# Nevada Technical Associates, Inc.
# Radiation Safety Officer with Medical Emphasis
# Course Outline

Starting time: 8:30 each day.
The topics below will be more or less evenly distributed over the duration of the course.

1. Introduction

    a. Course objectives and schedule
    b. Origins of nuclear science
    c. Atomic structure, isotopes, nuclear stability
    d. Natural and man-made radiation sources

2. Radioactive Decay Processes

    a. Alpha emission
    b. Beta emission
    c. Gamma emission
    d. Other decay processes
    e. Statistics of radioactive decay

3. Interaction of Radiation with Matter

    a. Modes of interaction
    b. Heavy charged particle interactions
    c. Beta particle interaction
    d. Neutron interaction
    e. Photon interaction

4. Radiation Detection and Measurement

    a. Gas-filled chambers (Ion Chambers, GMs, Dose Calibrators)
    b. Scintillation detectors (NaI, Well Counters)
    c. Semi-conductors
    d. Photographic emulsions
    e. Dose Calibrator QA

5. Biological Effects of Radiation

   a. Radiation quantities and units
   b. Quality factors
   c. Biological effects
   d. Mechanisms of biological damage
   e. Acute, whole-body and skin effects
   f. Risk of stochastic effects
   g. Fatality rates in various industries

6. Shielding

   a. Charged particle shielding (Nuclear Medicine/PET)
   b. Photon shielding (X-Ray Facilities)
   c. Neutron shielding (Linear Accelerators)
   d. Facility shielding

7. Radiation Dosimetry Devices and Methods

   a. External monitoring
   b. External dose evaluation
   c. Internal monitoring
   d. Internal dose assessment
   e. Patient Dosimetry

8. Federal and State Regulations

   a. Chronology of standards
   b. Sources of standards, recommendations and requirements
   c. Regulatory Bodies (NRC, FDA, JCAHO, DOH)
   d. Current regulations (10 CFR 20, 10 CFR 35)
   e. Licensing procedures
   f. Human Subject Research Requirements
   g. Security Requirements/Increased Controls

9. Radiological Safety Surveys, Records and Documentation

   a. Surveys and inspections (Nuclear Medicine, Radiation Therapy)
   b. Radiological Controls and ALARA
   c. Records and documents (Dose tracking, Written directives)
   d. Operating and emergency procedures and document control

10. Radioactive Material Transportation and Disposal Regulations

    a. Applicable regulations
    b. Categories, packaging and limits
    c. Manifests, records, markings, and labels
    d. Radwaste disposal methods, sites, records and regulations

11. Radiological Emergencies

    a. Definitions, classifications and phases
    b. Notifications and assistance
    c. Response: patient decontamination and medical evaluations
    d. Review of accident causes and recent accidents

12. Therapeutic Uses of Radiation
    a. Linear Accelerators
    b. LDR (Prostate, GYN, Eye Plaque)
    c. HDR
    d. Gamma Knife
    e. I-131
    f. Microspheres
    g. Written Directives
    h. Dealing with Radioactive Patients

13. Fluoroscopy Safety
    a. Factors affecting patient and staff dose
    b. Credentialing of Fluoroscopy Users

14. RSO Responsibilities
    a. NRC/State requirements
    b. Training

15. Additional Resources

16. Course exam