The purpose of the lecture is to review our current understanding of one-dimensional relative dose measurement for therapeutic electron and photon beams. Emphasis will be placed on problematic areas when electron equilibrium is not present, such as small field dosimetry, near-surface depth dose, penumbra, and 1D dosimetry for intensity modulated beams. Thimble and parallel-plate ionization chambers and solid-state detectors will be examined. These detectors are suitable for point measurement or relative dosimetry for static beam if there is electron equilibrium. Their restrictions under electron disequilibrium are examined using the concept of detector response curve. This concept can be correlated to gradient correction, detector displacement correction, and electron fluence correction used in absolute dosimetry. These correction factors can be used to extrapolate dosimetric quantities from measurements under electron disequilibrium. Other factors (such as energy, dose rate, accumulative dose) that affect detector sensitivity, especially diode detector, will be examined. For dosimetry of dynamic intensity modulated beam, detector array made of diodes or ionization chambers is reviewed. Specific dosimetric issues for the detector array, such as relative sensitivity calibration, detector location dependence, and data acquisition electronics for detector array, will be discussed.

Educational Objectives:

1. Understanding the perturbation effects for one-dimensional relative dosimetry.
2. Reviewing the concept of detector response curve and its application to dose profile, near-surface depth dose, and small field output dosimetry.
3. Commissioning of detector array for relative dosimetry of static and dynamic beams.