

Optics and Optical Systems for the Vision Care Sector: AMTC*4

Course Dates: 9th & 10th November 2010

National University of Ireland, Galway

Room AO 208, Applied Optics Group, Arts and Sciences Building

** AMTC (Advances in Medical Technology through Convergence) is a strategic training collaboration involving the Biomedical Diagnostics Institute, DCU, the Applied Optics group, NUIG and the Regulated Software Research Group, LERO, DKIT. AMTC is part of the LifeSciences Skillnet training programme for industry.*

Objective

This two-day course is designed to provide an understanding of the basic principles of optics and optical systems for engineers and managers in the vision care industry and support agencies who may not have a background in optics. No prior knowledge of optics is required but it is recommended that attendees have a basic training in science or engineering. The course is particularly focused on the optical knowledge required in the manufacture and testing of contact lenses and intra-ocular lenses, but is also relevant to those involved in spectacle lens design and testing and also to optometrists wish to refresh or upgrade their knowledge of optics and aberrations.

Aims of the Course

The course is designed to:

- Explain the basic principles of geometrical optics, especially with respect to the eye and vision
- Provide an introduction to aberrations of optical systems, the eye in particular
- Explain how corrective lenses are used in the eye (spectacles, contact lenses, intra-ocular lenses)
- Describe modern optical models of the eye
- Describe modern lens testing methods (wavefront analysis, MTF)
- Describe how optical components (including contact lenses and IoLs) are measured in practice

Who Should Attend?

The course is intended for engineers and managers in the vision care and related industry and supporting agencies who require knowledge of optics, either for their current projects or for future product development. It is also designed for those involved in quality control and inspection in the vision care sector (contact lenses, intra-ocular lenses, spectacle lenses).

Learning Outcomes

This course will enable you to:

- Carry out basic calculations in geometrical optics
- Evaluate the power of lenses required for correction of myopia and hypermetropia.
- Understand optical aberrations in terms of Zernike coefficients
- Know how to measure the aberrations of the eye
- Use ray-tracing to understand optical models of the eye
- Understand how a Shack-Hartmann wavefront sensor works
- Find the MTF of an optical system
- Understand a variety of lens testing methods

Programme

The course will run from 9:30 a.m. on Tuesday 9th November to 3:30 p.m. on Wednesday 10th November 2010, and consists of a total of 8 one-hour lectures, plus two short laboratory demonstration sessions and a networking event at the end of the first day. There will be ample opportunity to interact with the lecturing staff and other delegates during the course.

Outline Programme

Tuesday 9th November

9:30 Basic Geometrical Optics
10:30 The Eye and Visual Perception
11:30 Break
12:00 Aberrations of Optics Systems, including the Eye
13:00 Lunch
14:00 Optical Models of the Eye
15:00 Laboratory Demonstrations
15:30 Break
16:00 Wavefront Aberrometry of the Eye
17:00 Networking Event

Wednesday 10th November

09:30 Standards and Testing of lenses
10:30 Theory and Measurement of the MTF
11:30 Break
12:00 Advanced Lens Testing
13:00 Lunch
14:00 Laboratory Demonstrations
14:30 Discussion: topics raised by participants
15:30 Close of Course . A certificate of attendance will be provided to each participant.

Course Lecturers (partial listing)

Prof J C Dainty is Professor of Applied Physics at NUI Galway. He obtained his PhD from Imperial College, London and has 35 years experience in teaching and research in Applied Optics. He has received many awards for his contributions to optics, including the Mees Medal and Prize of the Optical Society of America. *Dr A Goncharov* is a lecturer in the School of Physics. He received his PhD from Lund Observatory, Sweden in astronomical optical instrumentation. His present fields of interest include imaging in ophthalmology and astronomy.

Accommodation

There are many hotels and B&Bs in Galway, ranging from €40 per night upwards. Attendees are strongly recommend to stay overnight to allow a prompt 9:30am start to the course each day. Details of accommodation and other facilities in Galway can be found at <http://www.galway.net/>.

Location of Short Course

The course will be held in Room A0208, in the Applied Optics Group, Physics Department, NUI Galway. Campus and Galway City maps can be found at: http://optics.nuigalway.ie/visit_us

Parking

There is limited "pay and display" car parking available at NUI Galway at a rate of €6 per day. However you are strongly encouraged *not* to bring your car on campus and to walk to the Campus if at all possible.

Fee and Registration

Life Sciences Skillnet member: €480 per participant including refreshments, lunches and copy of slides and lecture material.

Non member: €600 per participant including refreshments, lunches and copy of slides and lecture material.

Book on line http://www.imda.ie/0/imda_events or e mail pauline@imdaskillnet.ie

You are advised to register as soon as possible. Places will be limited in this course to provide the best possible opportunity for the participants and lecturers to interact in a productive and informal way.



Department of Enterprise, Trade and Employment
An Roinn Fiontar, Trádála agus Fostaíochta



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