Diagnostic Part III Oral Exam is designed to test the candidate knowledge and fitness to practice applied medical physics in the specified specialty independently and safely. The exam covers five diagnostic imaging and interventional categories. You will be examined by three to five medical physics examiners selected as part of the examination faculty. Each examiner will ask one question from each of the five imaging physics categories of the exam.

Diagnostic and Interventional Medical Physics Oral Exam Categories

The Part III exam tests the candidate competences in fundamental modality knowledge and the ability to apply such knowledge to the clinical environment and mastering the quality and safety expectations from each modality. The five categories include:

Category 1. Radiation biology, dosimetry, protection, and safety

- Bio-effects of ionizing and non-ionizing radiation in imaging, evaluation of radiation risk, and age/gender-specific risks.
- Radiation protection principles, standards and units, patient specific radiation dosimetry, detection methods and regulatory requirements.
- Radiation shielding design factors, barrier requirements, area surveys, and survey reports
- Patient safety and error-prevention issues, including dose reduction, recording and reporting doses, dose management and optimization, sentinel events, and MR- and US-specific safety requirements

Category 2. Informatics, image display, image fundamentals, professionalism and ethics

- Informatics system building, applicable standards, data and patient information security
- Networks, PACS connectivity, workflow, image display, storage and archive functions
- Image display standards, vendor variations, and calibration procedures
- Displayed image processing techniques, reformation and qualitative data extraction
- Image fundamentals, sampling theory, and ROC analysis
- Professionalism and ethics in clinical medical physics practice

Category 3. General radiography, mammography, fluoroscopy, and interventional imaging

- X-ray tubes, X-ray production, X-ray beam characteristics, beam interactions with matter, image-formation principles, image acquisition and related variations
- Types and characteristics of imaging detectors, performance and optimization
- Clinical protocols for common imaging exams, image metrics, quality and dose management
- Fluoroscopy and interventional procedures, including acquisition parameters, special safety considerations and dose reduction strategies
- Image contrast, resolution and noise assessment and dose assessment for all projection imaging modalities.
- Modality specific image artifacts, quality assurance program, modality quality control, mammography accreditation, and mammography quality standards

Category 4. Computed tomography

- CT specific X-ray tube, generator and detector; design and characteristics
- CT scanning geometry and principles of operation; image-acquisition parameters, reconstruction algorithms, acquisitions modes, including helical acquisition, tube current modulation techniques and Cone beam geometry
- CT Image optimization, quantitative CT Post-processing protocols, multi-planar and volumetric reconstruction
- Image quality assessment, noise, resolution, dose metrics (CTDI, DLP, SSDE), patient size and gender specific effective dose estimation
- Potential CT artifacts, quality assurance program, and CT accreditation and quality standards.

Category 5. Ultrasound and MR imaging

- Physical principles of Ultrasound (US), beam formation and properties, transducers characteristics, acquisition methods, signal formation and processing, and image display
- Doppler US and color flow imaging principles and operation
- Principles of magnetization, resonance, excitation, signal formation and contents, and MR equipment; structure and function of scanner components.
- MR contrast formation, pulse sequences, localization, acquisition, processing and protocol development
- Common artifacts for MRI and US, quality assurance, MRI and US quality standards