Optical Coatings from Design through Manufacture

Full Name (please print)

Preferred first name or nickname for badge

Organization

Address (please print)

Telephone

Fax

E-mail

* Will bring laptop? Yes / No *

Refund policy - Fee payment will be refunded in full if the course is oversubscribed or cancelled. Registrations cancelled on or before 23rd February will be refunded less £100 handling charge. Half the fee will be refunded in the case of registrations cancelled after that date. There will be no refund for "no shows". The organizers reserve the right to cancel the course in the event of insufficient registration.

Course Fee £1,750

SAVE! Pay before February 23, 2007 and receive a **£200** discount

SAVE AGAIN! Bring your own laptop and receive a **£250** discount

The course fee covers all lecture notes, coffee breaks and lunches, but not hotel accommodation.

(Microsoft Windows Operating System with Administrator privileges where appropriate. Must permit temporary installation of Essential Macleod software from CD.)

We accept MasterCard

Optical Coatings from Design through Manufacture

A logical approach to optical coatings, their design, manufacture, properties and application.

Optical coatings are traditionally thought to be rather mysterious with the unexpected the norm, and success dependent on skill and experience and a certain degree of good fortune. However there are excellent reasons for even the extremely bizarre behavior of coatings and it is an understanding of these reasons that is the key to real, effective, expertise in the subject. Understanding is the emphasis throughout this course, which covers all aspects of coatings from design through manufacture.

The course is a mixture of formal lectures and hands-on tutorials with a computer for each student. The objective is the presentation of a logical unified treatment of the subject with emphasis throughout on understanding and reasoning.

There are no prerequisites although a familiarity with high-school mathematics and/or science would be useful.

Instructor

Dr. Angus Macleod has over 200 publications in the field of optics including the book *Thin Film Optical Filters*. He is Professor Emeritus of Optical Sciences at the University of Arizona and President of Thin Film Center Inc. For his work in education and research he was presented the 2004 Lifetime Achievement Award of the European Society of Vacuum Coaters, the 2002 Nathaniel H Sugerman Award of the SVC, the 1997 Esther Hoffman Beller Medal of the OSA and the 1987 Gold Medal of the SPIE. He has taught courses in optical topics all over the world to classes from one or two to over two hundred. He specializes in teaching techniques for understanding and logical thinking that avoid complicated theory without oversimplification.

Thin Film Center

Spring Masterclass

Optical Coatings from Design through Manufacture

A short course with hands-on computer-aided design given by **Professor Angus Macleod**

26-30 March 2007

London - Gatwick, U.K.

2745 E. Via Rotonda, Tucson, AZ 85716, USA
Tel: + 1 520 322 6171 Fax: + 1 520 325 8721
VISIT www.thinfilmcenter.com
or email info@thinfilmcenter.com

Thin Film Optical Coatings

Calculation of the optical properties of a given thin-film coating is straightforward. Designing for desired optical properties is rather more difficult. Reverse engineering that attempts to identify the errors responsible for manufacturing failures is similar to design but requires a greater level of understanding. Computers are absolutely necessary in these tasks and so hands-on instruction in computer-aided techniques is important in the course. But methods that help in understanding the output of the computer, including powerful back-of-the-envelope approaches, are even more important and are covered in detail. Optimization and synthesis, included in the course, are impressive methods but in no way replacements for understanding.

Optical film behavior is quite different from that of similar bulk material and it is film microstructure that is largely responsible. Film growth, microstructure, crystallinity, interaction with the environment and, especially, failure modes are important course topics. Much of this can be included in a simple yet comprehensive model of film growth.

A further course objective is an appreciation of deposition processes, the effect of deposition errors, and of tolerances.

Hands-on computing tutorials using the Macleod software reinforce the lectures and allow individual instruction, even including aspects of a student's own specific problems. Students may opt in advance to use their own laptops for this (must have Windows and permit temporary installation of the Macleod software) or we will provide a computer for the duration of the course.

The lecture notes are extensive and have been specially written. Attending the course is the only way in which they may be obtained.

Provisional Syllabus

Day 1	*Fundamentals.* *Dielectrics, metals, semiconductors.* *Coating types.* *Thin film calculations.* *Visualization and analysis tools.*
Day 2	*More tools.* *Polarization.* *Color.* *Design of specific coatings.*
Day 3	*Optimization and synthesis.* *Thin film deposition processes.* *Optical monitoring and tolerances.*
Day 4	*Microstructure, crystallinity & film growth.* *Thin film properties and their relation to microstructure.* *Moisture adsorption.*
Day 5	*Adhesion, stress abrasion resistance, thermal cycling.* *Reverse engineering.*
Day 1-5	*Problem solving.* *Hands-on tutorial sessions.*

Dates and Times

Monday 26th - Thursday 29th March 2007
9.00 am - 4.30 pm.
Friday 30th March 2007
9.00am - 12.00 pm.
Registration - 8.50 am Monday 26th March.

Course Location

Premier Travel Inn
Gatwick/ Crawley South

Goffs Park Road
Crawley, West Sussex RH11 8AX
Tel: 0870 990 6390 Fax: 0870 990 6391
www.thinfilmcenter.com/hotel.asp

Enquiries

To make a reservation or to ask for further details please write, fax or call any of the following:

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Software

*The **Essential Macleod** software for optical coating design and analysis that will be used on the course is available from **Thin Film Center Inc**, in the USA, or its agents listed above. Write, telephone, fax or e-mail for full details of specification and price.*

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