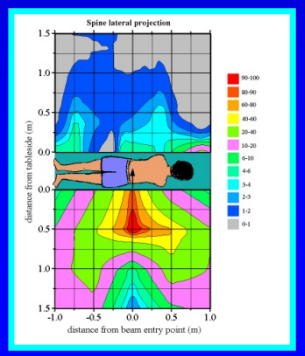
DAY 2: Pregnant patient: Calculation of conceptus absorbed dose

09:00-12:00 Patient cases. Each student calculates conceptus dose using normalized doses and submits his/her report.

12:00-13:00 Occupational exposure during pregnancy: Each student anticipates conceptus dose for a pregnant radiologist working in an interventional radiology suite and submits his/her report



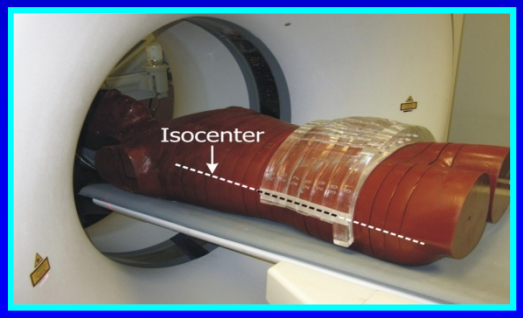


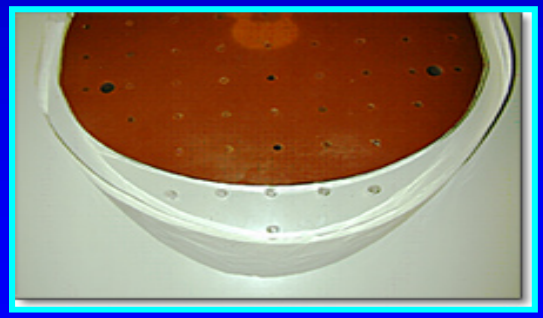


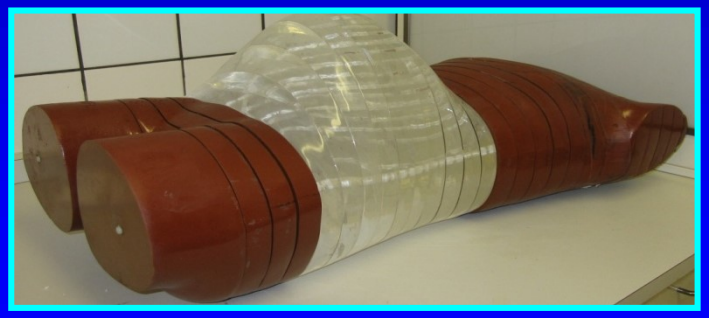
Face-to-face phase

DAY 2: Pregnant patient: Calculation of conceptus absorbed dose

Afternoon: Learn how to estimate conceptus dose for research purposes
14:00-17:00 TLD dosimetry



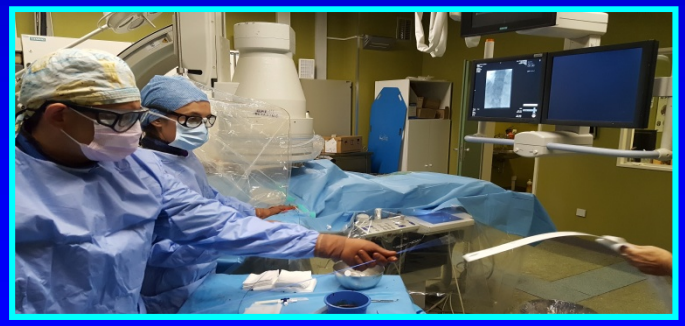




Face-to-face phase

DAY 3: Pediatric patient: Calculation of organ and effective dose
Morning: Learn how to estimate dose in clinical routine
09:00-11:00 NDs and software available to estimate dose from DR/IR examinations

Special session
11:00-13:00 Optimization of paediatric examinations



Face-to-face phase

DAY 3: Pediatric patient: Calculation of organ and effective dose

Afternoon: Learn how to estimate pediatric dose for research purposes
14:00-17:00 Monte Carlo Simulation using MCNP

Face-to-face phase

DAY 4: Pediatric patient: Calculation of organ and effective dose

Morning: Patient cases and dose calculation

09:00-11:00 Patient cases. Each student calculates effective and organ dose using NDs and submits his/her report.

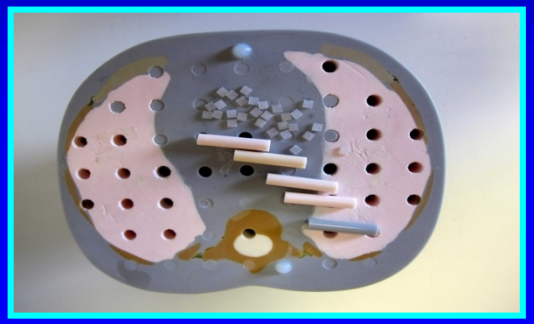
Special session

11:00-13:00 Discussion of research studies on pediatric doses and research methodology

Face-to-face phase

DAY 4: Pediatric patient: Calculation of organ and effective dose

Afternoon: Learn how to estimate pediatric dose for research purposes
14:00-17:00 TLD dosimetry



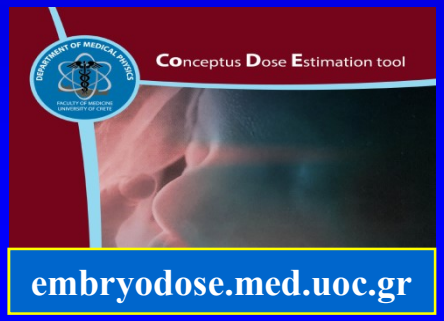
Face-to-face phase

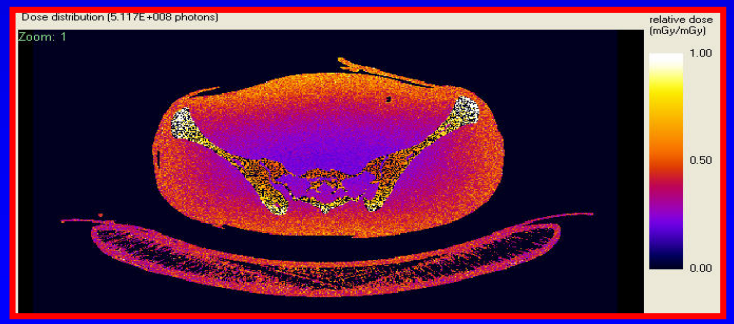
DAY 5: Use of Dosimetric Software

09:00-13:00 Familiarization with ImpactDose, PCXMC, CoDE, ImpactMC, (Split in groups)

14:00-15:00 Examinations

15:00 – 16:00 Summary





Assessment

a) literature review,

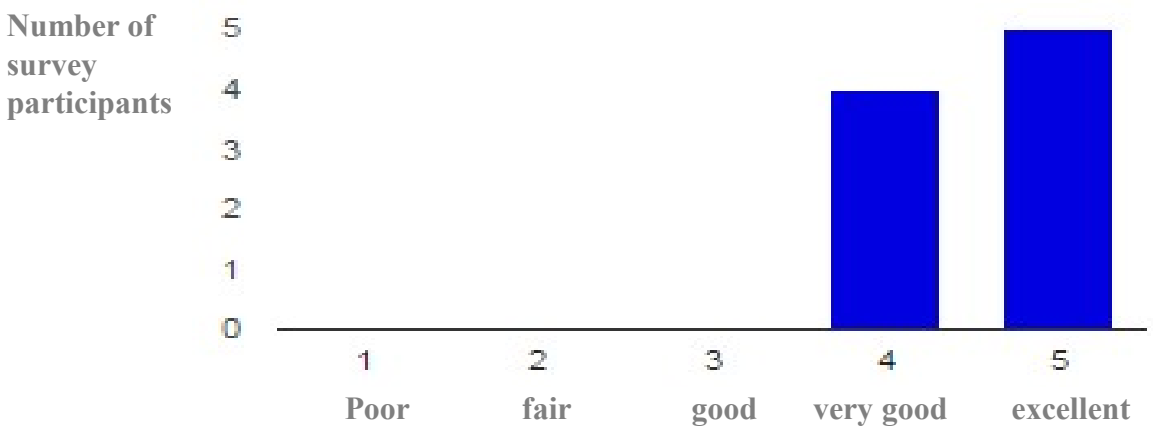
b) computer exercises and

c) final written exams

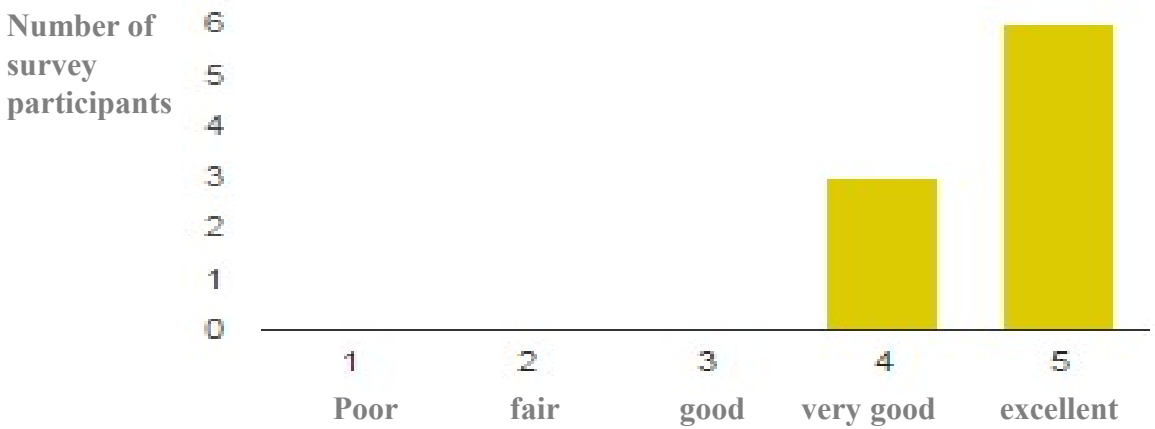
Final score: 6.5-9.1

Feedback from participants

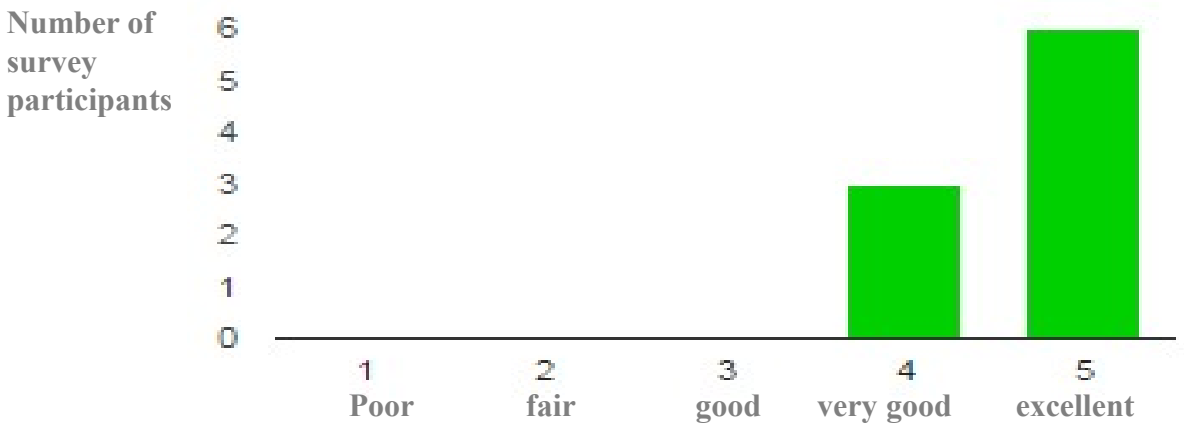
Learning goals were clear



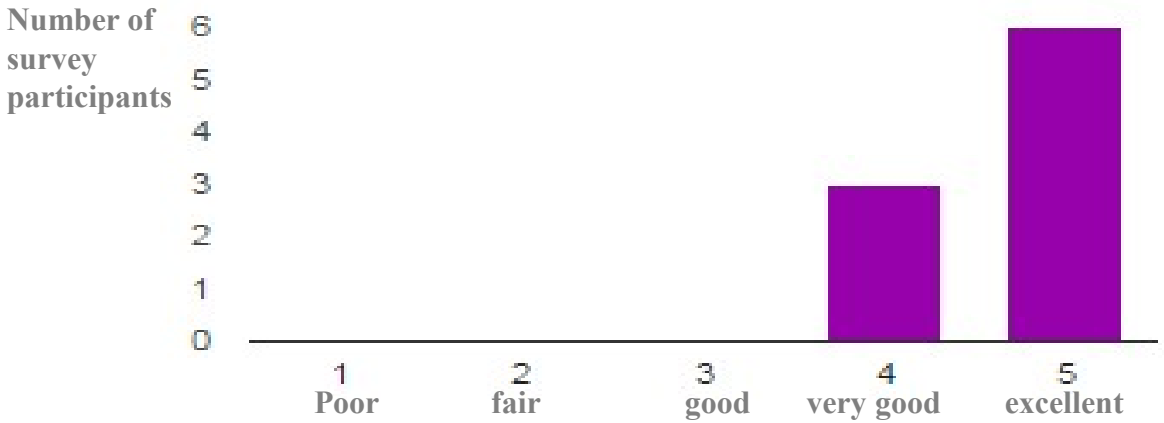
Module leader and presenters had a good command of the subject of the course



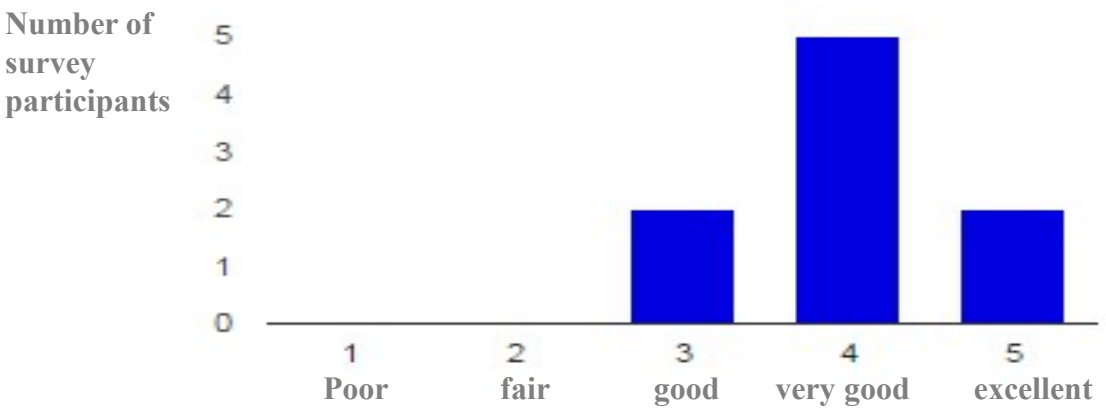
The module leader answered my questions promptly



Study materials were sufficient

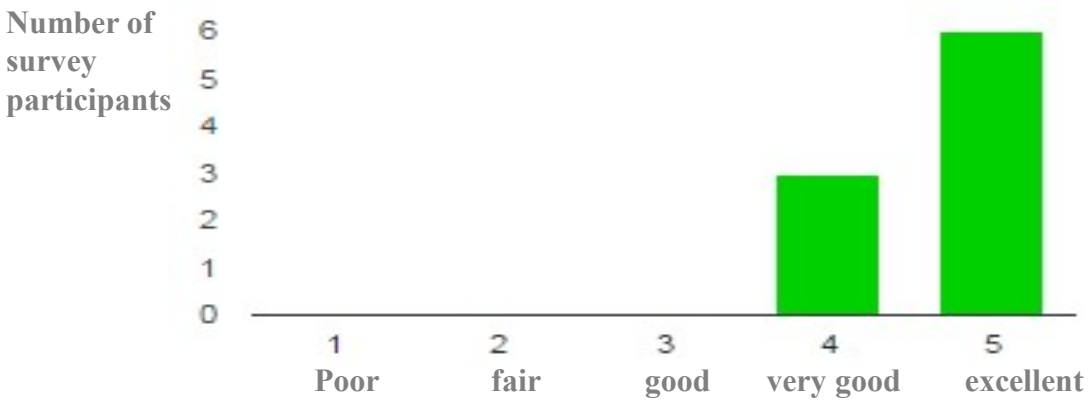


The e-platform enabled me to get involved with the content

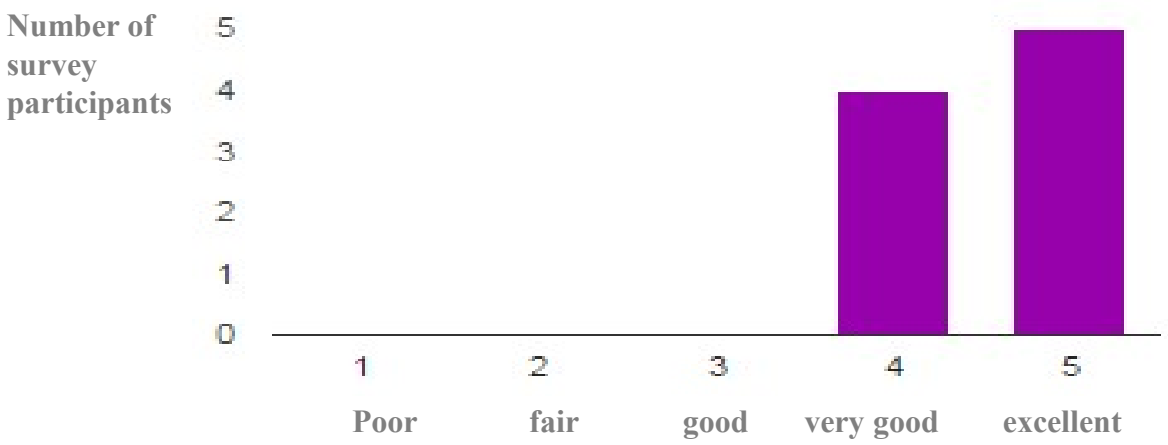


The e-platform allowed me to discuss content with fellow participants

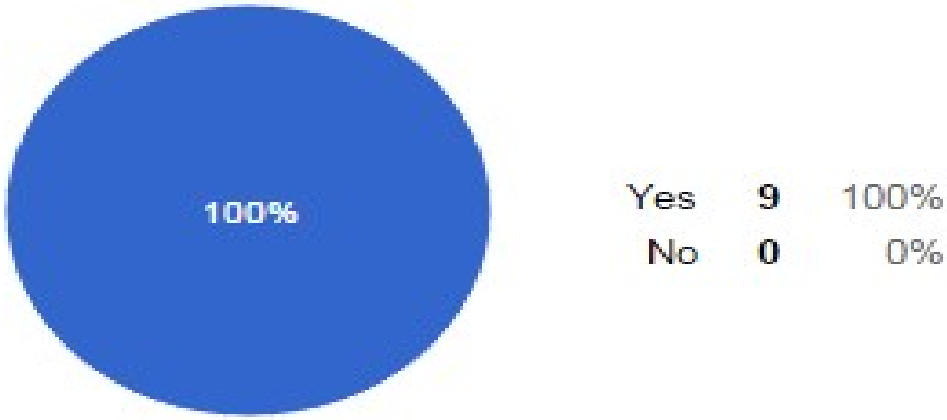
K, S, C match with those expected by employer



My own expectations were met

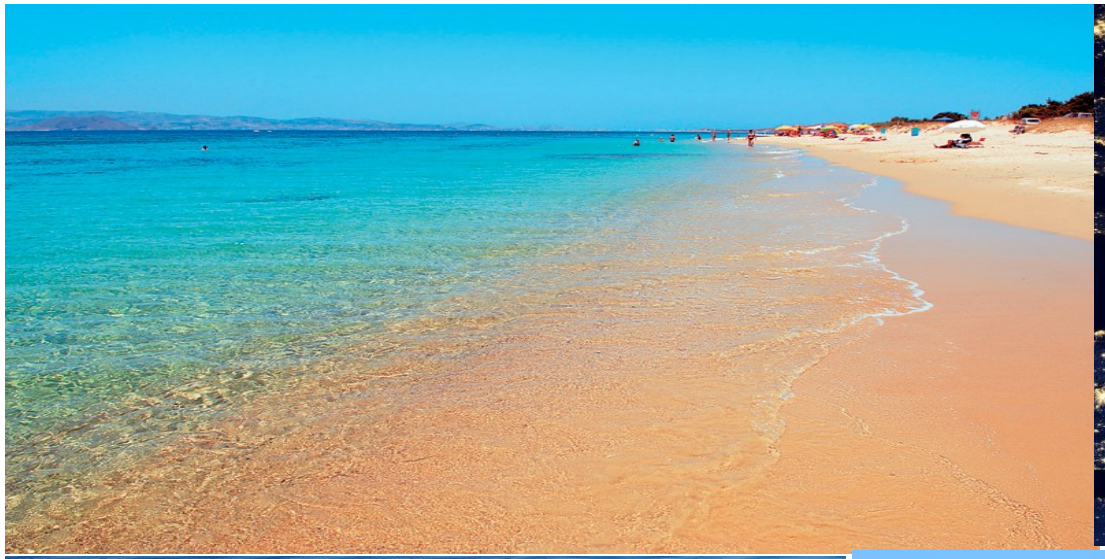


Do you think, this module should be organized again in the future?



In the same location?

Yes	**9**	100%
No	**0**	0%




CRETE

What 3 aspects did you find especially good?

The content regarding calculating conceptus dose was the best!

The practical approach with conceptus and pediatric dose estimations in different situations was great, more of that please!

The level of difficulty and the help from the lecturers was perfect!

The practical aspects enable the participants to thoroughly understand the methods and use them in practice

Organization was excellent, always on time as scheduled

What changes could be made to improve the module?

More discussion on what to do when conceptus/children receive high doses

Less time about Monte Carlo simulations

More practical sessions in the CT room

Exams with open books

EUTEMPE-RX

Module 11
Radiation dose management of pregnant patients, pregnant staff and paediatric patients in diagnostic and interventional radiology

Module Leader: Prof. John Damilakis

Department of Medical Physics
Faculty of Medicine, Univeristy of Crete (UoC)

Teaching objectives

1. Assess and evaluate conceptus doses and radiogenic risks from diagnostic and interventional examinations performed on the mother
2. Assess, evaluate and minimize conceptus dose for pregnant staff working in an interventional suite
3. Assess and evaluate paediatric patient doses and radiogenic risks from diagnostic and interventional procedures
4. Manage exposure of pregnant patients requiring diagnostic and interventional procedures
5. Develop new optimized diagnostic and interventional radiology protocols for pregnant patients
6. Develop new optimized diagnostic and interventional radiology protocols for paediatric patients
7. Develop research protocols focused on conceptus and paediatric dosimetry using TLDs and anthropomorphic phantoms or Monte Carlo simulation and mathematical phantoms

Teaching method: Blended Learning

Online phase: prepare yourself and learn anytime, anywhere

Face-to-face phase: interactive teaching at the highest level

Timeline

Online start: 1st April 2018
Face-to-face period 21-25 May 2018

Teaching Staff

John Damilakis
Kostas Perisinakis
John Stratakis
Antonios Papadakis
Georgia Solomou
Virginia Tsapaki

Venue (face-to-face teaching):
University of Crete, Faculty of Medicine, Heraklion, Crete, GREECE

Register now at
www.eutempe-net.eu

Please book early to ensure availability

Fees

700 € (370 € for the first 6 applicants from AL, BY, BA, BG, CY, EE, GR, HR, HU, XK, LV, LT, MK, MD, ME , PL, RO, RU, RS, SI, SK, SLO, TR, UA, countries on the UN list of least developed countries

EFOMP

EUTEMPE-RX is supported by EFOMP

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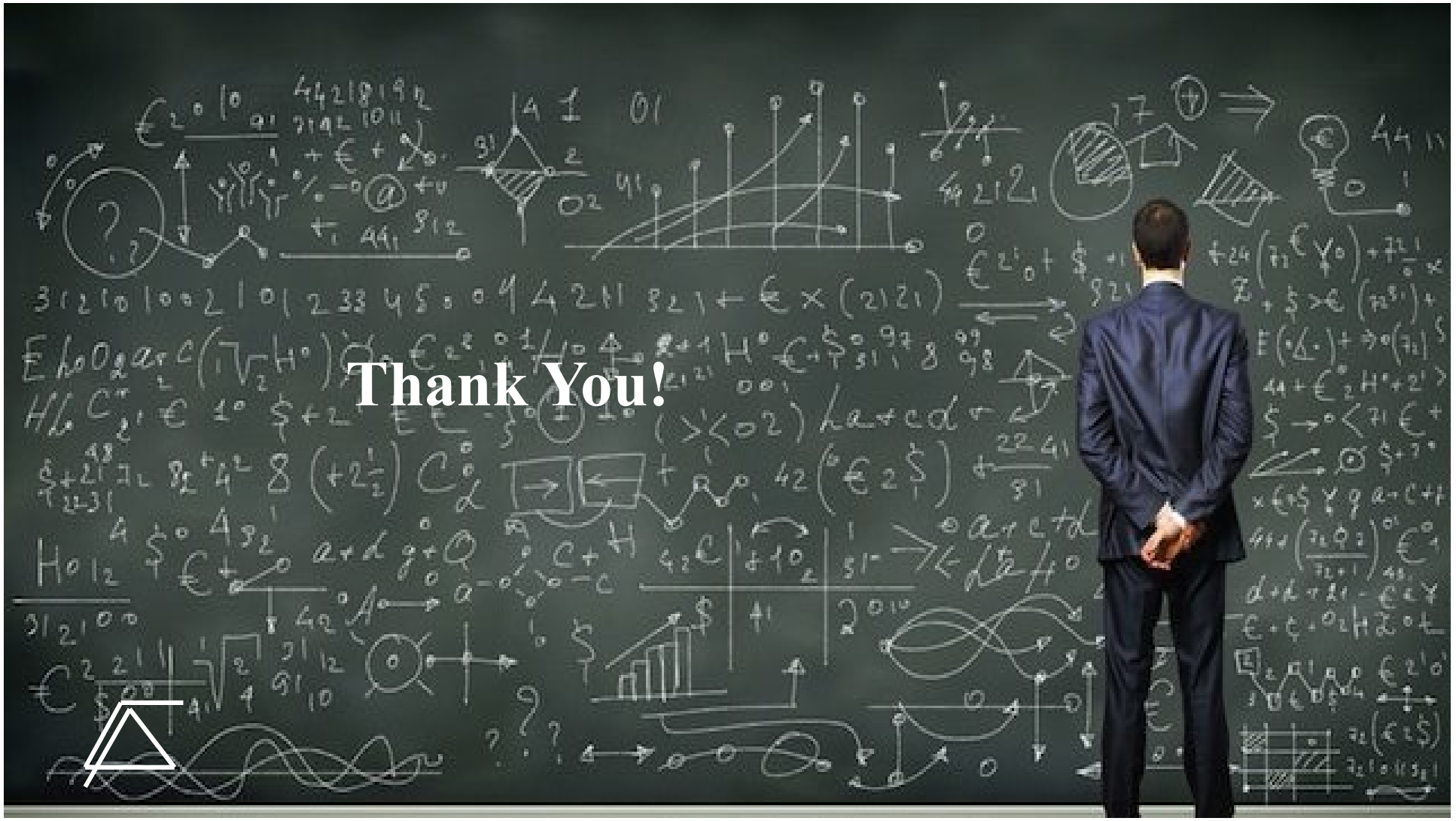
Thank You!