Course Description

This course is designed for engineering and science employees who need a basic understanding of fundamental nuclear and radiochemistry processes, and their applications in radioactive waste management, the nuclear fuel cycle, nuclear medicine, chemical engineering, and analytical chemistry.

A Course Developed For Varied Backgrounds

- Gain a solid background in the fundamentals and theory of nuclear and radiochemistry.
- Learn the basics of counting statistics for radiochemistry.
- Understand the basics of instrumentation for radiochemistry counting: gamma-ray spectroscopy, alpha spectroscopy, liquid scintillation, etc.
- Understand the principles of radiochemistry in the recycling of spent nuclear fuel.

Course Instructor

Sheldon Landsberger, PhD, is a Professor of Nuclear and Radiation Engineering at The University of Texas at Austin. He is nationally and internationally known for his work in low level gamma-ray counting and the application of neutron activation analysis in environmental research. He has more than 180 peer-reviewed journal publications. For the past 30 years he has been extensively involved in nuclear instrumentation, health physics and radioactive waste management both in teaching and research. He has been a consultant for the International Atomic Energy Agency since 1988 and has travelled to more than 30 countries as an expert instructor in nuclear science and engineering.

Onsite Training

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For further information please call 860-738-2440.
Course Outline

• Atomic structure
  Atomic electron orbital arrangements
  Organization of the periodic table
  Groups and trends on the periodic table

• Nuclear structure and stability
  Decay modes and types of radiation
  The chart of the nuclides

• Radioactive transformation
  Equilibria
  Secular equilibrium
  Transient equilibrium
  No equilibrium

• Decay Modes
  Alpha decay
  Beta decay
  Gamma transitions
  Branching decay
  Spontaneous fissions
  Rare decay modes

• Measurement of nuclear radiation
  Gas-filled detectors
  Scintillation detectors
  Semiconductors
  Alpha spectrometry
  Beta spectrometry
  Gamma ray spectrometry
  Gamma ray low-level counting
  Statistics and errors in counting

• Nuclear reactions
  Transmutation and the production of synthetic radioelements
  Cross-sections of nuclear reactions
  Nuclear fission
  Activation analysis

• Nuclear fuel cycle
  Nuclear reactor radiochemistry
  Reprocessing of nuclear fuels
  Radioactive waste management

• Dating by nuclear methods
  Cosmogenic Radionuclides
  Natural decay series
  Ratio of stable isotopes
  Radioactive disequilibria

• General chemistry applied to radiochemistry
  Actinide chemistry
  Mass balances
  Chemical equations and stoichiometry
  Equilibrium reactions
  Acid/base reactions
  Oxidation/reduction reactions
  Aqueous solubility
  Phase partitioning

Accommodations

This course will be held at the Hilton Baltimore.

A block of rooms has been reserved at reduced rates for course participants. Please make your reservation directly with the hotel by calling 443-573-8700. Please specify that you are attending Technical Management Services’ short course to receive the group rate.

The reserved block of rooms will be released 3 weeks prior to the course (at which time rooms will be offered on an availability basis.

4 Easy Ways To Register....

1. Register online: www.tmscourses.com
2. Call TMS at (860) 738-2440
3. Fax your registration (860) 738-9322
4. Mail the attached form:
   TMS, P.O. Box 226, New Hartford, CT 06057

Name ___________________________________________________
Company_________________________________________________
Address___________________________________________________
City __________________ State ______ Zip ______
Telephone __________________ Fax __________________
Email _____________________________________________________
Course Fee: $1395.00

☐ Bill my company
☐ Charge Credit Card:
  ☐ Visa ☐ Mastercard ☐ American Express

Discounts:
$50 discount if 2 or more people from the same company register...
... take an additional $50 discount if payment is received by July 27th

Continuing Education Credits
The AAHP has awarded 32 credits for this course. Please reference
ID Number 2011-00-013.