Mathematics Review (1.5 hour)
- Basic Mathematical Concepts
- Exponential and Scientific Notation
- Basic Problem Solving
- Dose Calculations

Radiation Dose Units (1.5 hour)
- Roentgen
- Rad
- Rem
- Quality factor

Atomic Structure (1 hour)
- Bohr model
- Chart of Nuclides
- Nuclides and notation
- Isotopes

Types of Radiation (1 hour)
- Alpha
- Beta
- Gamma and X
- Neutrons

Radioactive Decay (1.5 hour)
- Activity
- Decay schemes
- Decay law
- Half-life

Interaction of Radiation with Matter (1 hour)
- Ionizing vs. Non-ionizing
- Ionization and excitation
- Alpha, Beta, Gamma interactions
- Photoelectric, Compton, pair production
- Photon exposure rate; shield calculation
- Half-value layers

Shielding (1.5 hour)
- Time, distance, and shielding
- Inverse square law
- Linear and Mass Attenuation Coefficients

Biological Effects (1 hour)
- Internal Exposure to Radionuclides
- Physical/Chemical Mechanics of Injury
- Acute Radiation Injury
- Long Term Effects
- Genetic Effects
- Teratogenic Effects
- Carcinogenic Effects
- Background Radiation

Regulatory Control (4 hours)
- Title 10 Code of Federal Regulations
- Agreement states
- Licensing and Compliance procedures
- General and specific license
- Installation and Relocation of gauges

Shipping Radioactive Material (1 hour)
- Packaging and Labeling
- IATA/ICAO
- Packaging and Shipping of gauges
- Title 49 Code of Federal Regulations

Radiation Protection Program-ALARA (2 hour)
- ALARA statement
- Radiation Protection Program
- Operating, safety, and emergency procedures
- Compliance with dose limits
- Employee notification
- Record keeping
- Posting
- Reporting

Radiation Detection (1 hour)
- Fundamentals of detection
- Instrument characteristics, use, and limitations
- Survey meters

Personnel Monitoring (1 hour)
- Requirements
- Film badges, TLDs, etc.

Industrial (1 hours)
- Industrial device installation
- Surveying & leak testing demonstration
- Industrial applications

Closed-book: Written Exam on Lectures and Homework Assignments (2 hours)

Note: A minimum 2 hours of homework is assigned each evening during the course.