Recent years have seen a technological revolution in radiation oncology. Enhanced use of imaging combined with computer-controlled methods of dose delivery provide a capability of escalating tumor doses without increasing morbidity. A pivotal component of this modern technology is the computerized radiation treatment planning system which is used to develop optimal treatment techniques. Modern treatment planning systems make increased use of images, possibly from various imaging modalities, enhanced 3-D displays, sophisticated dose calculation algorithms, complex treatment plan evaluation tools, combined with the generation of images (e.g., digitally reconstructed radiographs) which can be used for treatment verification. In addition, the implementation of intensity modulated radiation therapy has added a further complexity to the radiation treatment planning system and this is combined with automated optimization routines which are essential if intensity modulated radiation therapy is going to be used to its best advantage. A thorough commissioning of a modern 3-D radiation treatment planning system has become a daunting task. This refresher course will review issues associated with the commissioning and quality assurance of a modern radiation treatment planning system. The specific objectives of this refresher course are:

1. To review the major functionality of a modern radiation treatment planning system.
2. To describe generic quality assurance concepts.
3. To provide an overview of commissioning a modern radiation treatment planning system.
4. To provide an overview of the quality assurance associated with a modern radiation treatment planning system.

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