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# Subspecialty Program for Technologists

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The Medical Imaging has been a distinct medical specialty with unique technical challenges from its inception and its technology has evolved in an exponential manner. Nowadays, Medical Imaging is a key diagnostic tool for many diseases and has an important role in monitoring treatment and predicting outcome. However, this technology is operated by Human Resources and remains dependent on the qualification of the human capital.

In this connection, and with a great appreciation of the Technologist role throughout the diagnosis process, Medical Professionals has invested in the development of CT, MRI and X-ray subspecialty training programs with the intent to develop experts in those areas whom can serve as valuable asset to their peers, hospitals and patients.

Each one of those subspecialty training programs is delivered over 200 hours in total - broken-down as follows: 100 hours of theory, 50 hours of post-processing practice on the workstation and 50 hours of hands-on training on the equipment.

The complete program is scheduled to be delivered over 8 weeks and designed to accommodate a group of 12 participants maximum in order to maintain the desired level of interactivity and personal experience.



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# MRI Subspecialty Program

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## Learning Objectives

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- Understand the basic physics and evolution of MRI scanner's generations
- Identify normal anatomy
- Apply proper positioning and scanning protocols for all MRI procedures
- Evaluate image quality and properly adjust the imaging parameters
- Apply international safety guidelines for the patients, self and others
- Provide proper patient care and comfort
- Recognize emergency patient conditions and initiate life-saving first aid and basic life support procedures

## Program

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### Overview: 30 hours

- System accessories
- Magnet controls and safety features
- Operation of the scanner interface
- How to build scan protocols and review scan parameters

### Patient handling and safety: 15 hours

- Patient education and preparation
- Injection protocols and manipulation
- Patient screening
- Lab values
- Safety guidelines and consent forms
- Ways to minimize scan time
- Patient monitoring and code procedures
- Vital signs
- Infection control

### MRI scan procedures, anatomy, image quality control: 55 hours

- Routine cases, i.e. : neuro, MSK and body imaging, routine brain, cervical, dorsal, lumbar, IAC, orbits and pituitary, knee, shoulder, elbow, wrist, ankle, foot, hips, pelvis, abdomen, liver, pancreas MRCP, prostate, long bones ( femur or leg ), epilepsy and MS protocols and breast
- Contrast enhanced and non-enhanced vascular imaging: angio circle of Willis and brain MRV, MRA of carotids, renal arteries, pulmonary arteries, lower limb angio or distal run-off
- Advanced cases, i.e. : spectroscopy, diffusion tensor imaging, brachial plexus, enteroclysis, brain perfusion, and cardiac imaging

### Hands-on training: 50 hours

- Routine cases, i.e. : neuro, MSK and body imaging, routine brain, cervical, dorsal, lumbar, IAC, orbits and pituitary, knee, shoulder, elbow, wrist, ankle, foot, hips, pelvis, abdomen, liver, pancreas MRCP, prostate, long bones ( femur or leg ), epilepsy and MS protocols and breast
- Contrast enhanced and non-enhanced vascular imaging : angio circle of Willis and brain MRV, MRA of carotids, renal arteries, pulmonary arteries, lower limb angio or distal run-off using the available ptions.
- Advanced cases, i.e. : spectroscopy, diffusion tensor imaging, brachial plexus, enteroclysis, brain perfusion, and cardiac imaging.

### Workstation Skills : Hands-on post processing: 50 hours

- Basics functionality
- Reformat tools
- 3D reconstruction
- Fibertrack
- Volume rendering
- DWI and ADC calculation
- Brain perfusion
- Spectroscopy single and multi-voxel
- Cardiac
- Breast graph of wash in wash out



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# CT Subspecialty Program

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## Learning Objectives

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- Understand the basic physics and evolution of CT scanner's generations
- Identify normal anatomy
- Apply proper positioning and scanning protocols for all CT procedures
- Evaluate image quality and properly adjust the imaging parameters
- Apply international radiation protection norms for the patient, self and others
- Provide proper patient care and comfort
- Recognize emergency patient conditions and initiate life-saving first aid and basic life support procedures

## Program

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### Overview: 30 hours

- System accessories
- Physics and evolution of the scanner
- Gantry controls and safety features
- Operation of the scanner interface
- How to build scan protocols and review scan parameters

### Patient handling and safety: 15 hours

- Patient education and preparation
- Injection protocols and manipulation
- Patient screening
- Lab values
- Radiation safety and measuring radiation dose
- Ways to minimize patient dose
- Patient monitoring and code procedures
- Vital signs
- Infection control

### CT scan procedures, anatomy, image quality control: 55 hours

- Routine cases, i.e. : brain scan, high resolution chest, sinuses, standard chest and abdomen examinations
- Cases with contrast media injection, i.e. : brain, neck, chest, abdomen pelvis, triphases liver, pancreas
- Vascular cases, i.e. : circle of Willis, carotids, pulmonary embolism, aorta angiography, abdominal arteries, lower limbs
- CT cardiac
- CT colonography
- CT perfusion

### Hands-on training: 50 hours

- Routine cases, i.e. : brain scan, high resolution chest, sinuses, standard chest and abdomen examinations
- Cases with contrast media injection, i.e. : brain, neck, chest, abdomen pelvis, triphases liver, pancreas
- Vascular cases, i.e. : circle of Willis, carotids, pulmonary embolism, aorta angiography, abdominal arteries, lower limbs
- CT cardiac
- CT colonography
- CT perfusion

### Workstation skills: Hands-on post processing: 50 hours

- Basics functionality
- Filmer, burn CD / DVD
- Reformat
- Tools
- Vessel analysis
- 3D reconstruction
- Cardiac
- Colonography
- Bronchography
- Perfusion
- Nodule detection
- CT image anatomy



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# X-Ray Subspecialty Program

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## Learning Objectives

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- Understand the basic physics and mechanism of the production of x-ray
- Understand and demonstrate proper patient positioning for successful x-ray examinations and procedures
- Identify normal anatomy
- Effectively use of proper protocols
- Evaluate image quality
- Apply international radiation protection policies and procedures
- Provide proper patient care and comfort
- Recognize emergency patient conditions and initiate life-saving first aid and basic life support procedures

## Program

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### **Overview: 25 hours**

- Radiology physics
- Introducing the x-ray systems
- Digital detectors
- Accessories including radiation protection devices
- Radiation protection overview

### **Anatomy for basic radiography: 25 hours**

- Introduction of the whole body anatomy
- Definitions of the body general positions

### **Radiology technique: 25 hours**

- Radiology techniques & positioning
- Radiology protocols and parameters

### **Radiology image customization: 15 hours**

- Radiology image processing & post-processing
- Radiology image enhancements
- Archiving, networking, and printing

### **Radiology quality control procedures: 10 hours**

- Quality control procedures
- Image quality

### **Radiology procedures ( using fluoroscopic guidance ): 25 hours**

- Barium studies including : barium meals, upper GI barium studies, small intestines barium studies, barium enema studies for large colon...
- Other types of contrast media procedures : urethrograms, VCUGs, PTC, nephrostograms, hysterosalpingiograms, joints arthrograms, picc line insertions
- Gastro-endoscopy studies : ex: ERCP

### **Hands-on training: 75 hours**

- Covering most cases indicated & all the routine cases & body part examinations.