Hadrontherapy includes radiation therapy using neutrons, pions, protons and other heavier charged particles. The motivations for the use of these radiations are a desire to improve dose localization and/or to utilize the benefits of high-LET radiation. The enthusiasm for different types of hadrontherapy waxes and wanes depending on recent clinical results and technical advances. This course will review the basic physics of each of the radiation types and the rationale for their use. The means by which the radiation is produced will be reviewed in conjunction with a discussion of the advantages and limitations of each. The dosimetric equipment and techniques, the treatment planning strategies, and the dose delivery methods will be described for each radiation type. Comparisons will be made between the dose distributions that can be achieved with hadrons and with x-rays or electrons. Differences in the radiobiological qualities of each type will also be compared. A brief historical review of hadrontherapy will be presented along with a description of current and planned facilities throughout the world. Although this lecture will not be an in-depth discussion of clinical results, summaries of some clinical indications of each type of radiation will be presented, along with a discussion of the degree to which each has lived up to its promise. Although hadrontherapy is often dismissed as a fad or an obscure niche, tens of thousands of people have been treated worldwide. Continued development of production and beam delivery technology is leading us to the time when such treatments will be available to a large number of people worldwide. The educational objectives of this refresher course are as follows:

1. to provide an understanding of the rationales for the different types of hadrontherapy;
2. to put the development of hadrontherapy into an historical perspective relative to other forms of radiotherapy;
3. to provide a background in the generation of hadron therapy beams the associated dosimetry, and the beam delivery systems;
4. to bring the students up to date on the current state of hadrontherapy in the world;
5. to provide a basis for comparing the relative benefits and costs in using these therapies relative to conventional radiotherapy modalities.