The purpose of this lecture is to acquaint clinical physicists with basic MRI equipment and to discuss current equipment trends. A variety of different magnet designs are now becoming commonplace. These include newly-designed **A**small-footprint@superconducting magnets which produce horizontal magnetic fields and open-design permanent and resistive magnets which generally produce vertical magnetic fields. Superconducting magnets are now typically provided with refrigeration and active shielding. Refrigeration has significantly lengthened the interval between cryogen replenishment (up to 1 year). Active-shielding minimizes site preparation concerns and often precludes the need of passive shielding for fringe-field containment. The various magnet designs will be discussed in terms of associated trade-offs, including site preparation, fringe field containment and RF shielding. RF subsystems, including different types of RF coils, will be discussed, along with recent improvements in gradient technology.

Educational Objectives:

- 1. To understand trade-offs between different types of MR magnets
- 2. To be aware of factors affecting S/N of RF coils
- 3. To understand advancements in gradient technology and how image quality is affected