"This prospectus is made under the provisions of the Universities Act, the Postgraduate Institute of Medicine Ordinance, and the General By-Laws No. 1 of 2016 and By-Laws No. 2 of 2016 for Degree of Doctor of Medicine(MD) and Board Certification as a Specialist"

POSTGRADUATE INSTITUTE OF MEDICINE

UNIVERSITY OF COLOMBO, SRI LANKA

PROSPECTUS

DOCTOR OF MEDICINE (MD) AND BOARD CERTIFICATION

IN

GENERAL RADIOLOGY

BOARD OF STUDY IN RADIOLOGY

2015

Content

Annexes

DOCTOR OF MEDICINE (MD) AND BOARD CERTIFICATION

IN GENERAL RADIOLOGY

1. Nomenclature

- Full title: Doctor of Medicine and Board Certification in General Radiology
- Abbreviated title: MD and BC in Radiology
- University: University of Colombo
- Faculty / Institute: Postgraduate Institute of Medicine
- Departments: Board of Study in Radiology, Specialty Board in Neuroradiology, Specialty Board in Paediatric Radiology, Specialty Board in Interventional Radiology and Specialty Board in Nuclear Imaging

2. Background and justification / introduction

This is a 3-part training programme conducted by the PGIM's Board of Study in Radiology, for those who wish to specialize in the field of General Radiology. The training programme was first introduced in 1981 and since then, it has been reviewed and revised on several occasions to meet the changing needs of the country and taking into account advances in the technology used for radiological diagnosis and image guide treatment modalities

3. Eligibility for entry into training programme

Entry to the MD Radiology training programme is based on the results of a competitive Selection Examination conducted by the Postgraduate Institute of Medicine.

Prospective applicants must satisfy the following requirements:

a. A medical degree registered with the Sri Lanka Medical Council
b. Satisfactory completion of internship acceptable to the Sri Lanka Medical Council
c. Satisfactory completion of one year of work experience in a public / private sector institution in Sri Lanka, after completion of internship
d. Comply with any other General Regulations laid down by the PGIM, which are relevant to selection of trainees.

The criteria prescribed in paragraphs a) to c) must have been satisfied by the applicants as at the date of closure of applications. If a shortfall has occurred due to any reasons, including sick leave, maternity leave or any other form of leave, the doctor concerned should complete such shortfall in order to become eligible to apply for the selection examination.

4. Selection Examination

4.1 The content areas

The examination will be based on the following subject areas:

- Anatomy
- Physiology
- Pathology
- Medicine
- Surgery
- Paediatrics
- Obstetrics and Gynaecology
- Radiology
- Statistics

The detailed syllabus for the Selection Examination is shown in **Annex 1**

The number of questions from each area may vary from 1- 10

4.2 Components and Format of the Selection Examination

The selection exam will take the form of a 2 hour paper with 40 Multiple Choice Questions of the True / False type. Each correct answer will get a positive mark and each wrong answer will get a negative mark. The maximum mark for each question shall be 5 and minimum 0. Negative marks will not be carried over to the next question.

A panel of 5 – 9 examiners shall be appointed by the Senate on the recommendation of the Board of Study in Radiology and the PGIM Board of Management to set the MCQ paper.

The examination panel shall consist of subject specialists as well as clinical specialists who are eligible to be examiners according to the criteria laid down by the Post Graduate Institute of Medicine.

4.3 Requirements to pass the selection exam:

In order to pass the selection examination, a candidate should obtain 50% or more for the MCQ paper.

4.4 The permitted number of attempts at the selection exam is unlimited.

5 Number to be Selected for Training

Available training opportunities will be indicated by the PGIM in the public circular for the Radiology Selection Examination. The number of training slots will be predetermined each year by the Board of Study in Radiology and approved by the Board of Management in consultation with the Ministry of Health. This predetermined number will be selected from among those who have passed the Selection Examination, in rank order of merit and in compliance with the General Regulations of the PGIM.

6 Outcomes and Learning Objectives

The aim of this training programme is to produce competent Radiologists capable of functioning as specialists in the field**.**

At the end of the training programme the trainee should have

1. Acquired knowledge and skills required to serve in all categories of health care institutions in Sri Lanka.
2. developed professional attitudes towards delivering optimum radiological services
3. Developed the ability of decision making as a Radiologist which is required to manage a department of radiology.
4. Developed capabilities of working in a team conducting original research of a quality that makes a significant contribution to development of the discipline and satisfies peer review and merits publication.

7 Content areas

The content areas in which trainees are expected to gain expertise prior to the MD Radiology, Part 1 and Part II examinations are shown in **Annexes 2 and 3** respectively; that for post-MD training is shown in **Annex 4**.

8 Structure of training programme

The training program consists of six stages conducted over a total of 60 months: 36 months of pre-MD training and 24 months of post-MD training.

Stage I - Pre MD Part 1 training period (1st year, 12 months including Orientation Programme)
Stage II - MD Part 1 Examination
Stage III - Pre MD Training – 2nd and 3rd years (24 months)
Stage IV - MD Examination
Stage V - Post MD training - Local (12 months)
- Overseas (12 months)
Stage VI – Pre Board Certification Assessment.

The MD Part I Examination is held at the end of the first 12 months of local training and MD Part II Examination is held at the end of 36 months of local training. This is followed by a one year post MD training rotation at recognized local training centres and one year at a recognized centre overseas. After completion of all five stages of the training program, Pre Board Certification assessment shall be held.

A trainee who passes the Pre-Board Certification Assessment and fulfil other requirements of the PGIM shall be eligible to be recommended for the board certification as a Specialist in General Radiology or in particular subspecialty in Radiology as the case may be.

8.1 Pre-MD training programme

8.1.1 Allocation of training placements

Candidates who pass the Selection Examination and are selected for training in General Radiology (herein after referred to as trainees) will be placed in training centres accredited for pre MD training.

Placements for pre-MD training are made at an Allocation Meeting. A list of available training slots in each centre shall be made available to trainees. Allocation is based strictly on the merit of the selection examination of that year.
To commence in-service training, the trainee shall report to the allocated centre of training within one month from the date of allocation meeting. Failure to do so without a valid reason acceptable to BOS in Radiology and PGIM will result in cancellation of selection of the trainee for the training programme.

Trainees shall not be allowed to change the training rotations/centres to which he /she was allocated at the commencement of training.

8.1.2 Orientation Programme

At the beginning of 36 months of pre-MD training, each trainee will have to undergo a one-month Orientation Programme, according to the schedule specified by the Board of Study in Radiology. This will consist of introductory lectures and training under the direct supervision of a Trainer/s.

(Lecture schedule of Orientation Programme **Annex 5**

8.1.3 List training placements in 1st year(pre-MD Part I), 2nd year and 3rd year(pre-MD Part II)

8.1.4 Short Training Rotations in selected specialized areas

Trainees who are allocated to training centres which do not have the facilities in certain specialized areas in Radiology (MRI, Nuclear Medicine, Paediatric Radiology, etc) will be given an opportunity to choose a rotation to undergo training in training centers where the said facilities are available.

Training rotation is in **Annex 6**

Choice of such rotation is based on the following criteria.

The trainee will have a choice in selecting the rotation

- For Year 1 of pre-MD training, according to the order of merit at the Selection Examination.
- for Year 2 and Year 3 of pre-MD training according to the order of merit at the MD Radiology Part I examination.
- Candidates who were unsuccessful in their first attempts of the respective examination/s will be placed at the bottom of the merit list.

Trainees are required to follow the entire duration of the MD Radiology course with minimum of 80% attendance in each component of the training. Trainees who are unable to fulfil this requirement due to a valid reason shall be given a chance to repeat the required appointment/s by the Board of Study.

9 Learning activities during pre-MD training

9.1 Main Activities

An appraisal based training programme will be conducted at the training centres recognized by the Board of Study in Radiology. It shall comprise of

(a) in service training in radiology

(b) lectures/ film viewing sessions and tutorials

(c) documentation in log books/ case books / portfolios

(d) participation at clinico-radiological meetings and journal club meetings

(e) conducting audits/ research

(f) periodic assessments and appraisals

9.2 Learning Approaches

- shall follow a systematic full time training program
- shall be practice based
- shall adopt Integrated theoretical and practical (clinical) approaches
- emphasis on self- learning
- shall focus from general to more specialized areas

Research Project

Trainees shall apply basic research methodology and carry out a research project relevant to radiology during the training program.

A project proposal prepared as per guidelines given in **Annex 7** shall be submitted to the Board of Study in Radiology for approval prior to the commencement of the study. The proposal shall be evaluated by an evaluator appointed by the BoS (**Annex 8)** and report submitted. Based on the report it has to be approved with or without modifications.

10 Trainers and training units

10.1Trainers and supervisors

Board Certified Radiologists, with at least 3 years experience after Board Certification as a Specialist in Radiology, and serving in training units currently accredited by the Board of Study in Radiology as suitable for MD training, will be appointed as trainers.

10.1.1 Designated Supervisor

At the beginning of the training programme each trainee is assigned to a supervisor (hereafter referred to as 'designated supervisor'). This will be done at the allocation meeting.

The designated supervisor is responsible for overall supervision of his/ her trainee's attendance, punctuality, attitudes, good conduct of work and academic progress for duration of pre MD training.

10.1.2 Responsibilities of the Trainers

Trainers and Designated supervisors are responsible for monitoring the trainee's progress and ensuring that any learning and other difficulties are identified and rectified as early as possible. Clinical supervisors (other consultants and specialists of relevant field who work frequently with the trainees and closely involved in their training) will also monitor the trainee's progress.

Further details on Trainer responsibilities are given in **Annex 9**

10.2 Training Centres

The training shall be conducted in training centres accredited by the Board of Study in Radiology as suitable for training in Radiology.

Training centres and units available at present are listed in **Annex 10**

10.2.1 Pre MD Training Centres

Main training centre is the radiology training centre at National Hospital of Sri Lanka.

Other accredited centres for Radiology training are Radiology training centres at Teaching Hospitals – Kandy, Peradeniya, Karapitiya, Colombo South, Colombo North and Sri Jayawardenapura.

Pre MD training shall be at main training centre and /or at other accredited centres.

Accreditation of training centres has to be done periodically according to the regulations laid down by the BOS in Radiology and PGIM.

10.2.2 Post MD Training Centres

Post MD training shall be at training centres defined in 3.1 and in peripheral training centres recognized by the Board of Study in Radiology.

A 'peripheral training centre' is a Radiology Division in a Provincial General Hospital and /or in a District General Hospital with facilities acceptable to the Board of Study in Radiology.

10.2.3 Accreditation of Training Centres

Accreditation of training centres has to be done periodically according to the regulations laid down by the BOS in Radiology and PGIM.

The recognition of new centres and re-evaluation of existing centres for MD (Radiology) training shall be considered by the Board of Study and will be guided by reaccreditation criteria laid down by BOS and PGIM, facilities and clinical material for training and availability of trainers at these centres. **Annex 11**

11 Monitoring progress during pre-MD training

Various methods are used to monitor and document the progress of the trainee during the programme.

1. Pre MD Log Book

Minimum number of entries is specified.

Each trainee has to maintain a log book during the pre-MD training. This has to be done according to the format given by the Board of Study and in the form of a detachable loose folder.

Instructions to maintain a Log Book and format of the Log Book are available in Annex 12

2. Progress Reports

Progress reports at 6 monthly intervals shall be forwarded by the trainers to the Director/ Postgraduate Institute of Medicine during the entire training program.
Progress report - For pre MD training - **Annex 13**

Progress report - For post MD training - **Annex 14**

3. Peer Team Rating (PTR) forms

Satisfactory Peer Team Rating (PTR) forms shall be completed and return to the Director/ Postgraduate Institute of Medicine every six months as specified in the general rules of the Postgraduate Institute of Medicine.
Peer Team Rating (PTR) forms **Annex 15**

4. Periodical appraisals during pre MD training

Appraisal is designed as a positive process to give trainees a feed back on their performance to monitor their continuing progress and to identify the needs of trainees.

Appraisers are the designated supervisor and an external assessor who is a trainer appointed by the BoS in Radiology.

Appraisals will be confidential between the trainee and the appraisers, the Director PGIM and Board of Study having access to the records. The designated supervisor shall submit the relevant records to the PGIM.

The plan for periodical appraisals during pre MD training is as follows.

1st year trainees:

a) 01 month after commencing in-service training programme. Appraisers are the designated supervisor and supervisor/s from the training centre where the trainee had the orientation programme,

b) 09 months (3 months prior to MD Part I) after commencing training programme. Appraisers are the designated supervisors and 01 external assessor who is a trainer appointed by the BOS in Radiology.

2nd year trainees:

18 months after commencing training programme. Appraisers are designated supervisors from the training unit where the trainee is attached . .

3rd year trainees:

3 months prior to the MD Part II examination for the trainees who sit for the examination for 1st time. Appraisers are the designated supervisor and 01 external assessor who is a trainer appointed by the BOS in Radiology

The documents used for appraisals are given in Annex 16

The possible outcome of the appraisals

- **Progress** into the next year of training
- **Conditional progress** of the respective year of training. At the assessment a specific action plan will be formulated to address deficiencies in the performance of the trainee. Progress will be re-assessed as appropriate within the respective year of training.
- **Fail** - if the trainee falls short of the objectives of the respective year of the training programme, he/she will be prevented from continuing through the training programme. Repetition of the respective year shall only be recommended for well founded reasons.

  This situation will arise in exceptional circumstances and only after consultation between the supervisor and the external assessor appointed by the Board of Study in Radiology.

  A precise course of action will be formulated by this group depending on the individual situation. The trainee may repeat the training in the areas judged to be deficient or may be removed from the training programme.

5. Portfolio of Achievements

Trainees are required to thoroughly document their entire training experience both local and abroad and to compile an Evidence Portfolio of Achievements.

This Evidence Portfolio shall include:

(a) At least **05 fully documented** case histories per year, of rather **complex radiological problems** which demanded **interdisciplinary management** where the **trainee** had been **actively involved**.
At least 5 case records should include reflective analysis in main imaging modalities eg. Plain radiography, US, CT MRI, Nuclear Imaging, Interventional Radiology and may be a few from mammography and paediatric radiology. etc)
Similarly Clinico radiological meetings, museum sessions, MDT meetings local /overseas presentations should be reflectively analyzed.

(b) Evidence of Continuing Professional Development – Minimum number is 5

(c) Summary and evidence of lectures and presentations delivered by trainee. Minimum number is 5

(d) Oral presentations and discussion based on the research project

(e) Documentation of all aspects of training and learning experienced by the trainee.

(f) Experience in teaching i.e. Teaching of Medical students, Dental students, other undergraduates, nurses, technicians.

(g) Regular reflective entries on all aspects of patient care and professional training.

(h) A record of individual activity-based entries on the trainee's own experience

(i) Exposure to new technologies.

The portfolio shall be maintained in separate sections to conform to the above format and in a loose detachable folder.

It is advisable to collect the entries in a polythene ring binder initially which allow easy insertion. Later, this shall be compiled into a comprehensive report with permanent binding .**All entries in the portfolio shall be authorized or confirmed by the trainer or supervisor.**

It is mandatory that in each sub-section, the entries are in chronological order. Separate page numbering shall be made in each sub-section. In Continuing Professional Development and other areas in which further developments have taken place, reference shall be made to earlier entries via provision of the relevant page numbers.

All documents in the portfolio shall be typewritten/computer printed or scanned images or photocopies of articles.

The trainee is expected to keep the portfolio updated regularly. It is not a task that could be hurriedly completed at the end of the training program. The trainers and supervisors shall use the portfolio to assess the progress of the trainee and to provide a feedback to the trainee at regular intervals (once in every 4 months) during the training period. The trainers and supervisors are expected to assess the level of competencies in different areas of training and provide advice and assistance to the trainees to achieve the expected levels of skills empowerment.

It is the responsibility of the trainees, the trainers and the supervisors to ensure that the entries in the portfolio made regularly and are authentic. It is also essential to provide the trainee with accurate feedback on the trainer’s view about his/ her performance during the training period. The Board of Study in Radiology expects the trainees and the trainers to make the very best use of the portfolio in order to achieve the objectives of the training program.
The Portfolio shall be submitted to the PGIM 2 months prior to the date of Pre Board Certification Assessment.

Format of the Portfolio in Radiology - Annex 17

Log of procedures done by Senior Registrars in Radiology Annex 18

12 MD Examinations *(MD Radiology Part I and MD Radiology)*

12.1 MD (Radiology) Part I examination

12.1.1 Eligibility criteria to sit the MD (Radiology) Part I examination

(a) Satisfactory completion of the MD (Radiology) Part I training programme

(b) Attendance of not less than 80% at each of the following

- Practical components of work –this will be documented in the Log Book maintained by the trainee
- Lectures/ film viewing sessions/tutorials
- Clinico-radiological meetings
- Journal club meetings

(c) Submission of the following documents

(i) Attendance registers mentioned in 12.1.1 a) and 12.1.1 b)

Attendance registers for all above compulsory activities have to be maintained. These have to be submitted to BOS in the month of October each year.

Programme coordinator and coordinators of respective training centres are responsible for submitting above documents.

(ii) Log book

Trainee should submit the log book to the two supervisors appointed by the BOS (one shall be an external assessor from another local training centre) during appraisal that will be conducted 3 months before the scheduled date of MD part I examination,

(iii) Recommendations made by the Supervisor/s, on the appraisal form for postgraduate trainees. Skills should be further assessed at this stage, in addition to the assessment of skills during the in-service programme.

(iv) Portfolio – completion of relevant components and certification by the trainer/s of satisfactory progress

(v) Progress reports

(vi) PTR forms

(vii) Approval of the Research Proposal and commencement of the project certified by the supervisor

(d) Certificate of recommendation issued by the committee appointed by the Board of Study in Radiology after assessing above. **Annex 19**

Candidates who are eligible to sit for the MD Part I and MD Radiology examination are required to be present for the first scheduled examination after completion of the training programme. If a candidate does not apply or does not sit for the first scheduled exam or subsequent scheduled exam for reasons not acceptable to BOS, it will be considered as an attempt.

12.1.2 Components of the MD (Radiology) Part I examination

Proposed exam format

MD Radiology Part 1

Exam component	Segment	Total marks allocated
1. Theory	**1. Multiple Choice Question paper**	**300**
	2. Structured Essay Question paper	**300**
2. Practical	**3. Spots**	**100**
	4. Viva voce	**300**
Total marks		**1000**

Multiple choice questions (MCQs)

1) There will be two MCQ papers, each comprising of sixty questions to be answered in ninety minutes.

2) All questions are of single correct answer(SCA), single best answer (SBA) and extended matching (EMI) type

3) Each correct response will be awarded +3 marks; incorrect responses and no responses will be marked zero. Negative marks will not be are given. Each paper will carry a total of 180 marks which will be adjusted to 150maks to provide a total of 300marks from the MCQ paper

4) The subject areas for questions in each paper are as follows

a) Paper 1	-	Physics for Radiologists	40 questions
		Radiation protection	10 questions
		Radiography	10 questions
b) Paper 2	-	Radiological anatomy	30 questions
		Radiological techniques	30 questions

Structured Essay questions (SEQs)

1. There will be a total of 6 questions
2. All questions should be answered
3. Allocated time is 2 h
4. Each question carries equal marks
5. Total of 300 marks is awarded
6. Subject areas are as follows

Part A – 2 questions - Radiation physics and Radiation protection

Part B – 4 questions Anatomy, Techniques and Radiography.

Image viewing session

1. Consists of 20 stations
2. Films will be of analogue/digital format
3. Allocated time is 3 minutes at each station
4. Five questions are to be answered in each station
5. A total of 100 marks will be awarded.

Viva Voce

1. There will be two viva boards each consisting of two examiners
2. Candidate will be examined for 10 minutes by each examiner.
3. A total of 300 marks will be awarded.
4. Subject areas, examiners and allocation of marks are as follows

	Subject area	Examiners	Marks
Viva board 1 -	Radiation Physics & Radiation protection Radiography, Film faults	Physicist, Radiologist	150
Viva board 2 -	Radiological anatomy, Techniques Contrast Media, pharmacological agents	two radiologists	150

Exam format may be subjected to change with 12 month prior notice

The questions shall be predetermined questions with expected answers and a marking grid.

12.1.3 Requirements to pass the MD Part I examination

In order to pass the MD Part I examination, a candidate must obtain

- 50% or more of the total aggregate mark AND
- 50% or more in each of the four segments of the examination

12.1.4 Procedures relating to candidates who failed MD Radiology Part I Examination

- A candidate with a total aggregate score of less than 50% or who has scored less than 40% in any one of the segments, irrespective of the score for the other segments, should sit for both Theory and Practical components. Please refer to 12.1.2 for exam components and segments.
- *A candidate who obtains a total aggregate score of 50% or more **and** obtained 50% or more for one component, but has obtained between 40 and 50% in one or both segments of the other component , will be required to sit for both segments of that component at the next attempt.*

Trainees will be permitted not more than 2 attempts or a maximum period of 2 years from the date of commencement of a given examination (whichever is earlier) to pass that component.

Failing those two attempts, the trainee will have to re-sit the entire examination

A trainee not successful at MD Radiology Part I examination after 1st attempt will still be allowed to continue into the 2nd year of pre-MD training programme. Such trainees will be placed at the bottom of the merit list at the selection of 2ndyear Short Training Rotations in selected specialized areas.

A trainee who does not pass the MD Radiology Part I examination after 2 attempts will have to leave the training programme temporarily. Such trainees can sit for exam as "external re-sits". After being successful, the trainee will resume in-service 3rd year of training in his / her previous training centre. Such trainees will be placed at the bottom of the merit list at the selection of 3rd year Short Training Rotations in selected specialized areas.

Trainees who are unsuccessful at Part 1 are allowed to sit total of 4 attempts within period of 5 years. After which they will be deemed to have left the training programme

12.2. MD (Radiology) Examination

12.2.1 Prerequisites to sit the MD (Radiology) Examination

(a) Successful completion of MD (Radiology) Part I examination.

(b) Satisfactory completion of the 36 months of Pre-MD training programme

(c) Attendance of not less than 80% at each of the following

- practical components of work -
- lectures/film viewing sessions/tutorials
- clinico-radiological meetings
- journal club meetings

Attendance registers for all above compulsory activities have to be maintained. These have to be submitted to BOS in the month of October each year.

Programme coordinator and coordinators of respective training centres are responsible for submitting above documents.

(d) The submission of the following

- Log book
- This has to be assessed by two supervisors, (supervisor and an external assessor appointed by Board of study in Radiology) at the appraisal assessment 3 months before the scheduled date of MD part II examination
- Acceptance of a research paper or an audit submitted by the candidate
- Portfolio maintained by the trainee and acceptance by the BOS
- Recommendations made by the supervisor/s on the appraisal form for postgraduates
- Certificate of recommendation issued by the committee appointed by the Board of Study in Radiology after assessing above. **Annex 19**

(e) Progress reports acceptable to BOS

(f) PTR Forms acceptable to the BOS

Candidates who are eligible to sit for the MD Radiology examination are required to be present for the first scheduled examination after completion of the training programme. If a candidate does not apply or does not sit for the first scheduled exam or subsequent scheduled exam for reasons not acceptable to BOS, it will be considered as an attempt.

12.2.2 Format of the MD (Radiology) Examination

Examination shall consist of 2 components

Exam component	Segment	Marked out of	Final mark allocation
1. Theory	1. MCQ I	300	100
	2. MCQ II	225	100
2. Practical	3. Rapid Reporting Session	150	100
	4. Film Packet Reporting Session	700	200
	5. Clinico-Radiological Oral exam	200	200
Total			700

Component 1 -Theory - composed of 2 segments

Segment 1-MCQ 1 60 MCQ comprising of true/ false questions to be answered in 2 hours.

Marks 60 x 5 = 300 Made up to 100

Segment 2- MCQ 11 75 SBA questions to be answered in 2 hours.

Marks 75x 3 =225 Made up to 100

Total marks for Component 1 made up to 200.

Component 2 -Practical - (May be in analog or digital format) Composed of 3 segments

Segment 3 -Rapid reporting Session 100 marks

Plain radiographs only. 30 films to be answered in 30 minutes (1 minute for each film). Out of these 40-60% should be normal films. Emphasis will be on Accident and Emergency. Pass mark 67% or above.

The questions shall be predetermined questions with expected answers and a marking grid.
Marks 30x 5 = 150

Made up to 100

Segment 4 - Film Packet Reporting (FPR)

7 stations (15 minutes for each station) 200 marks

Each station will be marked out of 100 and the total made up to 200.

These serve as 'long cases'. ' A station will comprise of single case with multimodality imaging OR two to three short cases of one/more imaging modality.

The questions shall be predetermined questions with expected answers and a marking grid.

Segment 5 - Clinico-radiological oral examination

Each candidate will be examined by 2 panels, each comprising of 2 practicing clinical radiologists, for a total of 60 minutes (30 minutes per panel)

(100 marks per panel) Total 200 marks

The questions shall be predetermined questions with expected answers and a marking grid.

Total aggregate = 700 marks

12.3 Requirement to pass the MD Examination

50% or more of the total aggregate

AND

67% or more for RRS

AND 50% or more for each of the other segments.

12.3.1 Failed candidate

A candidate with an aggregate score of less than 50% or has scored less than 40% in any one of the segments irrespective of the score for the other segments, should sit for both Theory and Practical components.

A candidate who obtains 50% or more of the total aggregate, scores more than 50% in one component but fails the exam due to less than 50% but has scored more than 40% ***(regarding RRS this will be 45%)*** *for the other component or any one or more of the segments in that component will have to sit only that component at the repeat examination.*

A maximum number of 2 attempts or a maximum period of 2 years whichever is earlier from the date of commencement of that particular examination shall be permitted to pass that component.

Failing those two attempts trainee will have to re-sit the entire examination

Please note that candidates are allowed only 6 attempts at the part II within a period of 8 years from the date of first examination.

The trainees who are not successful at MD Radiology Part I examination at 4 attempts and trainees who are not successful at MD Radiology Part II examination at 6 attempts will not be allowed to sit for MD (Radiology) examinations thereafter.

12.4. Conduct of the examination

The chief examiner, external examiner and local examiners for the MD examination shall be nominated by the BoS in Radiology and appointed by the Senate on the recommendation of the BOM.

The venue shall be decided by the Board of Study.

13 Post MD training

Overview

The trainee who has obtained the degree of MD (Radiology) shall undergo further training in Radiology for a minimum period of 24 months.

Post MD training is of 2 categories.

i) Post MD training programme leading to Board certification in General Radiology

ii) Post MD training programme leading to Board Certification as a specialist in a particular subspecialty. (See separate prospectus)

Post MD training programme leading to Board certification in General Radiology

Total of 24 months training consists of 12 months local training and 12 months of overseas training in General Radiology.

Post MD local Training

12 months of post MD local training shall be in a centre / centres in Sri Lanka and comprise of a combination of all forms of radiological practice including exposure to administrative procedures.

Training programme and appointments to a centre/centres for local training shall be according to the rules and regulations formulated by the Board of Study in Radiology and the Board of Management.

During the period of local training, the trainee shall gain the following:

- Further experience and gaining confidence in working in a Department of Radiology in a centres of excellence and in Radiology Units of different settings.
- Further update knowledge and practical skills in general radiology.
- Exposure to aspects of administrative procedures, which will enable the trainee to manage a Radiology department in future.

Schedule for post MD local training is available in **Annex 20**

Allocation of training rotations will be done by a committee appointed by the Board of Study in Radiology at an 'allocation meeting'. Trainees will be given the opportunity to select training rotations strictly according to the order of merit of the MD Radiology examination that year.

The trainee shall report to the allocated training centre within seven days after receiving the letter of allocation.

The appraisal of the trainee during training shall be by a designated supervisor/ supervisors appointed by the Board of study in Radiology. The supervisor/supervisors shall forward the relevant documents and Progress Reports **(Annex 14)** to the Board of Study in Radiology every six months.

The trainee should submit a feedback form to the BOSR at the end of the Post MD Local training and at the end of the overseas training on a form formulated by the BOSR.

Record book - Trainees shall maintain a record book as in **Annex 21.**

Post MD Overseas Training

Overseas training of 12 months shall be on par with PGIM regulations. At least 6 months of this training period should be in General Radiology. A trainee who was unable to complete 12 months overseas training can undergo 6 months of supervised training in a centre in Sri Lanka approved by BOS in Radiology .

During the period of overseas training, the trainee shall gain the following:

- Further experience in working in a well equipped and organized Department of Radiology in a centre of excellence, in a different setting.
- Update knowledge and practical skills in general radiology.
- Further exposure to advanced techniques in radiology, some of which may not be readily available in Sri Lanka.

The assessment of the trainee during overseas training shall be by the designated overseas supervisor. The overseas supervisor shall forward the Progress Reports **(Annex 14)** of the trainee every six months to the Director of the Postgraduate Institute of Medicine.

On completion of the overseas training and returning to Sri Lanka the trainee shall report to the Director PGIM within three working days.

Post MD trainees who have not completed the training programme should report in writing to the PGIM through Chairperson BOS once in every 6 months to discuss their progress.

Failure to comply with satisfactory post MD training

With regard to a trainee who does not satisfactorily complete the local and / or overseas training, necessary action will be taken according to the general regulations and guidelines of the PGIM.

14 Eligibility for Pre-Board Certification Assessment

Following should have been fulfilled by trainees before they can apply for the PBCA.

a) completion of the required period of training

b) satisfactory progress reports from supervisors, to cover the entire period of training

c) submission of a completed portfolio

15 Format of Pre-Board Certification Assessment (PBCA)

Prior to Board Certification as a Specialist in General Radiology, all trainees should go through a PBCA.

PBCA is based on assessment of the portfolio **(Annex 17)** maintained by the trainee during the period of post-MD training. When the trainee is eligible for PBCA, 3 copies of the completed portfolio should be submitted to the PGIM Examinations Branch.

The PBCA is a final, summative assessment of the trainee's portfolio, carried out by 3 examiners appointed by the BOS radiology, comprising of 2 radiologists and a 3rd examiner from another discipline.

The trainee will be called for an oral examination, during which he/she will be questioned on the portfolio. The trainee is required to start with a presentation of 10 – 15 minutes, on the post-MD training.

The examiners will make an overall assessment of the portfolio with particular emphasis on the sections of subject expertise, research / audit and formative learning.

If the examiners are of the view that the trainee's performance is unsatisfactory, and the trainee should not be given immediate Board Certification, the examiners must provide the trainee with written feedback on how the portfolio should be improved in order to reach the required standard.

The trainee should then re-submit the portfolio within a specified period of time (up to 3 – 6 months), and face another oral examination based on the re-submitted portfolio.

If the trainee is successful at this 2nd oral examination, the date of Board Certification should be backdated as done routinely.

If unsuccessful again, the date of Board Certification will be the date of passing the subsequent PBCA following further training for a minimum period of six months in a unit selected by the Board of Study.

16 Board Certification

Board Certification

A trainee who has fulfilled the following criteria shall be deemed to be eligible for Board Certification:

- Obtained a pass at the MD (Radiology) Examination.
- Satisfactory completion of one year local and one year overseas post MD training.
- Submitted satisfactory progress reports from the local supervisor appointed by the Board of Study.
- Submitted satisfactory progress reports from the overseas supervisor appointed by the Board of Study.
- Passed the Pre-Board Certification Assessment.
- An oral presentation to the Board of Study and acceptance. The oral presentation should be of approximately 30 minutes duration regarding his/her post-MD training experience and future vision for improvement of the quality of Radiology patient care in Sri Lanka.

A trainee who has successfully completed the Pre-Board Certification Assessment is eligible for Board Certification as a Specialist in General Radiology or as a specialist in a particular subspecialty, on the recommendation of the Board of Study in Radiology.

Recommended reading

Annex 22

17 Contributors to revision of prospectus

Dr T. Rajapakshe, Chairperson, BoS in Radiology, February 2014 to date
Dr K.G. Pathirana, Chairperson, BoS in Radiology, July 2011 to January 2014
Dr C. Sirigampola, Secretary, BoS in Radiology
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Dr D.D. Ranasinghe , CSTH
Dr N.M.P.K. Arambepola, SJGH
Dr P.H. Dissanayake , F/M,USJ

ANNEX 1

Curriculum of the Selection Examination

Subject area -Anatomy

Introduction to regional anatomy

Tissues and structures, nervous system, embryology, anatomy of the child

Thorax

Chest wall including breast, pleura and diaphragm, trachea , bronchi and small air ways , lungs, mediastinum, Surface marking of important anatomical structures , bony thorax

Abdomen

Anterior abdominal wall, abdominal cavity, peritoneum including pelvic peritoneum vessels and nerves, gastro intestinal tract up to rectum, development of vessels and nerves of the gut, posterior abdominal wall including retroperitoneum, liver, biliary tract, pancreas, spleen kidneys, ureters , bladder and suprarenal glands ,pelvic cavity, male and female genital organs perineum ,male and female urogenital region , lumbar vertebra, pelvic joints and ligaments lumbar and sacral plexuses.

Head and neck

General topography of the neck,, triangles of the neck, suprahyoid region, prevertebral region, root of the neck, face, parotid region, infratemporal region, scalp, pterigopalatine fossa, nose and para nasal sinuses,mouth and hard palate,, pharynx and soft palate, larynx, thyroid and neck spaces, , major vessels of the head and neck, lymphatic drainage of head and neck, temporo mandibular joint, major salivary glands, ear, orbit and eye, cervical vertebral column and vertebral canal, cranial cavity and meninges, cranial fossa

Central nervous system

Cerebral hemisphears, brain stem, cerebellum, spinal cord, meninges, cranial nerves, vessels of the cranium, skull bones , development of the nervous system.

Upper limb

Pectoral girdle, axilla, breast, shoulder region, anterior and posterior compartments of arm and forearm, wrist and hand, upper limb innervation and vasculature, bones of the upper limb.

Lower limb

Compartments of the thigh, gluteal region and hip joint, popliteal fossa and knee joint, compartments of the leg, dosum and sole of the foot, ankle and joints of the foot, lower limb innervation and vasculature, bones of the lower limb.

Subject area – Physiology

Basics – Homeostasis, Body water compartments and physiological fluids, Cells, membranes and Membrane transport, Inflammation and immunity. **The nervous system** – CNS, sensory and motor systems, autonomic nervous system. Sensory and motor systems. Proprioception and reflexes, **The cardiovascular system**. - heart. and the cardiac cycle., blood vessels. and control of blood pressure and blood volume., microcirculation, filtration and lymphatics, local control of blood flow and special

circulations, **Blood and haemopoeitic system–** Composition of blood and haemopoiesis**. The respiratory system**.- lung mechanics, transport of gases and the gas laws., carriage of oxygen and carbon dioxide by the blood, Control of breathing, ventilation–perfusion matching **The renal system**.- renal filtration, reabsorption and secretion and the proximal tubule, loop of Henley and distal nephron, regulation of plasma osmolality and fluid volume, **The gut and metabolism**.- mouth, oesophagus and stomach, small intestine. the exocrine pancreas, liver and gallbladder. Large intestine**, Muscles.**- Skeletal muscle and its contraction, neuromuscular junction and whole muscle contraction., motor units, recruitment and summation. Cardiac and smooth muscle. **Endocrinology and reproduction**.- Endocrine control, control of metabolic fuels, the hypothalamus and the pituitary gland. Thyroid hormones and metabolic rate, growth factors. Somatic and skeletal growth, control of plasma calcium. The adrenal glands and stress, endocrine control of reproduction. Sexual differentiation and function, fertilization, pregnancy and parturition, lactation.

Subject area - Pathology

Fundamentals of general and systemic Pathology and definition of basic pathological terms, Connective Tissue Lesions, Errors of Metabolism, Immune Pathology, Calcification and Stone Disorders, Pathology of Inflammation, viral/ bacterial /mycotic/ protozoan infections ,Hereditary Disorders, Congenital Malformations , Tissue Repair, Tumour Pathology ,

Subject area - Clinical medicine

Neurological/ special senses/ Psychological diseases, Cardiovascular diseases, Haematological diseases, Respiratory diseases, Gastrointestinal diseases, Liver, biliary tract and pancreatic diseases, Kidney and urinary tract diseases ,Rheumatology and bone diseases, Endocrine diseases, Skin diseases, Malignant diseases, Infectious diseases , The immune diseases, Environmental medicine, Nutrition, Palliative medicine and symptom control, Critical care medicine, Drug therapy and poisoning

Subject area- Surgery

Traumatic – traumatic head/neck injuries, abdominal injuries including injuries to hepatobiliary/splenic/gastrointestinal/urinary tract, , extremity vascular injuries, common fractures in axial and appendicular skeleton **Infective and inflammatory –** CNS infections including meningoencephalitis, cerebral abscesses, head and neck infections including sinusitis, orbital cellulitis, pharyngitis and retropharyngeal abscess, abdominal/pelvic/peritoneal infective/inflammatory conditions including cholangitis, cholecystitis, pancreatitis, peritonitis, inflammatory bowel diseases ,diverticulitis, genitor urinary infections. **Neoplastic –** CNS neoplasms including gliomas and meningiomas, head and neck neoplasms including nasopharngeal and antral carcinomas, thoracic neoplasms including common benign respiratory tract tumors and bronchogenic carcinomas,benign and malignant mediastinal neoplasms,abdominal/ pelvic neoplasms including tumors of hepatobiliary gastrointestinal,genitourinary tracts. **Congenital –** Common developmental anomalies of the CNS/Musculoskeletal/gastrointestinal/genitourinary /cardio vascular/respiratory systems **Degenerative and metabolic** – including athereosclerotic vascular diseases, endocrine diseases **Miscellaneous** – Common non traumatic surgical emergencies of the head and neck,/ chest and mediastinum,/abdomen and pelvis/extremities basics of organ transplantation.

Subject area - Gynaecology and Obstetrics

Gynaecology – Development and Congenital anomalies of the female genital tract, puberty, Menstrual cycle, Amenorrhea, premenstrual syndrome and dysmenorrhoea, abnormal uterine

bleeding, adenomyosis, pelvic endometriosis, Pelvic inflammatory disease, benign and malignant gynaecological neoplasm, sub fertility, contraception, menopause, breast disease

Obstetrics – Physiology in singleton and multi foetal pregnancy, prenatal diagnosis of pregnancy, Early pregnancy complications, Nutrition in pregnancy, Medical diseases during pregnancy, genetics in pregnancy, disorders of foetal growth, disorders of amniotic fluid and pathophysiology of placenta, ante partum bleeding, ante partum foetal surveillance, postpartum haemorrhages and post partum issues.

Subject area- Paediatrics

Perinatal and neonatal medicine, growth/ puberty/ developmental problems, Common paediatric, neurological/ gastrointestinal and hepatobiliary/ genitor urinary/respiratory/ musculoskeletal/ cardiovascular disorders, Common metabolic and haematological disorders in childhood, Accidental and non accidental trauma, common paediatric emergencies.

Subject area – Radiology

The indications/contraindications for radiological investigations and rational imaging protocol in common medical/surgical/gyn & obs/paediatric diseases, Patient preparation protocols for routine and emergency radiological investigations/ procedures and identification and management of post procedural complications, The fundamentals of radiological imaging modalities and imaging equipments, The plain film findings and interpretation of common medical/surgical problems including emergencies and trauma, The CT findings and interpretation in traumatic head and chest injuries, Meaning of the radiological terms which are commonly used in radiology reporting.

Subject area - STATISTICS

Topic	**Learning objectives**
Introduction to medical statistics	To define and describe the scales of measurements To define the variables To describe the classification of variables
Introduction to descriptive statistics	To define, describe and construct the different methods of data presentation.
Introduction to descriptive statistics, numerical measures	To define, describe and discuss; measure of central tendency, measure of location, measure of variability
Introduction to probability	To define and describe the probability To describe the laws of probability To apply the laws of probability in appropriate situations and calculations
Introduction to normal distribution	To define and describe the normal distribution To describe the Z transformation To apply the normal distribution and the z transformation in calculations
Introduction to inferential statistics and Z distribution	To define and describe the population, sample, sampling variation, standard error of the mean, sampling distribution of mean

	and the sampling distribution of difference. To use these concepts in calculations To define and describe point and interval estimates. hypothesis testing, null, the alternative hypothesis and P value of a significant test. one tail and two tail tests
Introduction to t distribution	To define and describe the t distribution the pooled , independent t test paired dependent t test
Introduction to proportions	To define and describe the sampling distribution of the proportion
Introduction to errors in hypothesis testing	To use this concept in estimations and hypothesis testing of proportions To define and describe the errors which can occur in hypothesis testing.
Introduction to non parametric methods	To define and describe Wilcoxsan Rank sum test Kruskal Wallis test Spearman correlation test
Introduction to categorical data analysis	To define and describe Goodness of fit tests Test of independence
Introduction to sampling	To describe different probability sampling methods To define non probability sampling methods To describe the concepts in selecting the appropriate sampling methods
Introduction to regression and correlation	To define and describe regression, correlation and use of these concepts in calculations

Annex 2

CURRICULUM FOR MD RADIOLOGY PART I (Year 1)

1. Overview

The first year of training provides the trainees with their first opportunity to learn radiological skills.

2.1 Objectives

At the end of the first year, the trainee should:

(a) feel confident in his / her choice of radiology as a career

(b) have mastered the basic sciences of Radiology to the level of the MD Radiology Part I

(c) be familiar with the concepts and terminology of diagnostic and interventional Radiology

(d) understand the role and usefulness of the various diagnostic and interventional techniques and have learnt and performed radiological procedures.

(e) understand the responsibilities of a Radiologist to the patient

(f) be familiar with the various contrast media and drugs including sedation and monitoring used by Radiologists in day to day practice, and be aware of indications, contraindications for investigations, dosages of drugs and the management of reactions and complications

(g) be fully competent in cardio-pulmonary resuscitation and should have attended a CPR programme.

(h) should acquire interpreting, reporting and communication skills

(i) understand the principles of radiation protection and be familiar with the legal requirements for protection against ionising radiation. The trainee should also demonstrate that he / she is capable of safe radiological practice.

(j) be familiar with safety requirements for imaging with non-ionising radiation

1.1 A major component of training in radiology is achieved by the apprenticeship system, with the trainee undertaking an increasing number of radiological tasks. Each component of the training scheme will have a clearly defined structure with supervision of the trainee by a designated trainer.

1.2 Most of the topics which will consist of each year of training are given under each subject area.

1.2.1 The syllabus with the subject areas and sub topics will be reviewed from time to time as practise changes and newer techniques are introduced.

1.2.2 The number of hours required for each topic or subject area will be decided by the Board of study or the committee appointed by the Board of study for the purpose.

1.2.3 All the training centres will offer training according to the syllabus.

1.2.4 If any of the training components are not available at the training centre, the course coordinator of the training centre will arrange a schedule of rotation to a recognized training centre where such facilities are available.

1.2.5 If they are not available in Sri Lanka, an attempt should be made to learn them during the year of training overseas.

1.2.6 Theoretical knowledge of all the components of the syllabus should be acquired before sitting the MD (Radiology) Part I and Part II examinations.

1.3 The trainee should at all times be aware of his / her responsibility to the patient.

(a) The Board of Study in Radiology has decided that log books should be maintained by the first year trainees in Radiology to record the procedures they have performed.

1.4 The trainee shall be required to develop basic skills in research methodology necessary to evaluate critically and to perform research under appropriate guidance. An appreciation of the effective application of research findings in everyday practice will also be required.

1.5 Log books case record files or portfolios will be instituted and used for documenting the degree of experience and skill attained. Guidelines for preparation of the log-book or case record file will be given below.

1.6 Individual progress will be appraised periodically on the form for appraisal of postgraduate trainees drafted by the Board of Study in Radiology.

1.6.1 The **appraisal** form shall be made available to all trainees and trainers of training centres at the commencement of the course and periodically before each appraisal.

1.6.2 The Board recommends that the designated supervisor and an external assessor such as a trainer from another training centre be involved in the appraisal of trainees.

1.6.3 The supervisors shall forward the said forms of trainees to the Board of Study in Radiology at the end of each appraisal.

CURRICULUM MD PART 1 IN RADIOLOGY

Introduction and objectives

The purpose of the curriculum is to provide the trainees comprehensive theoretical and practical knowledge on following subject areas, as the basis for their future professional carrier in clinical radiology.

The subject areas for MD (Radiology) part I

i) Radiation physics and radiation protection
ii) Radiological anatomy, Radiological Techniques and Radiography

General overview of the curriculum

The curriculum will be delivered during a period of one year and consists of

a) A series of lectures in above subject areas, and
b) In-service training, in centers which are recognized for radiology training by the BOS radiology.

a) The lectures are organized by the PGIM and will be delivered by the clinical radiologists, radiation physicists and senior radiographers. Scheduled lectures are generally conducted during the week ends and number of hrs dedicated to each subject area will be as follows

Radiation physics	-
Radiation protection	-
Radiological anatomy	-
Radiological techniques	-
Contrast media and pharmacological agents used in radiology	-
Radiography	-

(Comprehensive lecture schedule with time/venue will be provided to the trainees at the beginning of each academic term)

b) In-Service training programme will be conducted in radiology departments of major teaching hospitals, under the supervision and guidance of senior clinical radiologists. This component of training is expected to help trainees to develop the skills in carrying out radiological procedures, supplement theoretical knowledge by practice of clinical radiology. In addition, during this period the trainees will have the opportunity to improve their communication skills with the patients as well as the staff.
During this period, the trainees will be given the opportunity to gain adequate practical experience in plain radiography, ultrasonography, fluoroscopy, nuclear imaging, computed tomography, magnetic resonance imaging.

Syllabus: Radiation physics and radiation protection

Aims of the curriculum

- To provide post graduate trainees in radiology with appropriate knowledge of the physical principles those underpin diagnostic radiology for safe and effective practice of medical imaging.

General overview

In the contemporary world, practice of medicine depends heavily on diagnostic imaging services. Fundamental knowledge in radiation physics and radiation protection is of great importance in providing effective and safe imaging service. The curriculum is designed with the intention of

providing basic and adequate knowledge in the subject areas of radiation physics and radiation protection relevant to a practicing clinical radiologist.

It is intended that the curriculum should be delivered during the first year of specialty training and basic knowledge of physics and mathematics is assumed.

Learning objectives

Those who have followed the curriculum should be able to:

a) Describe the structure and properties of matter, the phenomena of radioactivity and magnetism, the nature of ionizing radiation, radiofrequency radiation and ultrasound and how they interact with matter.
b) Understand how diagnostic images are created, reconstructed, processed, transmitted, stored and displayed
c) Describe the construction and function of medical imaging equipment including the radiation or ultrasound source, image-forming components and image or signal receptor.
d) Describe how imaging equipments are operated and utilize that knowledge to optimize the imaging procedures that are performed with such equipments.
e) Identify the type of information contained in images from different modalities and compare and contrast them.
f) Distinguish between different indices of image quality, explain how they are inter-related and indicate how they are affected by changing the operating factors of imaging equipment.
g) Identify agents that are used to enhance image contrast and explain their action.
h) Explain how the performance of imaging equipment is measured and expressed.
i) Describe the principles of quality assurance and outline how quality control tests of imaging equipment are performed and interpreted.
j) Recognize artifacts in medical images and identify how they are removed or their impact is reduced.
k) Comprehend the biological effects which are associated with ionizing radiation used in medical imaging.
l) Recognize the hazards and risks to patients, staff and the public associated with medical imaging and describe how their impact is reduced without compromising diagnostic image quality.

Assessment

- MD part 1 examination

  Assessment is in the form of a written multiple choice question (MCQ) paper, Essay paper, film viewing session and oral examination.

Contents of the syllabus

Physics syllabus gives particular consideration to diagnostic radiology.

The syllabus is intended as a guide and general indication to the breadth of the topics that may appear in the examination questions. The syllabus should be studied to a depth sufficient to postgraduate level.

1. **Basic concepts of atomic structure and eletromagnetic radiation**
   Basic atomic structure, Bohr and Rutherford models, nuclide, atomic number, mass number, binding energies, ionization, excitation, isotope, general properties, electromagnetic waves, electromagnetic spectrum, sources of electromagnetic radiation, wave and quantum theories, Planck's constant, wave particle duality, energy of photons.

2. **X-ray generators and production of x-rays**
   Generator waveforms, single phase generators, three phase 6 and 12 pulse generators, medium frequency generators, capacitor discharge generators, battery powered generators, effect on radiation output, effect on image quality, Switches and exposure timers, automatic exposure control (AEC).

   Continuous or Bremsstrahlung, characteristic radiation, effect of variation of kV, mA, filtration, voltage waveform, X-ray tubes (principal types and their construction), line focus principle, heel effect, causes of failure, tube rating.

3. **Interaction between x-rays and matter**
   Coherent scattering, photoelectric effect, Compton scattering and other processes (pair production & photodisintegration), attenuation, linear attenuation coefficient and equation, mass attenuation coefficient, half value layer (HVL), factors affecting attenuation, polychromatic radiation attenuation, measurement of radiation and radioactivity, detector types (gas filled, ionization, proportional, Geiger, solid state, scintillation, semiconductors), detector geometry and efficiency.

4. **Filters, collimators & grids**
   Effects of scattered radiation (kVp, field size, thickness), inherent filtration, added filtration, heavy metal (K-edge) filters, types of beam restriction, scatter reduction techniques, collimation, compression, grids, and air gaps.

5. **Luminescent screens**
   General principle, absorption or quantum detection efficiency, conversion efficiency, intensification factor, speed, types of phosphor (advantages and disadvantages of Calcium tun gstate & rare earth), emission spectrum, resolution, Photo stimulable luminescence (PSL), flat panel detectors & emerging detection systems.

6. **Physical characteristics of x-ray film & film processing**
   Structure of x-ray film, latent image formation by light or x-rays, single and double emulsion films, other film types and film processing.

7. **Photographic characteristics of x-ray films**
   Photographic density (optical density), characteristic curve and film contrast, speed and speed class system, spectral sensitivity of emulsion.

8. **Measures of image quality/imaging system performance**
   Contrast (subject, film & radiographic), fog and scatter, dynamic range, resolution, sharpness, limiting resolution, line spread function (LSF), modulation transfer function (MTF), noise (systematic/structured, random, radiographic/quantum mottle), wiener power spectrum, signal to noise ratio, geometrical considerations (magnification, focal spot size, distortion).

9. **Image intensification**
   Design, operation, characteristic performance, contrast ratio, limiting resolution, distortion, veiling glare, MTF

10. **Mammography**
    Basic principles of soft tissue imaging, contrast improvement at low kVp, contrast versus radiation absorbed dose, types of x-ray units, emission spectra with molybdenum anode filter, alternate target/filter combinations, geometric unsharpness, recording systems, magnification technique, digital techniques, alternate imaging modalities

11. Computed tomography

Basic principles, data acquisition equipment, X-ray tube, collimators, detectors (types and advantages, efficiency, number) sampling frequency, calibration, scanner geometry, (1^{st}, 2^{nd} , 3^{rd}& 4^{th} generation), Exotic designs, Spiral (Helical) scanning, CT Fluoroscopy, Image reconstruction and display, basic principle (voxels and pixels), correction factors, Types of reconstruction algorithms (no mathematics).

CT numbers, window width and level, image quality, spatial resolution, contrast discrimination (low contrast resolution), spatial uniformity, noise, impact of pixel size, slice thickness, mAs, algorithm, sampling frequency, number of projections & field of view on image quality, artifacts (partial volume, motion, high density foreign material, beam hardening, ring, spiral scanning).

12. Digital radiography

Basic principles of pulsed techniques & fluoroscopy, special equipment requirements

(X-ray tube and generators, high contrast image intensifier, TV chain, Computer interface), digitized image, logarithmic processing, image noise, effect of scatter, digital subtraction techniques (mask, hybrid & temporal filtering), digital image processing, noise reduction including frame integration, Edge enhancement, Land marking, Motion artifact reduction, dual energy radiography (basic physics, DEXA, hybrid DSA), future equipment developments.

13. Magnetic resonance imaging (mri)

Basic nuclear magnetic resonance (NMR), Nuclear magnetic moments, effect of external magnetic field, nuclear precession, equilibrium magnetization, effect of RF pulse, Resonance and Larmor frequency, free Induction Decay (FID), relaxation, general mechanisms, spin-lattice & spin-spin relaxation time, effect of field inhomogeneities,

pulse sequences, spin echo, inversion recovery, calculated T1 and T2 images, fast imaging sequences including gradient echo and echo planer, production of image, gradient fields, slice thickness and RF bandwidth, phase encoding gradient, readout gradient, 2D & 3D fourier transformation technique, image quality (signal to noise ratio, spatial resolution, artifacts, chemical shift), flow effects (flow void effect, paradoxical enhancement, flow imaging), instrumentation (magnets, gradient coils, RF coils and electronics, computer systems), hazards and bio-effects (static magnetic field, time varying magnetic field, RF field), environmental problems.

14. Nuclear medicine

Radioactivity, isotopes, alpha, beta, gamma, arithmetic of decay, half-life and decay constant, specific activity, radiopharmaceuticals, desirable characteristics, labelling, mechanism of localization, physiological clearance, biological & effective half-life, secular & transient equilibrium, artificial radioactivity and radionuclide production (reactor, cyclotron, generator), pulse-height analysis and energy spectra, imaging systems, gamma camera, collimators, pulse height analyzers, data analysis and display, analog and digital, performance parameters, efficiency /sensitivity, uniformity, linearity, resolution (intrinsic & extrinsic), single photon emission computed tomography (SPECT), positron emission tomography (PET), whole body systems.

15. Ultrasound

Fundamental physics of ultrasound and interaction with tissues, wave motion and types of waves, wave length, frequency, phase, intensity, pressure, amplitude, decibel notation, velocity in liquids and biological media, acoustic impedance, interference, diffraction, resonance, reflection, refraction, attenuation, absorption, scattering, transducers and the

ultrasonic field, Piezoelectric effect, transducer design, pulsed operation, beam pattern (near & far field), focused transducers (types and techniques), broad bandwidth transducers, pulse-echo imaging and instrumentation, A-mode, B-mode, M-mode, grey-scale imaging, dynamic range, receiver functions, digital processing, television display and recording, spatial resolution, operator controls, real time systems, mechanical sector scanners, linear and convex arrays, phased arrays, annular arrays, spatial types of scanners, Doppler effect and Doppler shift equation, continues wave and pulsed wave instruments, Duplex systems, colour Doppler, power Doppler, intravascular ultrasound (IVUS), ultrasound artefacts (Multiple reflections, reverberation, attenuation, shadowing, Enhancement), beam width (side lobes), instrumentation and operational artefacts, biological effects, mechanisms of interaction with tissues, measurements of power output and intensity, safety recommendations, methods of dose reduction.

16. Radiation biology

Radiation units, exposure (C/kg), air kerma (Gy), absorbed dose (Gy), equivalent dose (Sv), effective dose (Sv), skin, organ & integral dose, interaction mechanisms, ionization, excitation, free radicals, linear energy transfer (LET), mutation, spontaneous, radiation induced, dose rate dependence, genetically significant dose (GSD), doubling dose, relation to germ cell maturation, effects of radiation on chromosomes, types of radiation damage, influence of dose & dose rate, results of chromosome damage.

Radiation carcinogenesis, Mechanisms, latent period, effects of dose and dose rate

organ sensitivity, risk of carcinogenesis, effects on embryonic and foetal development, relation to stage of development, embryonic death and malformations, growth retardation, sterility, mental retardation, therapeutic abortion, risks of occupational exposure.

17. Radiation protection

Objectives, biological aspects, stochastic effects, deterministic effects, radiation weighting factors, measures of detriment, tissue weighting factors, ICRP framework of radiological protection, practices (Justification, Optimization -ALARA), protection in intervention including emergencies, medical radiation including medical research, dose limits (occupational exposure, public, occupational exposure of public women), practical methods of reducing dose (distance, time, protective clothing and barriers (calculations not required), radioactive materials, monitoring and surveillance, personal hygiene, transport, storage and management of sources, simple decontamination procedures,

practical methods of reducing dose to patients, optimization technique, guidelines for potentially pregnant patients & minimizing dose to foetus, methods of assessing radiation dose, film badge dosimeters, TLD, direct reading ionization chamber dosimeters, computational methods (particularly in nuclear medicine).

Patient radiation doses (skin and organ absorbed doses, effective dose) in diagnostic radiology procedures and nuclear medicine scans. CT-scan including impact of multiple slices & contrast agents.

18. Quality assurance for diagnostic imaging equipment

Benefits, quality control (QC) tests on radiographic equipment (X-ray generator and tube, fluoroscopic imagine equipment, computed tomography, DSA equipment

film processor), QC tests in nuclear medicine radiopharmaceutical integrity, dose calibrator, gamma camera, computer image processing artefacts (SPECT, PET), QC tests on ultrasound imaging equipment, tissue-equivalent phantoms, QC tests on MRI scanners

19. **Contrast agents**
    Basic physical properties, types of contrast studies (Iodine & Barium), contrast in MRI and ultrasound studies

Syllabus: Radiological Anatomy

Aim of the curriculum

To provide the trainees, comprehensive and detailed knowledge of radiological anatomy and anatomical variations of the human body.

General overview

The trainees are expected to gain substantial part of the knowledge through self learning.

In addition to gaining knowledge through text books/journals/internet, it is recommended that trainees supplement their knowledge through active participation in clinico-radiological meetings and conferences in their training centres and annual and periodic academic sessions conducted by Sri Lanka college of Radiologists.

The lectures will provide guidelines on specified topics .During the lectures, trainees are encouraged to discuss with lecturers to clear doubts in relevant subject areas.

Learning objectives

At the end of the training period of one year trainees are expected to have

i) A thorough knowledge in radiological anatomy of the human body, relevant in interpretation of images depicted by all imaging modalities.

ii) A comprehensive knowledge of all normal anatomical variations depicted by various imaging modalities

iii) Knowledge of microstructure in certain relevant anatomical areas of the body.

iv) The ability to identify and describe correctly all the anatomical structures depicted in the images of various imaging modalities.

v) The ability to identify the normal anatomical variations depicted by various imaging modalities and differentiate them from pathologic conditions.

vi) The ability to identify the normal functional status and metabolic activity of anatomical structures in images of relevant imaging modalities

vii) The ability to use anatomical knowledge in performing radiological procedures including interventions.

Assessment

i) Continuous assessment of the trainee's anatomical knowledge and skills in interpreting the radiological images will be carried out by the trainers in the respective training centers.

ii) An appraisal of the trainee's competence in the subject area will be carried out by a senior radiologist from another training centre in the latter part of the academic year.

iii) MD part I Examination (Details of the examination format is available elsewhere in the prospectus)

Contents of the Syllabus

The following is an enumeration of contents in the subject area of Radiological anatomy. Trainees should not consider this as a teaching manual or a guide.

Skull and Brain – Scalp, skull meninges, Supratentorial brain, Infratentorial brain, ventricles and CSF spaces, cranial nerves, veins and venous sinuses, intra and extracranial arteries

Head and neck – Temporal bone and skull base, orbit, nose and sinuses, infra and supra hyoid neck, oral cavity

Spine – Vertebral column, discs and paraspinal muscles, cord, meninges and CSF spaces, spinal vascular, neural plexuses and peripheral nerves

Chest – Chest wall, airways, lungs, hila, pulmonary vessels, plura, interstitial network, mediastinum, heart, pericardium and great vessels, coronary vessels, breast and axilla

Abdomen and pelvis – Abdominal wall, diaphragm, peritoneal cavity and retroperitonieum, esophagus, gastroduodenal, small intestine, colon, liver, biliary system, pancreas, spleen, kidneys and adrenals, prostate, seminal vesicles, urethra, testes and epididymis, uterus and cervix, vagina

Upper limbs – Bones and joints, muscles and nerves, blood vessels

Lower limbs – Bones and joints, muscles and nerves, blood vessels

Developmental and Fetal anatomy

Paediatric anatomy

Syllabus- Radiological Techniques

Aims of the curriculum

1. To provide the trainees, comprehensive theoretical and practical knowledge in emergency and routine diagnostic and minor interventional radiological procedures.

2. To provide the trainees, in depth knowledge on indications, contraindications and patient preparation for radiological procedures as well as identification and treatment of complications which arise during and after the procedure.

3. To provide the trainees ,broad gauge knowledge on all types of contrast media and auxiliary pharmacological agents used in radiology , in order to optimize results and ensure safety of the radiological procedures.

4. To educate the trainees on radiation safety measures in radiological procedures

General overview

During the period of first academic year, BOS radiology will make every endeavor to provide the trainees with adequate hands on experience in emergency and routine radiological procedures, under supervision of senior clinical radiologists.

The trainees are expected to make maximum use of this period and develop their procedural skills through keen and active participation.

Theoretical background of specific procedures will be discussed in relevant lectures and it is recommended that trainees supplement their knowledge on procedures by referring recommended text books.

In addition trainees are expected to attend periodic and annual academic sessions, organized by the Sri Lanka College of Radiologists to update their knowledge on radiological procedures.

Learning Objectives

At the end of the training period of one year trainees are expected to have

i) Acquired skills in performing diagnostic and minor interventional radiological procedures under supervision

ii) Understood the theoretical basis of radiological procedures

iii) Comprehensive knowledge on indications and contraindications for radiological procedures

iv) Learned the logical and rational approach in deciding the optimal individual imaging workup after careful analysis of clinical features

v) Competence in identifying and treating complications which may occur during and after radiological procedures

vi) In depth Knowledge on contrast media and auxiliary pharmacological agents used in radiological procedures

vii) Apprehended the radiation safety measures in radiological procedures and realized the need to adhere to ALARA principles

Assessment

i) Directly observed procedural skills will be carried out continuously by the trainers in the training centres.

ii) Trainees are expected to keep detailed records on the radiological procedures they perform. The trainers will be making portfolio based assessment on these records continuously.

iii) Trainees knowledge and skills in radiological procedures will be further assessed in the appraisal during the latter part of the academic year by a trainer from another training centre. The visiting trainer will also verify the records on the radiological procedures carried out by the trainee with regards to the quality and quantity along with tariner's remarks and provide a certificate of competence, which will be an eligibility criterion to sit for MD part I examination.

iv) MD (Radiology) part I Examination (Format of the examination is described elsewhere in the prospectus)

Contents of the syllabus

Brain - Computed tomography and Magnetic Resonance Imaging of the brain, ultrasound of the infant brain, cerebral angiography

Spine - Computed tomography and Magnetic Resonance Imaging of the spine, myelography, percutaneous vertebral biopsy, vertebroplasty, facet joint arthrography, nerve root blocks

Respiratory system - Computed tomography and Magnetic Resonance Imaging of the respiratory system, positron emission tomography/computed tomography of therespiratory system, conventional, computed tomographic and magnetic resonance pulmonary angiography, ventilation/perfusion radionuclide studies, computed tomographic guided lung biopsy

Heart - Computed tomography and Magnetic Resonance Imaging of the heart and coronary circulation, Conventional angiocardiography, radionuclide ventriculography and myocardial perfusion imaging

Gastrointestinal tract - Upper gastrointestinal barium and contrast studies, barium follow through and small bowel enema, barium enema, colostomy enema, barium and contrast procedures in pediatric gastro intestinal tract ,reduction of intussusceptions, ultrasound of gastrointestinal tract, Computed tomography and Magnetic Resonance Imaging of the gastro intestinal tract, celiac, superior mesenteric and inferior mesenteric arteriography, radionuclide studies in gastrointestinal tract.

Liver, biliary tract and pancreas – Ultrasonography of the liver/ biliary system/gall bladder and pancreas, Computed tomography and Magnetic Resonance Imaging of the liver/ biliary system/gall bladder/pancreas, radionuclide studies of the hepatobiliary tract, Angiogrphy, biliary driange and other inteventional procedures of the hepato biliary tract and pancreas including image guided biopsy procedures

Urinary tract – Ultrasound of urinary tract, excretion urography, Computed tomography and Magnetic Resonance Imaging of the urinary tract, micturating cystourethrography, ascending urethrography, retrograde pyeloureterography, percutaneous nephrostomy, antegrade pyelography, image guided renal biopsy/drainage procedures and cyst punctures, renal arteriography, radionuclide studies in the renal tract

Bones and joints - Computed tomography and Magnetic Resonance Imaging of the musculoskletal system, Ultrasound imaging of the musculoskletal system including assessment of neonatal hips, conventional an Magnetic Resonance arthrography, radionuclide bone scan, image guided musculoskeletal interventions

Reproductive system – ultrasonography of the male and female reproductive systems. Computed tomography and Magnetic Resonance Imaging of the male and female genital tracts, ultrasonography and magnetic resonance imaging in obstetrics, image guided interventions in male/ femal gental tracts and in obstetrics

Arterial system – Doppler ultrasonography of the arterial system, Computed tomography and Magnetic Resonance angiography, conventional/digital subtraction catheter angiography, balloon angioplasty and vascular embolisation

Venous system – Doppler ultrasonography of the venous system, Computed tomography and Magnetic Resonance Imaging of the venous system, conventional venography, radionuclide studies of the venous system

Lymphatic system - Computed tomography and Magnetic Resonance Imaging of the lymphatic system, radionuclide studies, image guided biopsy procedures

Thyroid, parathyroids - Ultrasonography and guided biopsy procedures, Computed tomography and Magnetic Resonance Imaging of the thyroid and parathyroids

Lacrimal glands and salivary glands – Ultrasonography, sialography and dactrocystography, Computed tomography and Magnetic Resonance Imaging of the salivary and lacrimal glands, radionuclide studies of the salivary glands and lacrimal glands

Breast – Mammography, ultrasound, Magnetic Resonance Imaging, radionuclide imaging, conventional ductography, image guided breast biopsy, preoperative localization

Iodinated intravascular contrast media – chemical composition, indications /contraindications for usage, injection, extravasations, adverse effects including contrast nephropathy, treatment in contrast reactions, Usage in childhood and pregnancy

Gastrointestinal contrast media – Chemical composition, basis of usage, indications contraindications for usage, adverse effects and treatments, usage in childhood and pregnancy

Gadolinium based MR contrast media-Chemical composition, basis of usage, indications, contraindications for usage, adverse effects and treatments, usage in childhood and pregnancy

Sonographic contrast media - Chemical composition, basis of usage, indications contraindications for usage, adverse effects and treatments, usage in childhood and pregnancy

Pharmacological agents in radiology including local anesthetics, sedatives, antiemetic agents, anticholenergic agents, drugs used in anaphylaxis and hypotension

Indications/contra indications for usage, route of administration, dosage, adverse effects and treatments, usage in childhood and pregnancy

Radiation safety measures in the radiological procedures and practice of ALARA principle

Syllabus – Radiography

<u>Aims of the curriculum</u>

i) To provide trainees with comprehensive theoretical and practical knowledge on the process of acquisition and recording of film based and digital images in plain film radiography in order to logically analyze the artefactual errors which may degrade the image and interfere with interpretation .

ii) To educate trainees on post processing, archiving and communication of digital images.

iii) To provide trainees with substantial knowledge in plain film radiography techniques including patient positioning and centering points for commonly performed plain radiographs. This will help trainees to identify and remedy the artifactual errors in the images which may arise due to faulty radiographic technique .This will also help trainees in their future career in clinical radiology to supervise and provide guidance to radiographers.

iv) To provide trainees with comprehensive knowledge on the apparatus used in analogue and digital plain film radiography

v)To provide trainees with practical experience in a working atmosphere and logical approach and alteration of plain film technique to suit the clinical scenario.

vi) To educate trainees on radiation safety measures in plain film radiography

General overview

Substantial part of the theoretical aspect of this syllabus will be covered in the scheduled lectures delivered by the senior radiographers. Trainees are expected to refer standard textbooks in the subject area for more details. It is highly recommended that trainees attend the plain radiography rooms regularly to observe the proceedings and discuss with radiographers and the trainers regarding the techniques.

Learning objectives

At the end of the training period of one year the trainees are expected to have

i) Acquired comprehensive knowledge on the process of image acquisition and recording of film based and digital radiography.

ii) Competence in post processing, archiving and communication of digital images

iii) The ability to identify and analyze the artificial errors in analogue and digital images

iv) The theoretical and practical knowledge in techniques of plain film radiography of commonly performed plain radiographs (trainees are not required to memorize exposure factors)

v) Acquired comprehensive knowledge on the apparatus used in analogue and digital plain film radiography

vi) Learned the rational approach in deciding the optimum plain film protocol in specific clinical scenario

vii) Comprehensive theoretical and practical knowledge in radiation safety measures and application of ALARA principle in plain radiography.

Assessment

i) Continuous assessment of theoretical and practical knowledge of trainees in plain film radiography techniques will be carried out by the trainers during the period the trainees are in plain film reporting sessions.

ii) Trainees' knowledge in plain radiography techniques and imaging protocol in various clinical situations will be further assessed by a trainer from another centre during appraisal in the latter part of the academic year.

v) MD (Radiology) part I Examination (Format of the examination is described elsewhere in the prospectus)

Contents of the Syllabus

Basic radiographic positioning and related terminology

Lines and landmarks used in radiography

General principles that can be followed to minimize dose to patients and staff at various stages of the radiological examination.

Skull – Ocipito frontal 20 degrees, Occipito -frontal 30 Degrees (Reverse Towne's, Lateral Erect , Fronto-occipital,20 Degrees↑(Supine/Trolley),Modified Half Axial (Supine/Trolley), Lateral (Supine/Trolley)

Facial bones - Mandible – Postero-anterior, Mandible Lateral Oblique, Orbits – Occipito-mental (Modified), Orthopantomography

Sinuses – Occipito-mental, Occipito- frontal 15 Degrees, Lateral

Cervical Spine – Antero-posterior C3–C7, Lateral Erect ,Antero-posterior C1–C2'Open Mouth', ,Lateral 'Swimmer's', Lateral Supine, Posterior Oblique, Flexion and Extension

Chest – Postero -anterior, Antero-posterior (Erect), Lateral, Supine (Antero-posterior) Mobile/Trolley (Antero-posterior) Sternum – Lateral

Upper limb, Clavicle – Postero-anterior Clavicle – Infero-superior Acromioclavicular Joint Antero-posterior, Shoulder Girdle – Antero- ,posterior Shoulder Joint – Antero-posterior (Glenohumeral Joint) Shoulder – Supero-inferior (Axial) Shoulder Joint Lateral Oblique 'Y' Projection. Humerus –Humerus – Lateral ,Elbow – Antero-posterior Elbow – Antero-posterior alternate Projections for Trauma Elbow – Lateral Forearm – Antero-posterior ,Forearm – Lateral , Wrist – Postero-anterior ,Wrist – Lateral, Hand – Lateral ,Hand – Dorsi-palmar, Hand – Dorsi-palmar Oblique ball cathing view, AP both hands, scaphoid views, carpel tunnel Fingers – Dorsi-palmar Fingers – Lateral Index and Middle Fingers Fingers – Lateral Ring and Little Fingers

Thoracic Spine – Antero- posterior, Thoracic Spine – Lateral,

Abdomen – Antero-posterior Supine, Abdomen – Prone Abdomen – Left Lateral Decubitus

Lumbar Spine – Antero- posterior, Lumbar Spine – Lateral, Lumbar Spine – Oblique, Lumbar Sacral Junction (L5–S1) – lateral, Coccyx – Lateral

Pelvis – Antero-posterior Sacro-iliac joints – Postero, anterior, Sacrum

Hip – Antero-posterior Hip – Lateral Neck of Femur (Trauma) Hip – 'Frog Leg Lateral,'

Lower Limb Femur – Antero-posterior , Femur – Lateral , Knee – Antero-posterior ,Knee – Lateral ,Knee – Horizontal Beam ,Lateral (Trauma), Knee – Tunnel/Intercondylar ,Notch Knee – 'Skyline' Patella (Supero-inferior), Tibia and Fibula – Antero- ,Posterior Tibia and Fibula – Lateral , Erect ,Ankle – Antero-posterior Mortice Joint, Ankle – Lateral, Calcaneum – Axial Toe – Hallux – Lateral,Toes – Dorsi-plantar ,Toes Second to Fifth ,Dorsi-plantar Oblique,Foot – Dorsi-plantar Foot – Dorsi-plantar Oblique,Foot – Lateral

Annex 3

CURRICULUM for MD RADIOLOGY (Year 2, Year 3)

Objectives

At the end of the third year the trainee should:

- have substantial experience of interpreting and reporting plain radiographs, CT, MRI and Nuclear imaging
- have acquired experience in performing and reporting the radiological procedures confidently
- be able to perform and give a provisional interpretation of standard emergency imaging procedures
- be able to advise clinicians on appropriate imaging algorithms for the investigation of standard clinical situations.
- be in a position to attempt the MD (Radiology) Part II examination.

1. Syllabus for MD Radiology

The programme for the second and third year period will consist of practical training which should give appropriate experience in all the imaging modalities.

General radiology forms the largest part of the syllabus. A knowledge of general radiology is expected, without a highly specialized knowledge of any particular field.

General Radiology comprises a mixture of all forms of radiological practice which are normally encountered in most Teaching, General, Base and District Hospitals in the country.

System based specialities

Vascular, Musculoskeletal,

Cardiac, Gastro-intestinal,

Chest, Uroradiology,

ENT/Dental/Eye, Obstetrics &Gynaecology,

Breast, Neuroradiology

Technique based specialities

Ultrasonography, Magnetic Resonance Imaging,

Computed Tomography, Interventional Radiology,

Nuclear Imaging

Disease based specialities

Oncology

Trauma

Age based specialities

Paediatrics

Geriatrics

In many training centres it will be possible for trainees to receive training in more than one speciality at the same time and there may also be opportunities to link certain specialities (e.g. CT and Neuroradiology). Such arrangements will usually be necessary so as to allow all specialities to be covered within the second and third years of training. Because of the complexities of such rotations and the inherent differences between different training schemes, the Board empowers individual training centres to determine the order of rotations and their duration. The course coordinator shall arrange such necessary rotations, with the approval of the Board of Study.

The trainee will participate in an appropriate on-call roster in which he/she will be responsible to a designated trainer/ on call trainer.

2 Syllabus in detail for MD Radiology part II

The following sections will delineate the knowledge that will be acquired during the second and third year of training.

2.1 General Radiology

Objectives in General Radiology

- participate in reporting plain radiographs which are done during the general throughput of the normal working day of a Radiology Department.
- Perform any routine radiological procedures that might be booked during a normal working day.
- Have a knowledge of the current legislation regarding radiation protection

Chest

- consolidation of knowledge of respiratory anatomy and clinical practice relevant to radiology.
- Reporting plain radiographs performed to show chest diseases.
- Obtaining experience in performing and reporting computed tomography scans of the chest.
- Obtaining experience in image guided biopsy of chest lesions & of drainage procedures.
- Obtaining experience in the application of nuclear medicine to imaging chest pathology with particular experience in reporting radionuclide lung scans.

Gastro-intestinal, Hepato biliary, Pancreas and spleen

- consolidation of knowledge of the gastrointestinal anatomy and clinical practice relevant to radiology.
- Reporting plain radiographs performed to show gastro-intestinal disease.
- Obtaining practical experience in the application of transabdominal ultrasonography to the gastro-intestinal system.
- Obtaining practical experience in contrast studies
- Obtaining experience in performing and reporting computed tomography of the gastro-intestinal tract.
- Familiarity with the current application of nuclear medicine to the gastro-intestinal tract.
- Familiarity with the relevant application of the following interventional procedures:

  ultrasound / computed tomography guided biopsy ,percutaneous biliary drainage/ stenting

• awareness of the application of angiography and vascular interventional techniques
• ERCP and other diagnostic and therapeutic endoscopic techniques
• magnetic resonance imaging applied to the gastro-intestinal system.
• endoluminal ultrasound, percutaneous gastrostomy.

Uroradiology

• consolidation of knowledge of urinary tract anatomy and clinical practice relevant to clinical radiology.
• reporting plain radiographs performed to show urinary tract disease
• obtaining practical experience in the application of transabdominal ultrasound and computed tomography in imaging of the urinary tract.
• obtaining experience in performing and reporting the contrast medium studies
• obtaining practical experience in percutaneous renal puncture as a prelude to diagnostic and interventional procedures
• awareness of the application of angiography and vascular interventional techniques
• familiarity with the current application of nuclear imaging to urinary tract imaging
• endorectal ultrasound
• magnetic resonance imaging applied to the urinary tract.
• percutaneous ureteric stent placement
• percutaneous nephrolithotomy
• lithotripsy
• urodynamics

Neuroradiology

• consolidation of knowledge of neuroanatomy and neurological clinical practice relevant to clinical radiology.
• Reporting plain radiographs performed in the investigation of neurological disorders.
• Obtaining experience in performing and reporting computed tomography of brain.
• Obtaining experience in performing and reporting magnetic resonance imaging of brain and spine·
• Familiarity with the applications of magnetic resonance angiography in imaging the cerebral vascular system.
• Obtaining experience in performing and interpreting carotid ultrasound including Doppler.
• Obtaining experience in performing and reporting cerebral angiograms.
• Familiarity with the applications of nuclear medicine to neuro-imaging.
• Obtaining experience in performing and reporting myelogram procedures when applicable.
• Familiarity with interventional neuroradiological procedures.

Vascular

(a) Ateriography / Venography/ vascular Interventional Procedures

- consolidation of knowledge of vascular anatomy and clinical practice relevant to Radiology.
- Be confident with the indications, contraindications,pre-procedure preparation, patient monitoring during procedures and post -procedure patient care.
- confident with procedure and post-procedure complications and their management. Improving practical experience of vascular imaging.
- Performing and reporting the following procedures:
    - lower limb angiogram
    - arch aortogram
    - abdominal aortogram
    - selective angiogram (e.g. hepatic, renal, cerebral)
- alternative arterial access
- performing and reporting upper limb and lower limb venography
- assisting in the performance of the following interventional procedures, such as Angioplasty, embolisation procedures, thrombolysis, stenting and filter insertion

(b) Other vascular imaging techniques

- Doppler ultrasonography
- CT angiography
- Magnetic resonance angiography
- Nuclear imaging

(c) Cardiac

- knowledge of cardiac anatomy and clinical practice relevant to Radiology.
- reporting plain radiographs performed to show cardiac disease.
- familiarity with the application of the following techniques:
    - nuclear medicine
    - computed tomography
    - magnetic resonance angiography

Musculoskeletal

- knowledge of musculoskeletal anatomy and current clinical practice relevant to radiology.
- reporting plain radiographs relevant to the diagnosis of disorders of the musculoskeletal system.
- Obtaining experience in performing and reporting Ultrasonography, computed Tomography and radionucleide scans of the musculoskeletal system.
- image guided biopsy.
- obtaining experience in performing and reporting, magnetic resonance imaging of the musculoskeletal system.

Obstetrics and Gynaecology

- consolidation of knowledge of obstetric and gynaecological anatomy and clinical practice relevant to clinical radiology.
- Obtaining practical experience of the application of transabdominal and endovaginal ultrasound in:
  - Obstetrics
  - Gynaecology
- Hysterosalpingogram - appearance of pathologies causing subfertility.
- Obtaining experience in performing and reporting computed tomography scans in gynaecological disorders, and to be aware of all obstetric applications (e.g. assessing pelvic dimensions)
- Awareness of the applications of angiography and vascular interventional techniques.
- Magnetic resonance imaging applied to gynaecological disorders.

Breast

- Understanding the principles of current practice in breast imaging and breast cancer screening.
- Knowledge of breast pathology and clinical practice relevant to Radiology.
- Obtaining experience in mammographic reporting
- performing and reporting Breast ultrasound
- Awareness of the proper application of imaging techniques to this speciality, breast biopsy and localisation techniques.

E.N.T.

- Consolidation of knowledge of ENT anatomy and clinical practice relevant to Radiology
- reporting plain radiographs performed to show ENT disease.
- obtaining practical experience of relevant contrast examinations
- obtaining experience of performing and reporting computed tomography.
- an awareness of the proper application of other imaging techniques to this specialty.
- Obtaining experience of performing and reporting magnetic resonance scans.

Head and neck / thyroid

- Secure knowledge in anatomy and application of appropriate imaging in this region , including anatomy of the supra and infra hyoid neck.
- Knowledge of common pathology in head and neck region (eg- carotid stenosis, tumours in the neck including thyroid)
- experience in invasive procedures such as biopsies

Male genital tract

- Secure knowledge of anatomy and current practice of imaging in the male genital tract
- Knowledge of testicular pathology and application of imaging
- Knowledge of transrectal anatomy and pathology and TRUS biopsy of prostate

Ultrasonography

- Consolidation of knowledge of the technical aspects and anatomy of ultrasound relevant to optimising image quality
- Obtaining practical experience in performing transabdominal ultrasound and ultrasound of small parts, transcranial ultrasonography.
- Familiarity with the practical applications of doppler ultrasound imaging.
- Obtaining practical experience in ultrasound guided interventional procedures (e.g. biopsy and drainage) endoluminal ultrasound, ultrasound of the eye

Nuclear Medicine

- A secure knowledge of the relevant aspects of current legislation regarding the administration of radiopharmaceuticals.
- Knowledge of the technical aspects of nuclear medicine relevant to optimizing image quality.
- Knowledge of radiopharmaceuticals currently available for the purposes of imaging organs and locating inflammatory collections, tumours and site of haemorrhages.
- Experience of reporting radionuclide investigations with particular experience in kidney, bone, lung.

Computed Tomography

- Consolidation of knowledge of the technical aspects of performing a computed tomographic scan, including the use of contrast media and knowledge of anatomy as visualized on computed tomography.
- Practical experience in performing and reporting computed tomography.
- Practical experience in performing computed tomography guided procedures (e.g. biopsy and drainage).
- CT angiography

Magnetic Resonance Imaging

- Understand the safety aspects of magnetic resonance imaging.
- Knowledge of the basic physical principles of magnetic resonance imaging, including the use of contrast media.
- Knowledge of anatomy and application of different pulse sequences.
- Experience in performing and reporting magnetic resonance scans

Interventional Radiology

- Familiarity with the equipment and techniques used in vascular, hepato-biliary, and renal interventional techniques.
- Familiarity with the indications, contraindications, pre-procedure preparation patient monitoring during the procedure and post-procedure patient care.
- Familiarity with procedure and post procedure complications and their management.
- Assisting and obtaining practical experience in the performance of the interventional procedures, familiarity with advanced interventional procedures.

Oncology

- Knowledge of clinical practice relevant to radiology.
- Familiarity with tumour staging nomenclature
- Reporting plain radiographs performed to assess these patients
- Obtaining practical experience in trans-abdominal ultrasound, nuclear medicine, computed tomography, MRI and interventional procedures in oncological staging, management and monitoring the response of tumours to therapy.
- Familiarity with the radiological manifestations of complications which may occur in tumour management.

Trauma

- Knowledge of current clinical practice relevant to radiology
- Knowledge of anatomical variants and normal anatomy which may mimic trauma
- Reporting plain radiographs performed to show trauma
- Obtaining practical experience of the proper application of other imaging techniques such as CT, MRI.

Paediatrics

- Knowledge of paediatric anatomy and clinical practice relevant to Radiology
- Knowledge of disease entities specific to the paediatric age group and their clinical manifestations
- Reporting plain radiographs performed in the investigation of paediatric disorders.
- Obtaining practical experience in performing ultrasound in children
- Obtaining practical experience of routine contrast studies
- Obtaining practical experience in computed tomography and MRI
- Familiarity with the practical management of intussusception Limitation of Radiation Dose in all procedures

Geriatric

- Knowledge of pathology related to ageing
- Reporting plain radiographs performed on elderly patients.
- Performing routine contrast studies in elderly patients.
- Interpretation of CT, MRI with relevance to age related change.

Annex 4

Curriculum for Post MD training in General Radiology (Year 4, year 5)

1 Post MD local training

Objectives

(a) Consolidate the knowledge and skills obtained at pre MD level

(b) Further improve the attitudes of a trainee required to function as a Radiologist in any part of the country.

(c) Develop the ability of decision making which is an essential requirement for a Radiologist

(d) Acquire the necessary strengths to join the task of further improving the field of Radiology in the country

Programme for post MD local training

The Board of study in Radiology shall decide on the post MD training to fulfill the above objectives

2 Post MD training overseas

Objectives

(a) Enhance the knowledge obtained locally

(b) Learn the global applications of Radiology and recent advances

(c) Consolidate the skills by getting exposed to ideal standard of imaging.

(d) Improve the field of Radiology locally by applying such facets of knowledge and skills thus obtained

Programme for overseas training

- Training at a center of excellence, approved by the Board of study in Radiology
- Type of training will be decided by the Board of study according to the prevailing regulations on post MD training and needs of the country
- Trainee should take an interest to make this opportunity to remedy the deficiencies experienced locally 31.7.2013.

Annex 5

ORIENTATION PROGRAMME

Orientation programme consists of a series of lectures on introduction to different imaging modalities followed by apprentice type of training at the centre to which the trainee is allocated.

Scheduled course of lectures during orientation programme are as below.

Following lectures are done by Radiologists

1. Introduction to Radiology
2. Introduction to Paediatric imaging
3. Introduction to Nuclear imaging
4. Introduction to vascular and interventional procedures
5. Introduction to CT and MRI
6. Introduction to Radiological imaging of Obstetrics and Gynaecology
7. Introduction to contrast studies (other than vascular) and Ultra Sound
8. General over view of MD Radiology Part 1

Following lectures are done by conducted by MERC, PGIM**.**

1. **Professionalism in Medicine**
2. **Portfolio maintenance and Assessment**
3. **Research programmes**

Annex 6
Short Training Rotations in selected specialized areas

Paediatrics	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct	

IR & Angiography	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct	

MRI	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct	
NHSL NSU -2 weeks NTU -2 weeks																				

Mamo	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct	

ANNEX 7

Guidelines for Submission of the Research Proposal

Section 1

1. Name of trainee
2. Name(s) of supervisor(s)
3. Training centre

Section 2

1. Project title
2. Background and justification
3. Objectives of study
4. Research plan
    a. Design
    b. Setting
    c. Method
    d. Sample size and sampling techniques
    e. Outcome measures
    f. Statistical analyses and plan of presentation of results
    g. Ethical considerations
    h. Work plan and time lines
5. References
6. Funding for study
7. Signature of trainee

Section 3

Recommendation of supervisor(s)

Signature of Supervisor 1 Signature of Supervisor 2

Date Date

Section 4

Date of submission to PGIM

Date of approval by BOS Signature of Secretary BOS

ANNEX 8

***ASSESSMENT OF THE* PROJECT PROPOSAL BY REVIEWERS - Guidelines for submission of the evaluation report**

Name of Trainee:
Training Centre:

Supervisor:

Name of Reviewe/s:

Designation: Official Address:

Tel//Fax: ……

Email: ……

……

……

Title of Project:

……
……

The two reviewers appointed by the BoS shall use the following guidelines and marking scheme to assess the project proposal of the trainee

1. **Title and Introduction:** Rationale (Justification) – problem identified and quantified. Hypothesis and expected outcome, impact and relevance of the study.
   Comments: …….
   ……
   Marks (10): ……..

2. **Literature Review:** Adequacy (evidence of a systematic search for related. similar, relevant studies)
   Comments: ……..
   ……
   Marks (10): ……..

3. **Objectives:** Clearly defined. Relevant and stated in measurable terms.
   Comments: ……..
   ……
   Marks (10): ……..

4. **Method:** Appropriate study design to address the objectives with clear detailed description of subjects, sampling technique and sample size, interventions, data collection and management. The study should be, internally valid and reproducible. Where specific details are available in the literature, reference should be made to the original papers, and comments kept to a minimum. If modifications have been made to the published techniques, these should be described in full. Appropriate statistical tests planned should be mentioned and ethical issues addressed
   Comments: ……
   ……
   Marks (30): ……..

5. **Ethical considerations/institution from where ethical approval will be /has been obtained:**

   Comments: ……
   ……..
   Marks (10) : ……..
6. **References:** According to the Vancouver system and relevant to the study. Properly documented in the Bibliography and appropriately cited in the text.
   Comments: ……..
   Marks (10) : ……..

Recommendations of reviewer/s:

- Is the project proposal acceptable? Yes / No
- If No, What corrections are required? (Attach a separate sheet of paper if necessary)
  ……..
  ……..
- Additional Comments: ……

Total Marks (80) : ……..

Signature: …….. **Date:**

Recommendation of the BOS: ……

Signature of Chairperson/Secretary: ……

Date: ……

Annex 9

Duties and Responsibilities of the Trainers

The roles and responsibilities of a trainer are multiple:

A. MD trainer(Designated Supervisor /Clinical Supervisor)
B. Supervisor of a research project
C. Reviewer/assessor of a research project
D. Supervisor of the Training Portfolio
E. Role model
F. Examiner

A. <u>As a MD trainer,</u> he/she should

1. Be involved in teaching and ensure trainees learn on the job.
2. Allocate time for trainees to discuss academic as well as personal issues.
3. In instances of unsatisfactory behaviour, attitude or problems of the trainee if the trainer is not the Designated Supervisor first warn the trainee and if the situation persists, inform the Designated Supervisor of the trainee to sort out the problem at grass root level. As a last resort, inform the Director of Post Graduate Institute of Medicine and Board of Study in Radiology so that remedial action can be taken. Communications on such issues should be copied to the trainee's Designated Supervisor.
4. Consult the Board of Study and inform the Designated Supervisor of the trainee, if a trainee is required to repeat any duration of a clinical appointment or any other appointment.
5. Send progress reports to the Board of Study in Radiology, every six months.
6. Supervise the leave arrangements of trainees. (Warn the trainees if in excess and remind them that leave is not a right but a privilege, but give their due)
7. Encourage trainees to participate in continuing medical and professional development activities such as time to visit the library, participate in other clinical meetings, workshops, critical appraisal of journal articles etc.
8. Encourage presentations by the trainees in clinical meetings, CPD activities etc.
9. Conduct workplace based assessments –as indicated in the portfolio guidelines.
10. Inform the Board of Study in Radiology if more than 2 weeks of leave is to be taken by trainer.
11. Arrange for cover up of leave for training purposes (since this may be different from work cover up)
12. Inform the Board of Study in Radiology and give adequate time for the Board to decide on an appropriate course of action if more than 1 month leave is to be taken,
13. Handover the required letters of release/ attest to the satisfactory completion of log book/ record book / portfolio of the trainees on completion of an appointment by the trainee.

ANNEX 10

Training Centres and Special Units

Training centres and special Units recognized by the PGIM as per June 2013

1. Main training centre - Radiology Training Centre in NHSL (Main Radiology Division, Radiology Division of Neuro Trauma Unit, MRI Unit of NSU)
2. Kandy – Peradeniya Radiology training complex
3. Training centre at TH Karapitiya
4. Training centre at TH CS
5. Training centre at TH CN
6. Training centre at SJGH
7. Training centre at LRH only for Paediatric Radiology
8. Training centres at DMH and CSHW only for Obstetrics and Gynaecology Radiology

In addition, Radiology Units in following Hospitals are recognized for Post MD Local Training short appointments.

Chest Hospital, Welisara
National Cancer Institute, Maharagama
SBCH for MRI only
Military Hospital, Colombo
TH Jaffna
PGH Badulla, Anuradhapura, Ratnapura, Kurunegala
DGH Matara, Kalutara

Annex 11

Criteria for Accreditation of Training Centres and Special Units

1 Status of the hospital to which the proposed radiology department is attached.
2 Availability of radiology equipment in the proposed radiology department
3 Work load of the proposed Radiology department
4 Trainers in the proposed Radiology department
5 Teaching programme and facilities

1. Status of the hospital to which the proposed radiology department is attached.
   a. State sector teaching hospital with an affiliation to a university approved by the UGC
   b. The hospital should have teaching units identified by the PGIM for post graduate training in Medicine, Surgery, Gyn and Obs and Paediatrics
   c. Minimum bed strength of 750
   d. Minimum patient turnover of about 250 per day

2. Availability of radiology equipment in the proposed radiology department
   i. Availability of following imaging equipments is mandatory
      a. Analogue/DR/ CR static plain XRay Unit
      b. Ultrasound machines capable of performing trans vaginal, soft tissue and Doppler studies- minimum of 02
      c. Spiral CT machine
      d. Fluoroscopy

   ii In addition to equipments mentioned above in i availability of at least one of the following equipment is mandatory
      a. A digital/ analogue mammography unit
      b. DSA unit
      c. MRI machine
      d. Gamma Camera
      e. PET/ CT

3. Work load of the proposed Radiology department
   The proposed Radiology department should have minimum work load in respective imaging modalities as stated below

   i. Plain radiography
   ii. Ultrasound including Doppler studies
   iii. Special investigations including Fluoroscopy studies
   iv. Non vascular interventions
   v. Vascular interventions

4. Trainers in the proposed radiology department

   a. Minimum of 2 Radiologists with at least 4 years of post Board certification experience in a state sector hospital
   b. Conduct clinic radiological meetings , journal club sessions in the department
   c. Engage in updating radiology knowledge such as CME programmes, locally/ internationally
   d. Radiologist should have been involved in conducting the post graduate lectures in MD Part 1 or Part 11 in two preceding years
   e. Should maintain a film library in the department

f. Should maintain a roster for smooth functioning of the department across the various imaging modalities, including a on call roster supervised by trainers

5. Teaching programme and facilities
   i. Spacious main reporting room with adequate facilities- To be evaluated during site visit
   ii. Facilities for instant (automat)reporting
   iii. Proposed teaching activity programme of the department
   iv. Film library/ Digital film archive

ANNEX 12

LOG BOOK: Instructions and Format

Log Book Entry of Radiological Procedures - Instructions to Trainers and Trainees

1. A log book has to be maintained by all postgraduate trainees in Radiology. This log book will be a record of practical work done by trainees and will provide written evidence of the gradual progress made by them during in-service training programme. Furthermore the discussions at Step 7 will give the trainees a continuous feedback of their performances.

2. Following procedures are to be entered in the log book.
   i. All radiographic contrast studies
   ii. All image guided diagnostic and therapeutic interventions
   iii. Selected number of other imaging studies e.g. US, CT, MRI, Mammography, Nuclear Imaging At least 10 entries from each modality per year.
   iv. Any other procedure considered as relevant by the Trainer

3. Procedures entered in the log book are to be the procedures done by the trainee under supervision or procedures where the trainee has assisted to the Trainer.

4. Entrees are to be made according to the format provided by the Board of Study in Radiology.

5. Entrees should preferably be type written.

6. It is the responsibility of the trainee to get the log entrees checked and signed by the Consultant Radiologist under whose supervision the procedures were done, within 01 week of carrying out the study.

7. Consultant Radiologist should assess the entrees and grade those according to the grading scheme provided.
   Discussion of the procedures at this step also will provide useful opportunities for trainees to improve their knowledge and skills and to overcome any deficiencies and limitations observed at that level.
   Attitudes of the trainees too can be assessed and discussed at this stage.

8. Signed entrees are to be classified technique wise and should be included in the log book in the calendar order in which the procedures were done.

9. Trainees must have the log books regularly updated and should submit those for inspection by trainers and supervisors on request, for appraisal meetings and on other occasions as deemed necessary by the PGIM.

Postgraduate Training Programme in Radiology, PGIM, Sri Lanka

Format for Log Book Entrees by Pre-MD Trainees

Procedure: X-ray No:

Institution: Date:

Assisted to the procedure / Done under supervision

Details of the patient:

Name			
Age		Sex	
Ward/clinic		BHT/Clinic No.	

Referring consultant

Relevant clinical history:

Indication for the procedure:

Pre-procedure Investigations:

Preparation of patient:

Contrast medium used (if relevant): Type

Volume

Details of technique:

Complications:

Post-procedure care:

Feedback:

Lessons learnt:

Report:

Conclusion:

Consultant Radiologist (supervisor) :

Grading by supervisor: A B C D E

Supervisor's comments:

Supervisor's signature:

A - Excellent (Nothing found wanting)
B - Good (There is some room for improvement)
C - Satisfactory (There is more room for improvement)
D - Fair (There is a lot of room for improvement)
E - Poor (Needs considerable improvement)
F - Bad (All aspects found wanting)

The purpose of this grading is to assess whether the skills of the trainees in conducting the radiological procedures show an improvement with time.

Annex 13

PRE MD PROGRESS REPORTS

NAME OF TRAINEE:

PERIOD OF TRAINING:

HOSPITAL AND Training Centre:

NAME OF THE SUPERVISOR:

Performance:

Practical Skills	**Grading**
Clinical evaluation	
Radiological procedure ; pre and post procedure care	
Procedural skill	
Radiological Diagnosis	
Detection and management of complications	
Imaging follow up	

Academic Skills

Theoretical knowledge	
Knowledge of current literature	
Participation in academic activities	

Communication Skills

Report writing	
Demonstrate appropriable communication skills with patients , relatives and others	

General Conduct

Responsibility and conscientiousness	
Punctuality	

Comments on particular weaknesses and suggested remedies:

Date : ……..

Signature of Trainer

A - Excellent (Nothing found wanting)

B - Good (There is some room for improvement)

C - Satisfactory (There is more room for improvement)

D - Fair (There is a lot of room for improvement)

E - Poor (Needs considerable improvement)

Annex 14

POST MD PROGRESS REPORT

NAME OF TRAINEE: **SPECIALTY:**

PERIOD OF TRAINING:

HOSPITAL AND Training Centre:

NAME OF THE SUPERVISOR:

	Grading
Theoretical knowledge	
Clinical decision making	
Clinical skills	
Operative skills	
Ability to cope with emergencies and complications	
Thinks independently and rationally	
Seek appropriate consultations	
Ability to follow instructions	
Quality of documentation	
Dedication to work	
Professional attitudes	
Reliability	
Availability/punctuality	
Communication skills	
Doctor-patient relationship	
Relationship with colleagues	
Relationship with other staff	
Supervises and help juniors	
Teaching of medical students/junior staff	
Other Comments:	

Signature of the Supervisor:

Date:

A - Excellent (Nothing found wanting)
B - Good (There is some room for improvement)
C - Satisfactory (There is more room for improvement)
D - Fair (There is a lot of room for improvement)
E - Poor (Needs considerable improvement)

Annex 15

PGIM PTR ASSESSMENT OF REGISTRARS/ SENIOR REGISTRARS

PTR FORM B

Confidential

Dear Colleague,

You have been your invited to participate in Peer Team Rating of this doctor. PTR is a tool for multi source feedback 360^0 assessment. We value your independent and honest rating of our trainees.

Please indicate your profession by filling in one of the following circles

O	Consultant	O	Registrar	O	SHO or HO
O	Allied Health Professional	O	Senior Registrar	O	Nurse
O	Clerical or Secretarial Staff	O	Other specify		

Your scoring should reflect the performance of this trainee against that which you would reasonably expect at his/her stage of training and level of experience. Please feel free to add any other relevant comments about this doctor's strengths and weaknesses.

Please place form in the attached self addressed envelope and return to the Trainer named on the envelope. DO NOT return to the trainee concerned.

THE PTR IS NOT AN ASSESSMENT OF KNOWLEDGE OR PRACTICAL SKILLS

Name of trainee: Specialty: Date:	**Strongly Agree**			**Strongly Disagree**	
	1	**2**	**3**	**4**	**5**
Attitude to staff: Respects and values contributions of other members of the team	1	2	3	4	5
Attitude to patients: Respects the rights, choices, beliefs and confidentiality of patients	1	2	3	4	5
Reliable & punctual	1	2	3	4	5
Communication skills: communicates effectively with patients and staff	1	2	3	4	5
Team player skills: Approachable, Supportive and accepts appropriate responsibility	1	2	3	4	5
Leadership skills: Takes responsibility for own actions and actions of the team	1	2	3	4	5
Honesty and Integrity: do you have any concerns?	Yes			No	

What is your overall rating of trainee's professionalism?

Very poor **Extremely good**

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Comments

Name: Signature:

Date:

Annex 16

APPRAISAL FORMS

EDUCATIONAL AGREEMENT

The Trainee doctor will:

1. Take an active part in the appraisal process including setting educational objectives and development a personal learning plan.

2. Make every effect to achieve the learning objectives including :
    - Making the most of apportunities for learning provided in day to day work
    - Attending all format teaching sessions
    - Planning personal study
    - Making best use of locally provided educational resources

3. Act on the principles of adult learning.
    - reflecting and building upon their own experiences
    - identifying his/ her learning needs
    - be involved in planning his/ her education and training
    - evaluating the effectiveness of their learning experiences

Educational Supervisor will:

1. Be available for and take an active part in the appraisal process; including setting educational objectives in a personal learning plan.

2. Ensure that objectives are realistic, achievable and within the scope of the available learning opportunities.
3. Ensure that an individual doctor's timetable allows attendance at format teaching sessions, is appropriate for his/ her learning needs and that there is a correct balance between training and service in the post.

4. Ensure that there is a 'climate for learning' including a positive attitude to trainee doctors

5. Ensure that help and support are always available.

I have read and understand the requirement of my role as set out above

Signed by trainee	Signed by Educational Supervisor
Name (print)	Name (print)
Signature	Signature
Date	Date

First appraisal in Radiology

(Should be done within one month of commencement of training)

Name of trainee:

Supervisor/ appraiser:

Date:

	Trainee to complete (Before meeting) Learning objectives	**Appraiser** How to meet the learning objectives	**Time scale**
Skills at Practical procedures			
Good Radiological care			
Interpretation of investigations			
Communication skills			
Presentation skills			
Maintaining trust			
Working with colleagues			
Teaching and training			
Further comments			
1.			
2.			
3.			

Date of next appraisal –

Trainee's signature
Date

Appraiser/ supervisor's signature
Date

Appraisal/ Assessment of Registrar's performance In Radiology

Name of Trainee -

The Supervisor -

External assessor -

The training center -

Year of training - **1st / 2nd / 3rd / 4th / 5th**

Period of appraisal - **from** **to -**

Appraisal - **1st / 2nd / 3rd / 4th / 5th / 6th**

1) Radiological Skills

a. Performance of investigations

	Score of trainee	Score of Trainer/ External assessor	How to meet the Learning objectives	Trainer's comments
Plain film Interpretation Chest Abdomen Extremities Axial skeleton Others-specify				
Contrast Procedures IVU Barium swallow Ba meal Smallbowel Study Ba Enema Nephrostogrm MCUG Urethrogram HSG Others-specify				

Ultrasound Conventional Doppler				
Nuclear Medicine				
CT Abdomen Brain Chest Others-specify				
MRI Brain Musuloskeletal Billiary Others-specify				
Angiography Arteriograms Venograms				
Interventional Procedure Vascular Hepatobiliary Nephrology Others-specify				

b. Report writing

	Score of trainee	Score of Trainer/ External assessor	How to meet the Learning objectives	Trainer's comments			
Plian Films							
Contrast Studies							
CT							
MRI							
US							

2) Knowledge

	Score of trainee	Score of Trainer/ External assessor	How to meet the Learning objectives	Trainer's comments
Factual Knowledge				
Clinical Application				
Health Outcome				
Management				

3) Postgraduate activities

	Score of trainee	Score of Trainer/ External assessor	How to meet the Learning objectives	Trainer's comments
Presentation Skills				
Audit				
Research				
Teaching				
Journal Club/ Clinical Meeting attendance				

4) Personal Qualities

	Score of trainee	Score of Trainer/ External assessor	How to meet the Learning objectives	comments of Trainer
Communication				
Attendance Punctuality **Time Management**				
Self motivation				
Leadership Problem Solving skill				
Self awareness/ **Self assessment**				
Reliability Taking Responsibility				

5) Professional relationships

	Score of trainee	Score of Trainer/ External assessor	How to meet the Learning objectives	Trainer's comments
Senior Colleagues				
Junior Colleagues (Medical/ Non medical)				
Patients				

Guidelines for the scoring system is given below

1. Procedural and report writing skills

	Deficient (Score 1)	**Satisfactory (Score 2)**	**Excellent (Score 3)**
Plain film Interpretation Chest Abdomen Extremities Axial skeleton Others - specify	Poor observational Skills	Accurate and Perceptive	Precise perceptive Reliable analysis and conclusions
Contrast Procedures IVU Barium swallow Ba meal Smallbowel study Be Enema Nephorstogram MCUG Urethrogram HSG Other - specify	Poor technique Frequent errors Produces poor Images	Competent examinations	Good examinations Reliable analysis/ Conclusions
Ultrasound Conventional Doppler	Poor technique Frequent errors	Competent Examinations	Reliable analysis/ Confident conclusions
Nuclear Medicine	Poor understanding/ Interpretation	Reliable analysis/ conclusions	Reliable analysis And conclusions
CT Abdomen Brain Chest Other - specify	Difficulty with technique Lack of distinction between normal and pathology	Understands the technique Reasonable analysis an conclusions	Consistently reliable analysis And confident Conclusions
MRI Brain Musculoskeletal Billiary Others - specify	Difficulty with technique Lack of distinction between normal and pathology	Understands the technique Reasonable analysis an conclusions	Consistently reliable analysis And confident Conclusions
Angiography Arteriograms Venograms	Poor manual skills Careless technique	Adequate dexterity Safe technique	Excellent aptitude Dexterity and Temperament
Interventional Procedures Vascular Hepatoniliary Nephrology Others - specify	Poor manual skills Careless technique	Adequate dexterity Safe technique	Excellent aptitude Dexterity and Temperament

1.b – Report writing

Deficient (Score 1)	**Competent (Score 2)**	**Excellent (Score 3)**
poor	Competent	Excellent

2. Knowledge

	(Score 1) (Deficient)	**(Score 2) (satisfactory)**	**(Score 3) (Excellent)**
Factual Knowledge	Shows lack of/ Undergraduates Interest in Reading Literature	Adequate knowledge	Outstanding Knowledge Widely read
Clinical application	Fails to apply Basic factual Knowledge to clinic problems Lacking Appropriate Knowledge to construct a differential diagnosis	Satisfactorily Correlates to Clinical problems Satisfactory Knowledge for Dealing with Common disorders and learn from experience	Outstanding Knowledge Sensibly applied
Health outcome	Uninterested No knowledge	Satisfactory Knowledge of cost and benefit of radiological investigations	Good Appreciation Of health Technology as it relates to Radiology
Management	Uninterested No knowledge	Basic Understanding	Good Appreciation of management structures and Issues

3. Postgraduate activities

	Score 1 (deficient)	**Score 2 (Satisfactory)**	**Score 3 (Excellent)**
Presentation skills	Inadequate Preparation No clear Conclusions Does not use Audio – visual (A – V) aids	Usually good Preparation Logical presentation Limited by inexperience Uses A – V aids	Comprehensive Clear presentation And conclusion Good use of A – V aids
Audit	No original ideas Unmotivated to carry out projects even with direction	Tries hard May lack Originality but once given ideas follows them through	Many original ideas which are effectively put into practice
Research	No original ideas Unmotivated to carry out projects even with direction	Makes an effort may lack originality but once given ideas carries them through	Many original ideas which are have been of are likely to be translated into publications
Teaching	Uninterested avoids teaching other staff	Conscientious competent	Excellent Enthusiastic teacher
Journal club/ clinical meeting attendance	Avoids meeting	Attends meeting with persuasion	Enthusiastically attends meetings and actively participate

4) Personal Qualities

	Score 1	Score 2	Score 3
communication	Fails to communicate appropriately on numerous occasions	Effective and timely	Makes considerable effort to Communicate and does so very effectively
Attendance **Punctuality** **Time management**	Poor Poor Often behind with reporting Disorganized	Average Average Can deal with day to day problems	Excellent Excellent Can confidently be left with day to day running of the service
Self motivation	Lacking Enthusiasm	Hard working Keen to learn	Full of enthusiasm Exceeds Contractual Commitment
Leadership **Problem solving Skill**	Limited	Competent	Outstanding
Self awareness	Not aware of Personal Limitation and Attitudes Reluctant to Accept criticism	Aware and responsive	Encourages Constructive Criticism and Alters practice accordingly
Reliability **Taking Responsibility**	Unreliable Forgets to do Things Not conscientious in Patient care	Dependable Does not need reminding Conscientious n Patient care	Highly Conscientious Anticipates problems

5) Professional relationships

	Score 1 (deficient)	**Score 2 (Satisfactory)**	**Score 3 (Excellent)**
Senior Colleagues	Fails to get on with senior colleagues	Good rapport With Senior colleagues	Excellent rapport With Senior colleagues
Junior Colleagues (Medical/ Non medical)	Rude Generates problems	Professional and Approachable	Exceptional Communication skills
Patients	Rude Patients dislikes him/ her as their doctor Bad listener/communicator	Caring Attitude can allay Fears Trusted by Patients Listen and explains well	Establish exceptional rapport communicator

Ref No:

BOARD OF STUDY IN RADIOLOGY
ASSESSMENT FORM FOR POSTGRADUATES

Name of trainee: **……...**

Hospital/ Unit: **……..**

Year of Pre MD training: **…….**

Local Post MD: **……**

Period of training from **…….…….** to **……..**

Please encircle as appropriate from 5 to 1 each of the following categories and add up the total

SOCIAL SKILLS

(A) Empathy – sensitivity in dealing with patients family members of patient and staff.

5 Demonstrates outstanding sensitivity – Always compassionate and caring.
4 Always considerate.
3 Usually considerate and develops good rapport.
2 has difficulty in establishing rapport, or is occasionally considerate.
1 Insensitive and inconsiderate to patient/ or staff needs.

(B) Oral Communication – Ability to communicate with patients, technical and nursing staff and clinical colleagues.

5 Outstanding.
4 Above average.
3 Average with adequate and communication.
2 Below average and has occasional difficulty communicating clearly and effectively.
1 Unsatisfactory with poor communication skills.

(C) Interpersonal skills – Ability to muster cooperation from other team mates and clinical colleagues

5 Outstanding.
4 Above average.
3 Generally respected.
2 Has alienated team members and clinical colleagues.
1 Frequently alienates team members of is not trusted. respected by them.

THEORETICAL SKILLS

(D) General Medical Knowledge applied to Radiology

5 Demonstrates outstanding knowledge.
4 Above average.
3 Generally adequate.
2 Below average.
1 Unsatisfactory and requires remedial attention.

(E) Knowledge of the speciality area

5 Outstanding.
4 Above average.
3 Generally adequate.
2 Below average.
1 Unsatisfactory and requires remedial attention.

(F) Technical skills – Pre-procedure assessment of patient, proficiency in carrying out Radiological procedures and ability to handle post procedure complications.

5 Extremely proficient.
4 Demonstrates a good capacity in above.
3 Adequate performance in most areas.
2 Some areas of deficiency which need to be improved – specify.
1 All areas are deficient and remedial action required.

(G) Diagnostic skills – Ability to make a reasonably accurate Radiological diagnosis on the data available.

5 Outstanding with completeness and accuracy.
4 Above average.
3 Average – occasionally misses the diagnosis.
2 Below average.
1 Unsatisfactory with often incomplete or inaccurate diagnosis.

ORGANIZATIONAL SKILLS

(H) Written and oral communication – standard of radiological reports and oral communication at clinico – radiological meetings.

5 Outstanding.
4 Above average.
3 Average.
2 Radiological reports are often incomplete and inaccurate. Oral communication below average – specify.
1 Very poor in computing a report and in oral communication.

(I) Research and Publications

5 Outstanding.
4 Able to formulate ideas for publications.
3 Adequate and can plan without too much assistance.
2 Needs assistance.
1 Disorganised.

RESPONSIBILITY/ CAREER AMBITION

(J) Responsibility in patient care and discharging the duties entrusted.

5 Highly motivated and responsible.
4 Can be relied upon.
3 Generally can be relied upon
2 Occasionally forgets of avoids responsibilities, require frequent reminders.
1 Avoids responsibility and demonstrates erratic performance of duties.

(K) Self-Education – Seeking/ probing learning opportunities and confidence displayed in presentations and talks.

5 Outstanding.
4 Above average.
3 Usually participates in learning activities.
2 Needs prompting to attend continuing educational activities
1 No interest in self-education.

(L) Work Performance – General attributes/ attitudes, punctuality, attitude towards senior colleagues helping junior colleagues, establishing rapport with colleagues in the department and colleagues in other disciplines.

5 Outstanding and excellent in all areas.
4 Above average.
3 Average and meets most expectations.
2 Below average and some improvement needed.
1 Unsatisfactory with performance below expected level.

Total (Marks) : **……**

EVALUATION (Please encircle as appropriate)

Total (Marks)	Grading	Performance
60-51	A	Highly commendable – progress
50-31	B	Adequate performance – progress
30-21	C	Improvement desired – conditional progress
20-12	D	Poor performance - fail

COMMENTS :

Trainee's Signature : **……**

Supervisor's Signature: **……**

Date: **……**

Annex 17

Trainee Portfolio in Radiology

1. Introduction

The trainee portfolio in Radiology is a comprehensive documentary record maintained by the trainee to reflect his/her learning process during the radiology in service training programme leading to board certification as a specialist in radiology.

It is also a key document in the formative assessment of the trainee performance and learning processes during the training programme.

Continuation of the portfolio beyond Board Certification would enable a specialist to maintain a valuable record of all aspects of his or her career.

2. The objectives of maintaining a portfolio

1) To provide comprehensive documentary proof of the learning and academic activities of the trainee during the training programme.
2) To help self, peers, supervisors and assessors to evaluate the overall training and provide guidance in areas when and where it is needed.
3) To identify the constrains and difficulties in the working environment and develop strategies to overcome them.
4) To set standards and design methods in correct practice of radiology which can be used locally or globally when appropriate.
5) To provide documentary proof of good rapport and communication skills of the trainee with his/her patients and peers
6) To provide documentary proof of trainee's ability to share his knowledge with others and impart his knowledge on the others.

3. Broad outcomes of the specialist training

- Subject expertise
- Research and audit
- Ethics and medico-legal issues
- Information technology
- Lifelong learning
- Teaching and sharing knowledge

4. Formative learning

Portfolio provides evidence of formative learning process through three essentially interlinked components

a) Descriptive – Description of the learning event

b) Analytic – focused self assessment, reflecting on his/her own experience with critical pondering on strength and weaknesses

c) Reflective – design of own strategies that leads to improvement of practice

Using such a process there is improved training by self-identification of strengths and weaknesses. This in turn is expected to promote deep learning. The entire procedure involves documentation of what the trainee already knows and identification of areas for improvement. In that context, it

would be a helpful aid in planning further learning. This approach promotes self-directed learning and critical thinking skills.

5. Contents of the portfolio

i) Subject expertise:
- progress reports from supervisors (essential, should be according to prescribed format – see annexure)
- Supervisor feedback on communication skills
- log of procedures carried out
- Case records – see annexure
- results of any work-place assessments conducted
  Direct Observation of Practical Skills (DOPS) , case based discussions, multi disciplinary team meetings, journal clubs

ii) Research and Audit relevant to specialty or subspecialty
- Research papers published or accepted for publication
- Clinical audit

iii) Ethics and Medico-legal Issues
a. Completed Professionalism Observation Forms (from integrated learning component of Professionalism Strand)
b. Completed PTR forms during post-MD training

iv) Information Technology
- Participation in training programmes / workshops
- Evidence of searching for information and application of findings in practice

v) Life-long learning
- Participation in conferences and meetings

vi) Teaching and sharing knowledge
- undergraduates
- postgraduates
- ancillary health staff

vii) Formative learning through reflective practise
The BOS (radiology) expects trainee to narrate at least one learning event experienced by him/ her in relation to broad outcomes of specialists training for specialist training given above , with reflection on what and how the trainee learned from this experience

Proposed approach for application of reflective practice in formative learning process in a radiological procedure is given in annexure

6. Guidelines to prepare and maintain the portfolio

a) All documents in the portfolio should be **computer printed** or should be scanned images or photocopies of articles.

b) Entries in the portfolio should be made by the trainee **at the time of acquiring the skill** and authorized or confirmed by the trainer or supervisor. The trainee is expected to keep the portfolio updated regularly

c) It is mandatory that the entries are made **in chronological order**

d) **Separate page numbering** should be made in each sub-section.

e) In Continuing Professional Development and other areas in which further developments have taken place, **reference may be made to earlier entries** via provision of the relevant page numbers.

f) It is the responsibility of the trainees, the trainers and the supervisors to ensure that the **entries in the portfolio are authentic**

g) It is advisable to assemble the contents as a polythene ring binder initially which would allow easy insertions by the trainee.

7. Format for formative learning in radiology procedures

Following is a proposed approach for application of reflective practice in formative learning process in a radiological procedure.

Maintenance of detailed records of each of the steps listed below is essential.

I) Identify the Learning Event
Define the target event - The radiological procedure and the indication, on which you are planning to base your learning process.

ii) Prepare for the learning event
Critical pondering on target event

a) What do I already know about the disease which I am planning to diagnose or exclude? Do I know the technique of the radiological procedure. If not, discuss with the trainer, peers

b) What more do I need to know?
Case specific details – Information from BHT, Clinic records, Clinical history from patient/relatives/guardian/attending clinicians

Disease specific details – Background knowledge about the disease. The sensitivity and specificity of the radiological procedure to demonstrate the disease, Modification of the technique to improve the sensitivity and specificity - Refer Standard text books, web search

Management specific details - The vital information expected from the procedure and its impact on patient management - Discuss with clinicians during MDT meetings

iii) Perform the radiological procedure (The learning event) – directly observed by the trainer and peers.

iv) Evaluate the learning event - Self assessment, feedback from the trainer and the peers regarding the problems encountered during the procedure and strategies adopted to overcome them .Compare the final diagnosis (surgical, histological) with your radiological diagnosis. Find out the impact on patient management brought about by your learning event.

v) Review and revisit the learning event - with regards to the lessons learnt and recommendations to improve future practice of similar procedures.

vi) Discuss with your trainer and formulate a better protocol - for similar procedures using the learning experience. Compare with the existing protocol and highlight the strengths of the new protocol

vii) **Perform similar procedures** - using new protocol and show progressive improvement of results.

viii) **Get the entire record endorsed by your trainer.**

Annex 18

Log of procedures done by Senior Registrars in Radiology

1. Name of Senior Registrar in Radiology: ……..

2. Date of Commencement of Training: ……

3. Date of Completion of Training: ……

4. Local Training

Training Centre/s ……

……

Supervisor/s ……

……

……

5. Overseas training

Training Centre/s ……

……

Supervisor/s ……

……

6. Were all the progress reports received from the overseas trainers?

Yes/ No……

If No, details ……

7. Date of Board Certification as a Specialist in Radiology

……

PART 1

LOG OF: - EXAMINATIONS /PROCEDURES PERFORMED

EDUCATIONAL COURSES/SCIENTIFIC SESSIONS ATTENDED

- TEACHING BY TRAINEE
- ATTACHMENTS/ROTATIONS COMPLETED

Please add extra pages for documentation of examinations and procedures if required

REPORTING OF PLAIN RADIOGRAPHS

Date	Chest 300	Skull and Spine 100	MSK 200	Abdomen and Pelvis 100	Name of Supervisor	Signature of Supervisor
Total						

FLUROSCOPIC EXAMINATIONS AND PROCEDURES

Date	Upper GI 100	Lower GI + Loopogram 100	MCUG + Urethrogram + IVU 50	Ante,Retro Grade Pyelogrm 15	Miscellaneous Sialo,Sino Fistulo etc. 40	Others including angiography & Intv. procedures 30	Name of Supervis.	Signature of Supervis.
Total								

ULTRASOUND SCANNING

Date	Abdomen + Pelvis 300	Brain 50	Chest 50	Hips 50	Other MSK + Small parts 50	Name of Supervisor	Signature of Supervisor
Total							

CT SCANNING

Date	Brain 200	Head & Neck 50	Chest Respiratory CVS HRCT 100	Abdomen & Pelvis 100	MSK 50	Name of Supervisor	Signature of Supervisor
Total							

MRI SCANNING

Date	Brain 150	Head & Neck + Spine 50	Cardiac (Optional)	Abdomen & Pelvis 50	MSK 50	Name of Supervisor	Signature of Supervisor
Total							

NUCLEAR MEDICINE

Date	DMSA 25	DTPA 25	HIDA 10	PET – CT (Optional)	Miscellaneous Bone,Thyroid,Meckel, Cystogram Milk scan etc. 10	Name Supervis.	Sig.of Superv.
Total							

INTERVENTIONAL PROCEDURES

Date	Biopsy compulsory 20	Others- Optional Specify	Name of Supervisor	Signature of Supervisor
Total				

EDUCATIONAL COURSES/SCIENTIFIC MEETING ATTENDED

Annual Academic Sessions and Clinico-radiological meetings organized by the Sri Lanka College of Radiologists can be included

Title	Date	Venue	Perceived Benefit to Trainee	Contribution to the field from the benefit gained

TEACHING BY TRAINEE

Date	Topic	Audience

ATTACHMENTS/ROTATIONS COMPLETED

YEAR OF TRAINING	DATES	SPECIALTY	HOSPITAL	TRAINER'S SIGN.

Annex 19

Certificates of recommendation issued prior to MD Part I and MD Radiology Examinations

BOARD OF STUDY IN RADIOLOGY
POSTGRADUATE INSTITUTE OF MEDICINE

This is to certify that

.....

has fulfilled all the prerequisites to sit the

MD(RADIOLOGY) PART I EXAMINATION

that will be held in December, 20....

and is eligible to apply for the said examination

.....	.....
Supervisor	**External Assessor**

Date: .....

BOARD OF STUDY IN RADIOLOGY
POSTGRADUATE INSTITUTE OF MEDICINE

This is to certify that

.....

has fulfilled all the prerequisites to sit the

MD(RADIOLOGY) PART II EXAMINATION

that will be held in December, 20....

and is eligible to apply for the said examination

..... **.....**

Supervisor **External Assessor**

Date: .....

ANNEX 20
Post MD LOCAL TRAINING ROTATION

Appointment	Training Unit
General Radiology	GH, Ratnapura
2 Months	GH, Kurunegala
	GH, Badulla
	BH, Trincomalee
	TH, Jaffna
	TH, Anuradhapura
	TH Matara
Ultrasonography	NHSL
01 Month	GH, Kandy
	TH, Peradeniya
	TH, Ragama
	SJGH
	TH, Karapitiya
	TH, Kalubowila
CT	NHSL
01 Month	GH, Kandy
	TH, Ragama
	SJGH
	TH, Karapitiya
	TH, Kalubowila
Interventional Rad.	NHSL
01 Month	TH, Kandy
MRI - 01 Month	NSU, NHSL
	SBSCH,Peradeniya
	TH, Karapitiya
	TH, Kandy
Paediatrics – 01 month	LRH
Trauma Imaging	AS, NHSL
- 01 Month	GH, Kandy
	TH, Peradeniya
	TH, Karapitiya
	TH, Ragama
Chest Imaging	TH, Kandy
- 01 Month	Chest Hospital, Welisara
Oncology Imaging	CI, Mahragama(**1 trainee each)**
- 01 Month	TH, Kandy
Gyn. & Obs(1month)	CSHW
Mammography	NHSL
02 weeks	GH, Kandy
	CI,Maharagama
Elective Appointments - 2 weeks . ***Trainee need to select 01 Appt only.***	
Nephrology	GH, Kandy
Nuclear Imaging	NHSL(1 week)
	LRH (1 week)

ANNEX 21

Post MD RECORD BOOK

MD (RADIOLOGY)

Post MD Local training

RECORD BOOK

POSTGRADUATE INSTITUTE OF MEDICINE

COLOMBO

This booklet has to be submitted by the trainee to the PGIM with the application for Board Certification.

Name of the Trainee -

Date of enrolment to the Radiology training programme -

Centre of the Pre MD training -

Date of passing the MD Radiology Part I examination –

Date of passing the MD Radiology Part II examination-

Date of commencement of post MD local training-

Date of completion of post MD local training-

General Radiology at a training center recognized for post MD training (3 months)

Training centre -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments – (1 month – Ultrasonography)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments – (1 month Interventional Radiology)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – **eg:**

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments – (1 month – MRI)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments – (1 month – Peadiatrics)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments – (1 month – Trauma Imaging)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments – (1 month – Chest Imaging)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments (1 month – Oncology Imaging)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments (1 month – Gyn. & Obs.)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Special Appointments (2 weeks - Mammography)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Elective Appointment (2 weeks - Nephrology)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Elective Appointment (2 weeks – Nuclear Medicine)

(1 week – NHSL)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

Elective Appointment (2 weeks – Nuclear Medicine)

(1 week – LRH)

Training center -
Date of Commencement -
Date of completion -
Leave -
No. of days
Casual / Vacation / Other

Supervisor's comments

Score			Subject	Score			Subject
A	B	C		A	B	C	
			Knowledge (Radiology)				Attendance at Clinico – Radiological meetings & Journal club meetings
			Reports				Presentations at Clinico - Radiological & Journal club meetings
			Problem solving / decision making skills				Professional attitudes & behaviour
			Attendance / Punctuality				Ongoing education
			Interpersonal & communication skills				Self assessment
			Research				Relationship with other staff members

Score 1. Standard exceeds expected level of training
2. Consistent with level of training
3. Below expected level of training
4. Well below expected level of training

Remedial action – eg:

1. Continue self education & reading
2. Recommended further exposure to the subject
3.
4.

	Name of supervisor	Signature
A		
B		
C		

ANNEX 22

READING MATERIAL

READING LIST for RADIOLOGY TRAINEES

The Board of Study in Radiology considers that the following publications are amongst the more helpful ones available. It is clearly not appropriate that the whole of every book should be read. The list has been prepared as a guide for trainees and trainers. It is appreciated that teachers may also recommend other suitable publications.

01. Radiological Anatomy

1. An imaging atlas of human anatomy by J. Weir & P. Abrahams.
2. An atlas of normal roentgen variants which may simulate disease by Theodore E Keats
3. Clinical Anatomy – By Harold Ellis
4. Radiological Anatomy by Paul Butler

02. Radiological Techniques, contrast media and drugs

1. Techniques in diagnostic imaging by G.H. Whitehouse and B.S. Worthington
2. A guide to Radiological procedures by S. Chapmen & R. Nakielny

03. Radiography

1. Diagnostic Radiography by Glenda Bryan
2. Clark's positioning in radiography volume 1 & 2

04. Physics, photography and apparatus

1. Christensen's Introduction to physics of Diagnostic Radiology by T.S. Curry, J.E. Dowdry & R.C. Murry
2. Physics for Radiologists – P.P. Dendy & B. Heaton
3. Fundamental physics of Radiology by W.J. Meredith & J.B. Massey.
4. The essential physics of Medical Imaging 3rd edition – J.T. Bush Berg
5. Farr's Physics for Medical Imaging – A Roberts, Jerry Williams

05. General Radiology

1. A Text Book of Radiology and Imaging by David Sutton
2. Text Book of Diagnostic Radiology by Allison and Grainger

06. Journals Recommended for Reference

1. Clinical Radiology
2. American Journal of Roentgenology
3. Radiology
4. Radiographics
5. Radiological Clinics of North America
6. Seminars in Roentgenology