

UNIVERSITY OF HARTFORD

COLLEGE OF ENGINEERING, TECHNOLOGY, AND ARCHITECTURE

Center for Manufacturing and Metrology

Practical Aspects of Scanning Electron Microscopy (June 26-30, 2017)

COURSE OVERVIEW

The scanning electron microscope has become an indispensable tool in recent years by industrial, government and academic scientists in numerous research, production and quality control applications. Manufacturers of microscopes and accessory equipment have responded to this increased demand with advanced instruments equipped with a wide range of innovative features. To obtain maximum performance from these state-of-the-art instruments, a basic theoretical and practical knowledge of SEM and associated techniques is essential. This course is designed to provide SEM operators with this basic theoretical and practical training by using integrated lectures and hands-on laboratory exercises.

COURSE DESCRIPTION

Practical Aspects of Scanning Electron Microscopy: Reboot is an intensive four-day short course, providing a thorough coverage of the basic theory and practice of SEM. Lectures coordinated with supervised laboratory exercises provide students with an informed hands-on experience on contemporary SEMs equipped with modern accessories.

WHO SHOULD ATTEND

Practical Aspects of Scanning Electron Microscopy: Reboot is directed toward government, academic and industrial users of the SEM who are interested in learning current practical methodology in the operation of the SEM and accessory equipment. The lectures and laboratory exercises are basic and beneficial to microscopists at all levels from novice through advanced user. Due to the limited class size, participants are provided with the opportunity to acquire extensive hands-on experience with modern SEM instrumentation. A total of 15 hours of lecture and 13 hours of hands-on laboratory sessions are scheduled into the four-day course. Extensive discussion time with the experts is also available.

COURSE FEE

The course fee including cost of course materials is \$2,495.

Course Schedule**

Monday

1:00 PM - 3:00 PM - Course introduction and Principles of SEM 1
Historical Perspective

3:00 PM - 3:15 PM Break

3:15 PM - 5:00 PM - Principles of SEM 2

5:00 PM – Discussion Period

Tuesday

8:30 – 10:00 - Operation of the SEM 1

Break

10:15 - NOON - Operation of the SEM 2
Analog Digital Imaging and Processing

Noon – 1:00 PM Lunch

1:00 PM – 2:45 PM Lab Section 1

Break

3:00 PM - 5:00 PM Lab Section 2

5:00 PM - Discussion Period

Wednesday

8:30 – 10:00 Operation of the SEM 3
Generation and Collection of Signals Useful to SEM
High and Low Accelerating Voltage

Break

10:15 – Noon – SEM-based Measurements

Noon – 1:00 PM Lunch

1:00 PM – 2:45 PM Lab Section 3

3:00 PM - 5:00 PM Lab Section 4

5:00 PM - Discussion Period

Thursday

8:30 – 10:00 - Sample Preparation and Instrument Diagnostics

Break

10:15 - NOON Practical x-ray analysis

Noon – 1:00 PM Lunch

1:00 PM – 2:45 PM Lab Section 5

Break

3:00 PM - 5:00 PM Lab Section 6

5:00 PM - Discussion Period

Friday

8:30 – 10:00 Getting your SEM to always to work optimally

10:15 - NOON Lab Section 7

Noon – 1:00 PM Lunch

End

Laboratories**

Basic SEM Operation
Electron Detection and Detectors
Low/high Magnification/Resolution Operation
High/Low Landing Energy Operation
Digital Imaging and Image Processing
Sample Preparation
Specimen Coating
Instrument Maintenance/SEM Performance

****Contingencies and equipment availability may require a change without notice.**

FACULTY

MICHAEL T. POSTEK, Course Coordinator, is the Senior Scientist in the Engineering Physics Division of the National Institute of Standards and Technology, Gaithersburg, MD. The Engineering Physics Division (EPD) provides dimensional and electronics metrology and standards for advanced manufacturing. The Division's overall strategy is to improve measurement science and to develop the advanced measurements and standards needed by current and emerging science and technology-intensive industries. Previously, Dr. Postek was the Chief of the Precision Engineering Division and Program Manager of the Nanomanufacturing Program in the Manufacturing Engineering Laboratory at NIST. Dr. Postek also functioned as the Assistant to the NIST Director for Nanotechnology and he is both a nationally and internationally recognized expert in nanometrology particularly using the scanning electron microscope (SEM) for nano-particle and semiconductor critical dimension (CD) metrology

Andras E. Vladar, Ph.D. is the leader of the Three-Dimensional Nanometer Metrology Project at the National Institute of Standards and Technology (NIST) USA. He is an expert in scanning electron microscopy (SEM) and dimensional metrology, one the best-known research scientists and a technical leader of this field. His research interest is in SEM-based nanometer-scale three-dimensional measurements for semiconductor and nanotechnology applications. He, over decades of working in his field, has developed international and US SEM-related standards, authored close to hundred publications and several scientific book chapters..

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Registration Form

Workshop on Practical Aspects of Scanning Electron Microscopy (June 26-30, 2017) at the University of Hartford D102.

Name: _____

School: _____

Address: _____

Job Function: _____

Phone: _____ email : _____

Fax: _____ Cell phone: _____

Course Fees: **\$2,495.00**

Payment Options (please print)

- Check (**payable to** Center for Manufacturing and Metrology, University of Hartford)
- Credit Card
 - American Express (CW 4 digits on the front)
 - Discover
 - MasterCard (CW 3 digits on the back)
 - Visa (CW 3 digits on the back)

Please mail/fax/email the completed registration form and payment to

Dr. Chittaranjan Sahay (Director)
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College of Engineering, Technology, and Architecture
University of Hartford
200 Bloomfield Ave.
West Hartford CT 06117-1599

Email: sahay@hartford.edu
Cc: cbudget@hartford.edu (Geraldyn Merrill)

Fax: (860) 768 5073

Website: <http://www.hartford.edu/ceta/manufacturing-metrology/>

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