

GMC Imaging Physics Curriculum

1. Module 1: X-ray Production
 - a. Part 1: The anode and the cathode
 - b. Part 2: Anode angle, heel effect, and filtration
 - c. Part 3: X-ray beam quantity and quality
2. Module 2: X-ray Projection Imaging
 - a. Part 1: Photon interactions and differential absorption
 - b. Part 2: Subject contrast, scatter, and the grid
 - c. Part 3: Magnification and distortion
3. Module 3: Digital Radiographic Imaging
 - a. Module 1: Detector target dose
 - b. Module 2: Digital radiographic detectors and artifacts
 - c. Module 3: Pixel size, bit depth, and image processing
4. Module 4: Image Quality
 - a. Module 1: Digital image sampling and display
 - b. Module 2: Spatial resolution, contrast, and noise
 - c. Module 3: Image quality scenarios
5. Module 5: Mammography
 - a. Module 1: Target-filter combinations and compression
 - b. Module 2: Detectors, grids, magnification, and artifacts
 - c. Module 3: Average glandular dose and MQSA quality control requirements
 - d. Module 4: Tomosynthesis and stereotactic breast biopsy
6. Module 6: Fluoroscopy
 - a. Module 1: Fluoroscopy detectors and artifacts
 - b. Module 2: Automated exposure rate control and operating modes
 - c. Module 3: Skin effects, dose metrics, and monitoring
 - d. Module 4: Radiation safety and image quality
7. Module 7: Computed Tomography
 - a. Module 1: Data acquisition and reconstruction
 - b. Module 2: Operating modes and technique factors
 - c. Module 3: Dose metrics
 - d. Module 4: Tube current modulation and protocol optimization
 - e. Module 5: Artifacts and advanced imaging techniques
8. Module 8: Nuclear Medicine:
 - a. Module 1: Decay modes, activity, and half-life
 - b. Module 2: Methods of radionuclide production
 - c. Module 3: Instrumentation
 - d. Module 4: Planar and SPECT imaging
 - e. Module 5: PET Imaging
 - f. Module 6: Internal dosimetry and regulatory requirements
9. Module 9: MRI
 - a. Module 1: Precession, excitation, and relaxation

- b. Module 2: Spin echo and signal localization
 - c. Module 3: Gradient echo and imaging time
 - d. Module 4: Artifacts and MRA techniques
 - e. Module 5: Advanced MR imaging techniques and MR Safety
10. Module 10: Ultrasound
- a. Module 1: Sound propagation, the transducer, and interactions with tissue
 - b. Module 2: Pulse echo imaging, spatial compounding, and tissue harmonics
 - c. Module 3: Doppler imaging and US artifacts
11. Module 11: Radiation Biology
- a. Module 1: Cellular interactions and tissue sensitivity
 - b. Module 2: Stochastic and Deterministic effects
12. Module 12: Radiation Safety
- a. Module 1: Dose Metrics and typical doses
 - b. Module 2: Background dose, dosimetry, and radiation protection principles