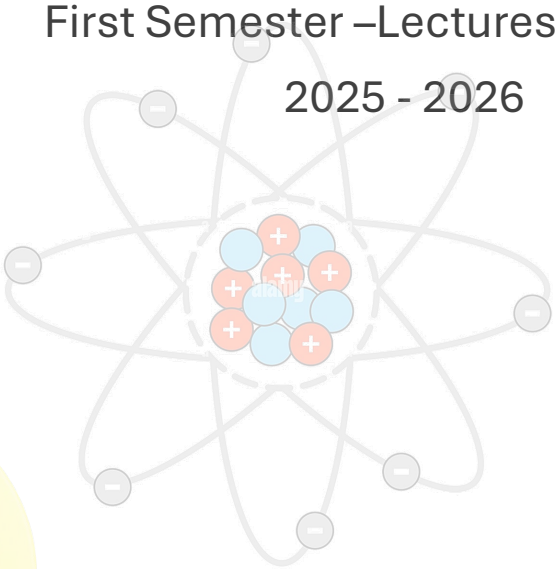
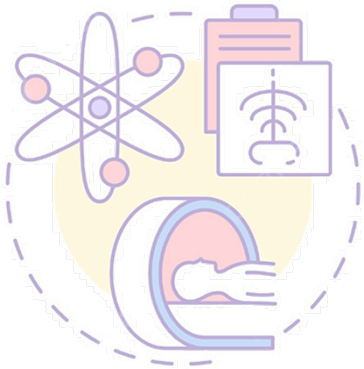
Radiation Protection

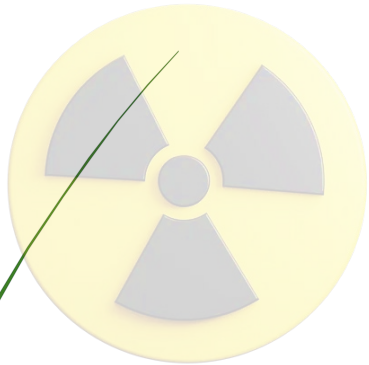
The Second Stage

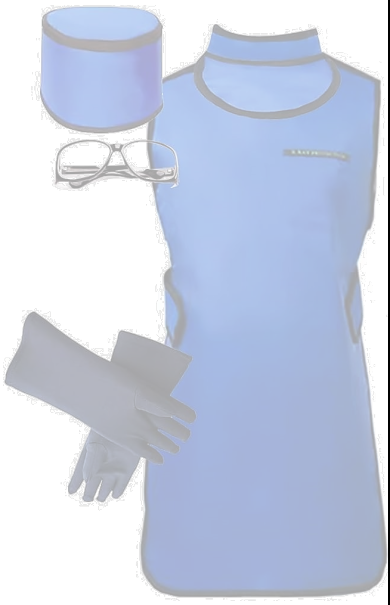
First Semester –Lectures No. 7,8,9

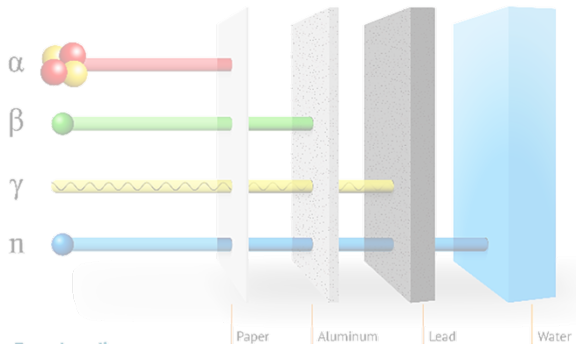
2025 - 2026











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Radiation Hazards
Radiation Measurements
Devices & Detectors

OUTLINES:

- ❖ **Radiation Hazard Evaluation Devices.**
  - ✓ **Area Monitoring Devices.**
    - ➢ **Personnel Monitoring Devices.**

- Measurement: The emitted light is measured using a photomultiplier tube or similar device. This measurement allows for the determination of the radiation dose that the TLD was exposed to.

4) Optically stimulated luminescent dosimeters (OSL):

They are passive radiation detection devices used for personal dose monitoring.

Unlike thermoluminescent dosimeter (TLD). OSL does not need heating for the reading of radiation dose. OSL dosimeters can be read multiple times and stored for several years.

OSL responds to a wide range of energies from 5 keV to 40 MeV for photons and from 150 keV to 10 MeV for beta radiation.

Calibration and Reading of TLD and OSL Dosimeters

Calibrating TLD dosimeters involves comparing their measurements against known radiation sources to ensure accuracy in readings. The readout process includes heating the TLD to release the stored energy as light (in case of OSL the heating process replaced with strong light source such as laser light), which is then measured using photomultiplier tubes. Proper handling and storage of TLD material, from manufacturing to analysis, is essential to maintaining their accuracy and reliability in measurements.

Advanced software is often employed to analyze the glow curve data, enhancing the precision of dose calculations. The meticulous calibration and reading processes underscore the importance of TLD technology in various applications, particularly in health and safety sectors.

Detection limit for TLD and OSL

The detection limit for the dosemeter, under laboratory conditions, is less than 10 micro-sieverts (μSv), better than other passive dosemeters.