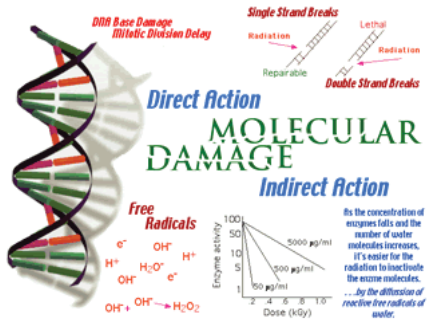
Fundamentals of Radiation Biology and Radiological Risk



This 3-day course covers the effects of ionizing radiation exposure on biological molecules, cells, tissues, and the human body as a system. Both short term and latent effects (such as the production of cancer and leukemia, and genetic effects) and their underlying causes will be examined in detail. Exposures of the embryo and fetus will be evaluated, along with special consideration of internally deposited radionuclides of importance in occupational settings. All of the various radiation bioeffects are put into perspective by an in-depth development of dose response and risk models. New concepts such as the bystander effect will be discussed. Applications of radiological risk in dose reconstruction studies and radiation compensation situations will be presented. Problem solving and discussion sessions will be interspersed among lectures.

Topics

REVIEW OF BASIC CONCEPTS AND UNITS SOURCES OF RADIATION EXPOSURE
- Natural
- Man-made
- Technologically enhanced natural radiation
- Medical

SOURCES OF INFORMATION ON RADIATION BIOEFFECTS RADIOLYSIS OF WATER
- Importance in radiation biology
- Direct and indirect effects
- Importance in DNA damage

MOLECULAR AND CELLULAR EFFECTS
- What the critical molecule is and why
- What the effects are
- Repair mechanisms
- Biological background on important body cells

RADIATION SENSITIVITY OF CELLS, TISSUES, AND ORGANS
- Cell survival curves
- Sensitivity categories

RELATIONSHIPS OF LET, RBE, AND QUALITY FACTOR
- Applications in occupational and compensation cases

ACUTE RADIATION SYNDROME
- Expected response to large, short term doses
- Treatment of large radiation exposures

EMBRYO/FETUS EFFECTS
- Evidence for increased sensitivity
- The effects
- Guidance in medical and industrial exposures to pregnant women (will include case studies)

CANCER INDUCTION
- Evidence for latent effects of cancer and leukemia
- Interpretation of effects
- Update from BEIR VII

INHERITED EFFECTS
- Do they exist?
- Evaluation

DOSE RESPONSE MODELS
- Examination of validity of various models
- Importance for development of risk models

RISK MODELS
- How they are developed
- How they can be used

SPECIAL CONSIDERATIONS
- Internal exposures-Radon (update on EPA's radon risk), Plutonium, Americium and others
- Treatment of internal exposures

BIOLOGICAL DOSIMETERS
- How to determine dose in the absence of good physical dosimetry

GUIDANCE FOR COMMUNICATION OF RADIATION EFFECTS
- Workers, Media, Public

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of Health Physics AAHP

The American Academy of Health Physics (AAHP) has awarded this course 32 continuing education credits.
Assigned ID Number: 2011-00-014

For further information or assistance, please contact:

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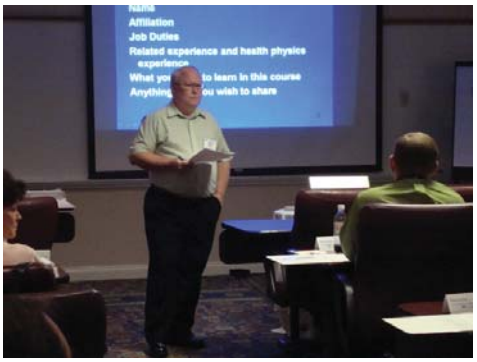
Course Instructor



DR. RODICAN P. REED has over 30 years of experience in health physics. From 1992 to 2007, he was a Senior Health Physicist at the U.S. Nuclear Regulatory Commission (NRC) Technical Training Center. At NRC, he provided health physics training to NRC inspectors, Agreement State inspectors, and other Federal agencies. He was responsible for the uranium fuel cycle technology training curriculum, including uranium mining and milling, health physics, nuclear criticality safety, fire protection, integrated safety analyses (ISA's), and uranium enrichment technologies. He trained fuel facility inspectors and license reviewers as part of the inspector qualification program. He briefed NRC Commissioners, the Office of the Inspector General (OIG), the Atomic Safety and Licensing Board Panel (ASLBP), and the news media, in radiation protection and uranium fuel cycle technology. He developed post-graduate training in radiation protection for the International Atomic Energy Agency (IAEA), which is now in use world-wide. He trained NRC and Agreement State health physics inspectors in the new 10 CFR Part 20. He developed and presented training on health physics for the proposed high-level waste geologic repository at Yucca Mountain.

He is certified by the American Board of Health Physics (ABHP) and is a member of the American Academy of Health Physics (AAHP). Most recently, he was a member of the History Committee of the Health Physics Society (HPS). He is also a past member of the HPS Continuing Education Committee and the Professional Development Committee of the AAHP. He has published papers in health physics, made numerous technical presentations, and prepared input to environmental impact statements (EIS's) for TVA's nuclear power plants and proposed coal gasification facility. He has a B.S. in Physics (1971), M.S. in Nuclear Engineering (1973), and Ph. D. in Health Physics (1977), all from Georgia Tech.

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