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**POSTGRADUATE INSTITUTE OF MEDICINE  
UNIVERSITY OF COLOMBO, SRI LANKA**



# **PROSPECTUS**

**DOCTOR OF MEDICINE (MD)  
AND BOARD CERTIFICATION  
IN MEDICAL PARASITOLOGY**

**2012**

**BOARD OF STUDY IN MICROBIOLOGY**

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## MD AND BOARD CERTIFICATION IN MEDICAL PARASITOLOGY

### 1. BACKGROUND

The MD Medical Parasitology and Board Certification are the second and third stages of a three-part training programme conducted by the PGIM's Board of Study in Microbiology for those who wish to specialize in the field of Medical Parasitology. The first stage of the training programme, the Diploma in Medical Microbiology, lays the foundation for MD training in several specialities including Clinical Microbiology, Medical Virology, Medical Parasitology and Medical Mycology.

The first MD Medical Parasitology training programme was launched in 1992. Since then it has been reviewed and revised to serve the evolving needs of the country in relation to the field of Medical Parasitology. The last MD examination was held in January 2009, and several changes have been recommended by the Board of Study with regard to the training programme and the assessments subsequent to receipt of the External Examiner's Report in 2009. However, there have been no MD Parasitology trainees since then, and therefore the changes have not been implemented.

This prospectus incorporates changes approved by the BoS in 2009<sup>1</sup>.

### 2. GOALS & LEARNING OUTCOMES

Those who are Board Certified in Medical Parasitology should be:

- Able to organise, manage and direct a diagnostic laboratory for Medical Parasitology.
- Able to provide clinicians with advice regarding diagnosis and treatment of parasitic infections, when requested.
- Able to plan and carry out a research project in the field of Medical Parasitology
- Conversant with modern developments in the field of Medical Parasitology
- Able to undertake teaching in Medical Parasitology for undergraduates, post-graduates and paramedical personnel.

#### Learning Outcomes

##### A. *Scientific Basis of Medical Parasitology*

- aetiology, pathogenesis, epidemiology and prevention of parasitic infections
- laboratory investigations for the diagnosis of parasitic diseases.
- antiparasitic agents

##### B. *Laboratory skills*

- process samples sent for routine parasitological investigations in a clinical diagnostic laboratory
- report on parasitic pathogens in clinical samples

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<sup>1</sup> BoS minute 09.03.3.2 and 09.04.3.2

- work with due attention to quality assurance and laboratory safety.
- instruct on collection and transportation of samples for parasitological diagnosis
- C. *Laboratory Management*
  - manage the Parasitological laboratory services and the work environment of a Medical Parasitology laboratory.
- D. *Patient management*
  - advise clinicians on the investigation and management of patients with parasitic infections
  - use of antiparasitic agents
- F. *Public Health*
  - work in an interdisciplinary team to investigate and control parasitic diseases of public health importance
- G. *Research*
  - design, conduct and report on a medical parasitology related research project

### **3. ENTRY CRITERIA**

Applicants should have

- i. A medical degree registered with the Sri Lanka Medical Council and
- ii. Completed an internship recognized by the Sri Lanka Medical Council and
- iii. Completed one year work experience in Sri Lanka, after internship and
- iv. The Postgraduate Diploma in Medical Microbiology examination conducted by the PGIM. Not more than 4 years should have elapsed after the trainee has passed the examination.

N.B. The PGIM's Postgraduate Diploma in Clinical Microbiology is not an entry pathway to the MD Parasitology.

### **4. SELECTION PROCESS**

All those who fulfill the entry criteria stated in Section 3 will be considered eligible for admission to the MD training programme provided they are released for training by their employers (Director-General Health Services, University Vice-Chancellors, private sector institutions etc).

In the event that the number to be released for training is less than the number who fulfill the entry criteria and apply for admission to the training programme, selection of those to be released for training should be on the basis of merit order at the PGIM's Postgraduate Diploma in Medical Microbiology examination.

In the event that such selections must be made from among those who fulfill the entry criteria but have passed the said Diploma examination at different points in time, those who have passed most recently at the first attempt will be given priority, and those who passed

in previous years or in a second or subsequent attempt will be placed at the bottom of the merit order.

## 5. INTAKE

The exact number will be decided by the BOM on the recommendation of the BoS in Microbiology (which will depend on the available facilities, training sites and trainers in Parasitology) and in consultation with the Secretary, Ministry of Health.

Not more than 5 trainees will be selected in any given year.

## 6. DURATION OF TRAINING

3 years for MD training and 2 years for post-MD training

## 7. FORMAT OF TRAINING PROGRAMME

The training programme will consist of **three** main components

- A. **in-service training** of 15 months (60 weeks) duration, with periods in specified Parasitology departments in the universities, and Health Ministry institutions (40 credits)
- B. **Tutorials** conducted during the period of in-service training (6 credits)
- C. a **research project** and dissertation to be completed in 21 months (45 credits)

### Outline of training programme

Year 1											
M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
In-service training block 1								LE1	Research project		

Year 2											
M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Research project											

Year 3											
M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Research project						In-service training block 2				LE2	

Year 4											
M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
MD exam	Post MD training										

Year 5											
M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
Post-MD training											

## A. In-service training

In service training will be provided in a range of institutions, each of which has staff with a distinct area of expertise in relation to parasitic and vector-borne infections.

The training site, area of study, and relevant training period shall be as follows:

Module	Training site	Training period (weeks)
<b>Training Block 1</b>		
1. General Parasitology	Dept of Parasitology, Faculty of Medical Sciences, SJPU	4
2. Malaria	Malaria Research Unit, Faculty of Medicine, University of Colombo	8
3. Malaria control	Anti Malaria Campaign HQ	4
4. Leishmaniases and trypanosomiases	Dept of Parasitology, Faculty of Medicine, University of Colombo	4
5. Filariasis	Filariasis Research Unit, Faculty of Medicine, University of Ruhuna	8
6. Filariasis control	Anti Filariasis Campaign HQ	4
7. Medical Entomology	Entomology Dept MRI	4
	Total	36
<b>Training Block 2</b>		
1. Intestinal protozoa and trichomoniasis	Dept of Parasitology, Faculty of Medicine, University of Peradeniya	4
2. Intestinal nematodes, cestodes & trematodes	Dept of Parasitology, Faculty of Medicine, Ragama	8
3. Toxoplasmosis and parasitic zoonoses	Dept of Parasitology, MRI	4
4. Epidemiology of vector-borne diseases in Sri Lanka	Epidemiology Unit, Ministry of Health	4
5. Molecular diagnosis of parasitic and vector-borne diseases	Molecular Medicine Unit, Faculty of Medicine, Ragama	4
	Total	24

The content areas for each module are set out in Annex 1.

*Calculation of credits: on the basis that 45 hours of in-service training under the direct supervision of a PGIM trainer is equivalent to one credit, this amounts to a total of **40 credits** for 60 weeks of training.*

## B. Tutorials

During the 2 periods of in-service training, trainees are expected to attend tutorials conducted by MD trainers on a fortnightly basis, on a topic related to the training component or other topics related to laboratory management, quality assurance etc. Some of these tutorials will be common to those on the MD Medical Microbiology and Medical Virology training programmes.

*On the basis that 15 hours of face-to-face teaching is equivalent to one credit, with 30 classes of 3 hours each, this amounts to **6 credits**.*

### **C. Research project leading to a Dissertation**

A research project approved by the Board of Study must be carried out by each trainee under a designated supervisor. The objective of this training component is to enable trainees to gain experience in planning, carrying out and presenting a research study. The findings are expected to contribute to existing knowledge regarding parasitic infections in Sri Lanka. The study proposal and dissertation should therefore show evidence of originality and / or discovery of new facts in the area under study, as judged by independent, critical assessment.

The project proposal is expected to enable trainees to show their ability to:

- Clearly define a topic for study
- Define the questions to be asked and investigated
- Put the research question into context nationally and internationally, and
- Apply appropriate research methods

The dissertation is expected to enable trainees to show their ability to

- Write clearly and succinctly
- Find and summarise relevant published literature
- Gather and analyse primary data from microbiology laboratory-based investigations
- Present findings in an orderly and coherent fashion
- Discuss, clearly and coherently, the significance of the findings as applied to the national and international contexts
- Justify conclusions in terms of findings
- Provide a properly cited, complete and orderly bibliography

Guidelines for supervisors are provided in **Annex 2**. The research project may be carried out on a subject of the student's choice.

Trainees are expected to submit the Supervisor's Consent Form (**Annex 3**) to the Board of Study, **by the end of the 4<sup>th</sup> month of the training period**, for Board approval of the title of the study and the designated supervisor.

Trainees are expected to participate in a PGIM workshop on research methodology and scientific writing during the first year of training.

After obtaining approval for the title of the project, trainees are expected to formulate a complete research proposal (**Annex 4**) and submit it for Board approval **by the end of the 7<sup>th</sup> month of the training programme**. Trainees are also expected to make 10-minute



presentations of their project proposals at a seminar, in order to obtain feedback from other trainers prior to commencing work on the project.

Trainees are expected to engage in sample collection, benchwork, data analysis and writing up of the dissertation during the 21-month period extending from the 10<sup>th</sup> to the 30<sup>th</sup> months of training. Supervisors are expected to submit a progress report at the end of each 6-month period (**Annex 5**).

**In 5<sup>th</sup> month of the 3<sup>rd</sup> year**, trainees are expected to make another presentation on their findings, in order to obtain feedback from other trainers. Trainees must submit their dissertations, written according to the guidelines set out in **Annex 6, before the end of the 6<sup>th</sup> month in the 3<sup>rd</sup> year of training**. Trainees must submit the completed dissertation by this deadline in order to be eligible to sit for the MD examination.

*This training component (Research Project) shall carry **45 credits**.*

## **8. TRAINERS**

Trainers recognized by the Board of Study for the MD in Microbiology have at least three years experience after Board Certification in the field of Medical Parasitology, Medical Microbiology, Community Medicine or Molecular Biology, or at least five years experience after obtaining a PhD degree.

The roles and responsibilities of a trainer are identified in **Annex 7**.

The current list of trainers is shown in **Annex 8**.

## **9. FORMAT OF ASSESSMENTS**

Assessment of trainees includes in-course assessment, assessment of the dissertation, and end-of-course final examinations.

### **A. In-course assessment**

Trainers are required to send **progress reports** every 6 months during the research project (**Annex 5**). Trainees are also expected to submit **Peer Team Ratings** as per standard PGIM requirements. Persistently unsatisfactory reports may result in candidates being discontinued from the training programme.

**Laboratory Skills Examination 1** will be conducted at the end of the in-service training block 1. It will consist of two sessions. For each session, there will be at least 2 examiners appointed by the Board of Study. The marks awarded at this examination will contribute to 12% of the final marks

1. **Lab Exam Session 1:** Examination of **blood films** for parasites, specimens at 3 stations, to be processed within 3 hours.
2. **Lab Exam Session 2:** **Entomological specimens** at 3 stations to be identified or dissected within 3 hours.

**Laboratory Skills Examination 2** will be conducted at the end of in-service training block 2. It will also consist of two sessions. For each session, there will be at least 2 examiners appointed by the Board of Study. The marks awarded at this examination will contribute to 12% of the final marks

3. **Lab Exam Session 3:** Examination of **faecal samples** for parasites, specimens at 5 stations, to be processed within 3 hours
4. **Lab Exam Session 4:** Examination of **cultured parasites, and pathological specimens** at 6 stations, to be processed within 3 hours

#### **B. Assessment of the dissertation**

The report on the research project must be submitted in the form of a dissertation at least four months before the MD examination. The dissertation must conform to the format given in the guidelines to MD trainees (**Annex 6**).

The dissertation will be assessed by one local examiner and the foreign examiner, using a standard format (**Annex 9**). The trainee will be questioned on the dissertation at the viva voce examination in the final end-of-course assessment. The marks awarded for the dissertation will contribute to 35% of the final mark

#### **C. Eligibility to sit for end-of-course assessment**

In order to be eligible to sit for the final examination, trainees must

- 1) Show at least 80% attendance in each of the following training components
  - a. In-service training appointments
  - b. Tutorials
  - c. Research project
- 2) Obtain a satisfactory progress report from trainers for each module
- 3) Submit Peer Team Rating forms as required by the PGIM
- 4) Submit the dissertation

#### **D. End-of-course assessment**

A final examination will be conducted at the end of the training period of 3 years. There shall be at least 3 examiners who are specialists in Medical Parasitology, two local examiners and one from overseas.

The final examination shall have three parts, with six components, as set out below:

**Part 1 – Theory examination with two components: Paper I and Paper II**

**Part 2 – Laboratory examination 3**

**Part 3 – Oral examination on dissertation**

**Part 4 – Oral examination on Medical Parasitology**

**D1: Theory Examination**

**Theory Paper I** will have 5 essay type questions to be answered in 3 hours. The number of questions from each sub-specialty will be as follows:

<b>Sub-specialty</b>	<b>No of questions</b>	<b>Marks</b>
Medical Protozoology	2	200
Medical Helminthology	2	200
Medical Entomology	1	100
<b>Total</b>	<b>5</b>	<b>500</b>

**Theory Paper II** will have 5 structured essay and short answer questions to be answered in 3 hours.

<b>Sub-specialty</b>	<b>No of questions</b>	<b>Marks</b>
Diagnosis of infection	1	100
Patient management	2	200
Prevention and control	2	200
<b>Total</b>	<b>5</b>	<b>500</b>

Each answer will be marked independently by two examiners.

**D2. Laboratory examination 3**

This will consist of 30 spots to be identified in 90 minutes. The number of questions from each sub-specialty will be as follows:

<b>Sub-specialty</b>	<b>No of questions</b>	<b>Marks</b>
Medical Protozoology	12	60
Medical Helminthology	12	60
Medical Entomology	6	30
<b>Total</b>	<b>30</b>	<b>150</b>

Each answer is marked by 2 examiners out of total of 5 marks, to derive a final mark out of 150.

**D3. Oral examination on the Dissertation.** The candidate is expected to make a 15 minute presentation on the dissertation, which will be followed by an oral examination by two examiners for 30 minutes.

**D4. Oral examination on Medical Parasitology.** The candidate will be questioned by two examiners for 15 minutes in a structured oral examination.

The final computation of marks shall be as follows:

Examination component	Marked out of	Percentage of final mark
Theory paper I	500	15
Theory paper II	500	15
Laboratory examination I	300	12
Laboratory examination II	300	12
Laboratory examination III	150	6
Dissertation	100	35
Oral examination	20	5
<b>Total</b>		<b>100</b>

#### E. Requirements to pass the MD Examination

To pass the MD in Medical Parasitology Examination, a candidate will be required to obtain the following:

- A final percentage mark of **60%** or more  
**AND**
- A minimum of **50%** or more for the theory part of the examination (Theory Papers I and II together)  
**AND**
- A minimum of 50% or more for the laboratory part of the examination (Laboratory Examinations I, II and III)  
**AND**
- A minimum of 50% or more for the dissertation (see below)

#### F. Repeat attempts

1. If a candidate's dissertation is passed (is awarded  $\geq 50$  marks), but he / she fails in either the written papers or the practical component, the candidate will not be required to carry out a fresh research project or re-submit the dissertation. However, the candidate will be required to take the written papers, practical and oral examinations again. The mark awarded for the dissertation will be the same as for the first attempt. If the candidate fails again and is required to repeat the written and laboratory examinations, the marks awarded for the dissertation will be the same as at the first attempt.
2. If the candidate passes in the written papers and the practical examinations, but the dissertation is unsatisfactory (is awarded  $< 50$  marks by the 2 assessors, see Annex for details), the results will be withheld and the candidate required to re-submit the dissertation, corrected as recommended by the examiners, within a period of 6 months. The dissertation will be marked again by the previous examiners. If it is then found satisfactory, the candidate shall be deemed to have passed the MD (Parasitology) examination, provided he / she has obtained an overall mark of **60%**. In this event, the date of passing the MD (Parasitology) examination shall be the date

of re-submission of the dissertation. If, however, the re-submitted dissertation is again awarded <50 marks, the candidate will be required to carry out a fresh project and submit a new dissertation, as well as re-take the entire examination again. If the candidate fails to re-submit the corrected dissertation within the period allowed, he/she shall be deemed to have failed the entire examination.

3. If the candidate passes the MD (Parasitology) examination, but the examiners recommend corrections to the dissertation, the candidate shall not be allowed to leave for post-MD overseas training until such corrections have been made, and at least one examiner has certified that the corrections are satisfactory.

#### **10. DETAILS OF POST MD TRAINING**

This will consist of 12 months of training locally as a Senior Registrar, and 12 months of training at a recognized centre overseas, approved by the PGIM. The 12 months of local training can be done en bloc or in 2 parts before or after the period of overseas training.

During the post MD training period, progress reports will have to be submitted as specified by the PGIM with reports based on the format shown in Annex 10. Certification of satisfactory completion of local and overseas training should be forwarded to the Director, PGIM by the respective supervisors.

#### **11. PRE-BOARD CERTIFICATION ASSESSMENT**

Upon completion of the prescribed period of post-MD training, the trainee should apply to the PGIM for Board Certification in Medical Parasitology, together with the completed portfolio with documentary evidence of the work undertaken by him / her during the period of overseas training. The trainee will also be required to make an oral presentation to the Board of Study regarding his / her post-MD training, and face a viva voce examination of at least 30 minutes duration.

#### **12. BOARD CERTIFICATION**

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

- (a) Completed one year local and one year overseas training in units approved by the Board of Study.
- (b) Submitted satisfactory progress reports from the local supervisor appointed by the Board of Study
- (c) Submitted satisfactory progress reports from the overseas supervisor appointed by the Board of Study
- (d) Passed the pre-Board Certification assessment conducted by the Board of Study, which comprises of a presentation by the trainee and an assessment of the trainee's portfolio, covering work carried out during the post-MD training period.

### 13. RECOMMENDED READING

#### Text books

- Gordon C Cook and Alimuddin I Zumla (eds) *Manson's Tropical Diseases*, 22nd ed. London, Saunders- Elsevier, 2009
- Guerrant RL, Walker DH, Weller, PF (eds). *Tropical Infectious Diseases: Principles, Pathogens and Practice* 3<sup>rd</sup> edition. Edinburgh, Saunders Elsevier 2011
- R Muller. *Worms and Human Disease* 2<sup>nd</sup> ed. Wallingford, Oxford, UK, CABI Publishing, 2001.
- S Yamaguti. *Systema Helminthum* Vol. 3. The Nematodes of Vertebrates, Parts I and II. New York, Interscience Publishers Inc. 1963.
- MW Service. *Medical Entomology for Students*. 4<sup>th</sup> ed. Cambridge University Press, 2008
- DA Warrell & HM Gilles. *Essential Malariology* 4<sup>th</sup> ed. BookPower, Hodder Education, 2002
- Thomas B Nutman (ed) *Lymphatic Filariasis*. Tropical Medicine Science and Practice Series, Volume 1. Imperial College Press, 2000.
- Yezid Gutierrez. *Diagnostic Pathology of Parasitic infections with clinical correlates*. 2<sup>nd</sup> ed. Oxford University Press, USA (2000).
- F Konradsen, FP Amerasinghe, W. van der Hoek and PH Amerasinghe. *Malaria in Sri Lanka: Current Knowledge on Transmission and Control*. International Water Management Institute, 2000.

#### Atlases

- W Peters & G Pasvol. *Atlas of Tropical Medicine and Parasitology*. 4th ed. Mosby, 2006
- T Yamaguchi. *A Colour Atlas of Clinical Parasitology*. London, Mosby Wolfe Medical Publications, 1981
- Thomas C Orihel & Lawrence R Ash. *Parasites in Human Tissues*. ASCP Press, 1995
- Lawrence R Ash & Thomas C Orihel. *Atlas of Human Parasitology*. 5<sup>th</sup> ed ASCP Press, 2007

#### Laboratory Manuals

- Lawrence R Ash, and Thomas C. Orihel. *Parasites: A Guide to Laboratory Procedures and Identification*. Chicago, ASCP Press, 1987.
- Monica Cheesbrough. *Medical Laboratory Manual for Tropical Countries* Vol.1. 2<sup>nd</sup> ed. Tropical Health Technology, 1987.
- Lynne S Garcia. *Diagnostic Medical Parasitology* 5<sup>th</sup> ed. ASM Press 2006
- World Health Organization. *Manual of basic techniques for a health laboratory*. Geneva, WHO 1980

## ANNEX 1. COURSE CONTENTS

### IN-SERVICE TRAINING BLOCK 1

#### Module 1. General Parasitology

- Principles of taxonomy, classification and nomenclature
- Definitions and concepts of animal associations
- General biology of protozoa, nematodes, cestodes, trematodes and arthropods

#### Modules 2 and 3. Malaria and Malaria Control

Biology and life cycle of *Plasmodium* spp.

Anopheline mosquitoes

- Identification
- Parasite development in vector
- Vector-parasite interactions

Pathology and pathogenesis

Clinical feature

Immunology, vaccine development

Laboratory diagnosis

Transmission and epidemiology

Vectorial competence and capacity

Species complexes

Detection of parasite in vector

Chemotherapy and drug resistance

Malaria control

Vector control in malaria

- Chemical control
- Bednets
- Evaluating control

#### Module 4. Leishmaniases and Trypanosomiases

##### Leishmaniases

Life cycle and biology of *Leishmania*

Clinical features

Immunology

Diagnosis

Epidemiology

Treatment and control

Sandflies

Life cycle

Morphology and identification

Ecology

Control

##### Trypanosomiases

*Life cycle and biology of African trypanosomes*

Clinical features

Immunology

Diagnosis

Epidemiology

Treatment and control

Tsetse flies

Life cycle

Morphology and identification

Ecology

Control

*Life cycle and biology of S. American trypanosomes*

Clinical features

Immunology

Diagnosis

Epidemiology  
Treatment and control

Triatomine bugs

Life cycle  
Morphology and identification  
Ecology  
Control

## Modules 5 and 6. Filarial infections and control of lymphatic filariasis

### Lymphatic filariasis

Biology and life cycle of *Wuchereria bancrofti* and *Brugia* spp.

Vectors of lymphatic filariasis

- Biology and morphology
- Vector-parasite interactions

Pathology and pathogenesis

Laboratory diagnosis

Transmission and epidemiology

Chemotherapy

Control

Detection of parasite in vector

Vector control in filariasis

- Chemical control
- Non-chemical

### Other filarial infections and dracunculosis

*Dirofilaria* spp.

- Morphology and transmission
- Clinical features
- Epidemiology and transmission

Vectors of *Dirofilaria*

*Onchocerca volvulus*

- Clinical features
- Epidemiology
- Diagnosis
- Chemotherapy

*Simulium* spp.

OCP in West Africa

*Loa loa*

Clinical features  
Diagnosis

*Chrysops*

*Other filarial worms*

- Diagnosis

*Dracunculus medinensis*

- Clinical features
- Diagnosis
- Control

*Cyclops*

## Module 7. Medical Entomology

### Mosquito vectors of arboviruses

Vectors of dengue, Japanese encephalitis

Ecology of vectors,  
development of virus in vectors,  
virus isolation from vectors



**Flies, fleas, lice**

Morphology,  
Transmission of disease

**Ticks, Mites**

Hard ticks, soft ticks, *Sarcoptes scabiei*, *Leptotrombidium*, *Dermatophagoides*  
Morphology,  
Transmission of disease

**Control of arthropod vectors**

Use of insecticides,  
environmental control,  
biological control,  
genetic control,  
insecticide resistance

**IN SERVICE TRAINING BLOCK 2****Module 1. Intestinal protozoa and miscellaneous protozoa****Intestinal protozoa**

*Entamoeba histolytica*, *Giardia intestinalis*, *Cryptosporidium* spp., *Balantidium coli*, other Coccidia,  
non-pathogenic intestinal protozoa

Life cycle and biology,  
Pathogenesis,  
Clinical features  
Epidemiology,  
Laboratory diagnosis,  
Chemotherapeutic agents

**Miscellaneous protozoan infections**

Trichomoniasis, Pathogenic free-living amoebae, *Babesia* and *Theileria* spp.

-Morphology,  
-life cycle and transmission  
-Clinical features  
-Diagnosis  
-Treatment

**Module 2. Intestinal nematodes, cestodes and trematodes**

*Ascaris lumbricoides*, *Necator americanus*, *Ancylostoma duodenale*, *Trichuris trichiura*, *Strongyloides stercoralis*, *Enterobius vermicularis*

Life cycle and biology  
Clinical features  
Pathogenesis  
Diagnosis, estimating intensity of infection,  
Epidemiology,  
Treatment,  
Prevention and Control

### **Cestode infections**

Adult cestode infections – *Taenia solium* , *T. saginata*, *Hymenolepis nana*, *H. diminuta*,  
*Diphyllobothrium latum*, *Bertiella studieri*, *Dipylidium caninum*

- Life cycles and transmission,
- Clinical features
- Epidemiology,
- Diagnosis,
- Treatment,
- Prevention and Control

Larval cestode infections – cysticercosis, hydatidosis, sparganosis

- Life cycles and transmission,
- Clinical features
- Pathogenesis
- Epidemiology,
- Diagnosis,
- Treatment,
- Prevention and Control

### **Trematode infections**

*Schistosomiasis*, *Paragonimus spp.* *Opisthorchis spp.* *Fasciola hepatica*, *Fasciolopsis buski*,  
*Heterophes heterophyes*, *Metagonimus yokogawai*

- Life cycles and transmission,
- Clinical features
- Pathogenesis
- Epidemiology,
- Diagnosis,
- Treatment,
- Prevention and control

## **Module 3. Toxoplasmosis and parasitic zoonoses**

### **Toxoplasmosis**

- Life cycle and biology,
- Clinical features
- Diagnosis,
- Epidemiology,
- Treatment

*Trichinella spp.* , Visceral larva migrans, Cutaneous larva migrans, Eosinophilic meningo-encephalitis,  
Capillariasis

- Life cycles and transmission,
- Clinical features
- Epidemiology,
- Diagnosis,
- Treatment,
- Prevention and control

#### **Module 4. Epidemiology of vector-borne diseases in Sri Lanka**

Malaria  
Lymphatic filariasis  
Dengue  
Chikungunya  
Leishmaniasis

#### **Module 5. Molecular diagnosis of parasitic and vector-borne diseases**

Molecular techniques for diagnosis of  
Malaria  
Lymphatic filariasis  
Dengue  
Chikungunya  
Leishmaniasis

## **ANNEX 2. INFORMATION & GUIDELINES TO SUPERVISORS**

### **MD (PARASITOLOGY) – RESEARCH PROJECT**

#### **INFORMATION & GUIDELINES TO SUPERVISORS**

- The dissertation for the MD Parasitology is based on a 18-month research project.
- Acceptance of the dissertation is a requirement to sit the MD examination
- The trainee should write up the project work as a dissertation conforming to the format approved by the Board of Study in Microbiology.
- The supervisor should guide the student in planning, carrying out research methodology and in presentation of the work.
- The supervisor should obtain recommendation of the research proposal from a reviewer.
- The supervisor should forward Progress Report(s) in the prescribed form at the end of 6 and 12 months after the trainee commences work on the research project.
- The objective of the dissertation is to prove the trainee's capability to plan, carry out and present own research. The purpose of this training is to ensure maturation, discipline and scholarship in research.
- The dissertation should comprise the trainee's own account of his/her research
- It must contribute to existing knowledge in infective disease relevant to Sri Lanka and afford evidence of originality as shown by independent, critical assessment and / or discovery of new facts in the area under study.
- It should be satisfactory as regards literary presentation.
- The dissertation should be certified by the supervisor as suitable for submission.
  
- **General Comments on the contents:** The objectives should be clearly stated and should be feasible to achieve within the time frame. Other published work relevant to the problem (both international and local) should be comprehensively covered and critically evaluated. The research methodology should be the best available to achieve the objectives stated. The results should be presented effectively. The discussion should include comments on the significance of results, how they agree or differ from published work and theoretical / practical applications of the results, if any. The conclusions should be valid and be based on the results obtained on the study.
  
- **Ethics:** When reporting on human subjects and animal experimentation, the candidate should confirm and document that procedures followed were approved by the Institution's Ethical Committee.
  
- The trainee will be required to make a short presentation (15 – 20 minutes) of their project research to BOS members and other invitees prior to commencement of data collection. This will give the trainee an opportunity to discuss their work and to get a feedback from peers and colleagues but it will not be used for evaluation in any form. The supervisors are invited for this presentations.
  
- The candidate will be questioned on the dissertation at a viva-voce examination.
  
- If at any time the supervisor is not satisfied with the work progress of the trainee, the trainee should be made aware of the deficiencies and corrective measures suggested. This should be conveyed in writing with a copy to the BOS. In such instance a follow-up report should be forwarded within three months or earlier if necessary to the BOS.

## **ANNEX 3. SUPERVISOR CONSENT FORM**

### **SUPERVISOR CONSENT FORM**

- 1. Name of Trainee:**
  
- 2. Training Centre:**
  
- 3. Supervisor:**
  
- 4. Title of Project:**

## ANNEX 4. FORMAT FOR RESEARCH PROJECT PROPOSAL

POST GRADUATE INSTITUTE OF MEDICINE- BOARD OF STUDY IN MICROBIOLOGY

### RESEARCH PROPOSAL FOR MD DISSERTATION

1. **Name of Trainee:**

2. **Training Centre:**

3. **Supervisor:**

---

4. **Reviewer:**

Name

Designation

Address Official

/Private

Tel//Fax

---

5. **Title of Project:**

---

6. **Brief description of project\* (*see footnotes*):**

6.1 Background and justification

6.2 Objectives

6.3 Research Plan

7. **Institution(s) where work would be carried out:**

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

---

9. **Recommendation of supervisor:**

Signature

date

---

**10. Recommendation of reviewer:**

I certify that it is feasible to complete this project within a period of three months, the methodology is scientifically valid and ethically acceptable.

Signature

date

---

**11. Students signature**

**date**

---

**12. Recommendation of the MD Course Coordinator**

Signature

date

---

**13. Recommendation of the BOS:**

---

**\*Notes**

- 6.1 *Brief technical description of subject, rationale of proposed research, brief literature review with explicit reference to earlier or ongoing work (approx. 300 words)*
- 6.2 *Should give concise statements of what you propose to achieve*
- 6.3 *Hypothesis to be tested. Methodologies and activities to be carried out; outline of work plan indicating time frame.*

## ANNEX 5. MD DISSERTATION PROGRESS REPORT

*To be forwarded by the supervisor to the BoS through the Course Co-ordinator at 6 months, 12 months and 18 months after commencing work*

- 1. Name of trainee**
- 2. Training Centre**
- 3. Supervisor**
- 4. Title of project**
- 5. Description of work carried out to date**

To be filled in by trainee: briefly describe progress in lab / field work and dissertation writing

---

### Supervisor's comments

- 6. Is the work on schedule?** Yes / No
- 7. Progress in dissertation writing:** satisfactory / unsatisfactory
- 8. Constraints (if any)**
- 9. Recommendation of supervisor:**

Signature

Date

---

### 10. Recommendation of MD Co-ordinator

Signature

Date

### 11. Date of BoS approval



## **ANNEX 6. MD DISSERTATION GUIDELINES**

### **General instructions**

It is essential to start writing the dissertation early and in all cases before the experiments / field work is finished. At the same time, you should make arrangements to have your manuscript word-processed. Your supervisor should be consulted before you start to write and thereafter at regular intervals. It is much easier to make corrections if the draft is double-spaced and printed on only one side of the paper.

The past tense should be used as far as possible. To avoid much exceeding the given word limit, it is suggested that an approximate running total is kept. The metric system and the International System (SI) of units should be used whenever possible.

### **Length**

An ideal length of text is approximately 40 000 words, which equals to about 160 pages. With figures, references, etc., the total length is likely to be in the region of 200 pages.

### **Number of copies**

Three copies should be submitted to the Director/ PGIM, spiral-bound in the first instance. One will be retained in the PGIM, one will be sent to the internal examiner and one to the overseas examiner. After acceptance (and necessary corrections), all three copies should be bound in hard covers (black) with the author's name, degree and year printed in gold on the spine. The front cover should carry the title, author's name and year printed in gold. One copy will be returned to the student, one retained by the supervisor, and the third housed in the PGIM library.

### **Layout**

The dissertation should be word-processed and printed single-side only, on A4-size photocopying paper.

#### Layout of typescript

There should be 1.5" on left-hand and top margins, and 1.0" on right-hand and bottom margins. It is especially important that the left-hand (binding) margin is of the regulatory size.

Line spacing should not be less than 1.5.

Lettering should be in Times New Roman, font size 12.

All pages should be numbered consecutively throughout, including appendices. Page numbers should be inserted in the bottom right hand corner.

#### Tables, diagrams, maps and figures

Wherever possible, these should be placed near the appropriate text. Tables should be numbered in continuous sequence throughout the dissertation. Maps, graphs, photographs, etc., should be referred to as Figures. Each of these should also be numbered in a continuous sequence. Colour should be avoided in graphic illustrations (unless it is essential) because of the difficulty of photographic reproduction; symbols or other alternatives should be used instead.

#### Notes

Notes, if essential, should be inserted, in reduced font, at the foot of the relevant page. If too voluminous for this to be practicable, they should be placed in an Appendix. Notes may be typed in single spacing.

## Abbreviations

Where abbreviations are used, a key should be provided.

## **Preliminaries**

The preliminaries precede the text. They should comprise the following:

1. Title page

<Title of dissertation>  
<Author's name>  
MD (Medical Microbiology)  
Post Graduate Institute of Medicine  
University of Colombo  
<Year of submission>

2. Statement of originality: This is a declaration that the work presented in the dissertation is the candidate's own, and that no part of the dissertation has been submitted earlier or concurrently for any other degree. The statement should be signed by the author, and countersigned by the supervisor.

3. Abstract: This should consist of a brief summary of not more than 350 words describing the objectives of the work, the materials and methods used, the results obtained, and the conclusions drawn. This may be in a structured format if helpful.

4. Table of contents: The table of contents immediately follows the abstract and lists in sequence, with page numbers, all relevant divisions of the dissertation, including the preliminary pages.

5. List of tables: This lists the tables in the order in which they occur in the text, with the page numbers.

6. List of figures: This lists all illustrative material (maps, figures, graphs, photographs etc) in the order in which they occur in the text, with the page numbers.

7. Acknowledgments

## **Text**

The dissertation should be divided into clearly defined chapters. Chapters may be subdivided and a decimal number system can be helpful to identify sections and subsections. You should avoid mixing the topics of the chapters, e.g. no results should appear in the Materials and Methods.

Chapter 1 – Introduction: The aim of this section is to state briefly the current position and the reasons for carrying out the present work. Generally, only a few references should be cited here.

Chapter 2 – Literature Review: This section should be reasonably comprehensive, and most of the references to be quoted normally occur here. The relevant references dealing with the general problems should be reviewed first and this is followed by a detailed review of the specific problem. The review is in many cases approached as a historical record of the development of knowledge of the subject. This chapter should conclude with a brief statement of what you propose to find out.

Chapter 3 – Materials and Methods: These should be described so that a reader could repeat all the experiments. 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.

**Chapter 4 – Results:** Much of the data should be given in tables and figures and these should be inserted in the text at the appropriate place. The results must be fully described in the text. It is not sufficient to merely present the tables and figures without any comment. The tables and figures should be clear without references to the text, and this requires concise explanations in legends. Where possible, data presented in the text should have already been analyzed and the complete ‘raw’ figures should not be included in this section but should be contained in tables in the Appendix.

Only data from the present work should be included in this section and in particular no comparison should be made at this stage with results from other workers.

**Chapter 5 – Discussion:** The discussion is the most difficult part of the dissertation to write because the author has to compare **critically** the present results with those of other workers and to draw valid conclusions from these studies. Descriptions of other workers findings which already appear in the Literature Review should not be repeated in the Discussion. Instead, refer to the Review.

The limitations of the study and recommendations for future research on the subject should also be included in this chapter.

As your project proceeds, keep notes of your thoughts and discussions relevant to this section.

## **References**

These are given so that the reader can refer to the original papers for further study. Uniformity is essential, but errors and inconsistencies are very common and authors are advised to check the references most carefully. Examiners will mark students down for inconsistencies in their references, either omissions or failure to follow the recommended format as given in the following section.

References are very important and must be complete and accurate. All literature referred to should be listed in a consistent form and style, and must contain sufficient information to enable the reader to identify and retrieve them.

There are different styles of citing sources, listing references and compiling a bibliography. The Harvard style (author, date) is widely accepted in scholarly and scientific writings, and is recommended for students on the MD (Medical Microbiology) course.

### **The Harvard style**

The Harvard style is often known as the ‘author-date’ system. Generally, when using the Harvard system, a citation in your paper requires only the surname of the author (or authors) and the year of publication. If there are only two authors give both names; for more than two authors use *et al.* Citations should, whenever possible, be placed at the end of a sentence (before the concluding punctuation). For example:

*There is consistent urban bias in the provision of health services (Sawyer, 1999).*

Alternatively, the author's surname may be integrated into the text, followed immediately by the year of publication in parentheses.

*Sawyer (1999) observes that .....*

If there is more than one reference by the same author(s), the references should be listed chronologically in order of year of publication. If there is more than one reference by an author in the same year, label with lower case letter, 'a' before 'b', 'c', etc.

Other researchers (Tang 1998a; Cleg, 1999) have highlighted this inadequacy, while Tang (1998b) argues that .....

References cited only in tables or in legends to figures should be in accordance with a sequence established by the first identification in the text of the particular table or illustration.

The arrangement of the references at the end of the dissertation should be alphabetical.

The order of the items in each reference should be:

- (a) for journal references: name(s) of author(s), year, title of paper, title of journal, volume number, page numbers.
- (b) for book references: name(s) of author(s), year, title of book, edition, volume, chapter and/or page number, town of publication, publisher.

Authors' names should be in roman letters, and arranged thus:

Smith, C.O., James, D.E. & Frank, J.D.

Note the use of the ampersand (&) and omission of comma before it. Where an author's name is repeated in the next reference it should also be spelt out in full.

The year of publication should be surrounded by parenthesis like this: (1999)

The title of the paper is then included, without quotation marks: e.g., Child health promotion in developing countries.

The journal title should be unabbreviated, underlined, and be followed by volume number in bold, the issue (part) number, and the page numbers (first and last page numbers). It should read like this:

Health Policy and Planning **14**:1; 1-10.

Examples:

Ehiri, J.E. & Prowse, J.M. (1999) Child health promotion in developing countries: the case for integration of environmental interventions? Health Policy and Planning **14**:1; 1-10.

Tuku, A.B. James, D.E. & Okada, F.C. (1999) The response of factor B to factor C. Biochemical Journal **151**:2; 1049-1053.

Harris, G.W. (1955) Neural Control of the Pituitary Gland. London: Arnold.

Sloper, J.C. (1966) The experimental and cyto-pathological investigation of neurosecretion in the hypothalamus and pituitary. In The Pituitary Gland, eds. Harris, G.W. & Donovan, B.T. Vol. 3. Ch.7 London: Butterworth.

Websites

Author's name (if available) must be listed first, followed by the full title of the document in italics (underline if handwritten), the date of publication or last revision (if available), the full http address (URL) enclosed within angle brackets, and the date of visit in parentheses

*Example:*

Schettler, T., Solomon, G., Burns, P. & Valenti, M. *Generations at risk: how environmental toxins may affect reproductive health in Massachusetts*.

<<http://www.igc.apc.org/psr/genrisk.html>> (24/08/99).

## **ANNEX 7. ROLES AND RESPONSIBILITIES OF A TRAINER**

### **Roles and responsibilities of a trainer in Medical Microbiology/Virology/Parasitology of the Postgraduate Institute of Medicine**

The roles and responsibilities of a trainer in Microbiology/Virology and Parasitology are multiple:

- A. Diploma / MD trainer
- B. Academic Appraiser
- C. Supervisor of a research project
- D. Reviewer/assessor of a research project
- E. Role model
- F. Examiner

**A. As a Diploma /MD trainer, she/he 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 behavior, attitude or problems of the trainee, first warn the trainee and if the situation persists, inform the academic appraiser of the trainee to sort out the problem at grass root level. As a last resort, inform the Director PGIM and Board of Study in microbiology so that remedial action can be taken. Communications on such issues should be copied to the trainee's academic appraiser.
4. consult the Board of Study and inform the academic appraiser 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 BoS in Microbiology , once for every clinical appointment in the MD including the 3 month appointments in LRH and CIM and twice for the post MD training programme. (annexe ) In the Virology and Parasitology training programmes, the consultant in charge of the particular segment of training should send a progress report for each trainee.
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, work shops, critical appraisal of journal articles etc.
8. encourage presentations by the trainees in clinical meetings, CPD activities etc.
9. conduct workplace based assessments – DOPS and CbD as indicated in the portfolio guidelines.
10. inform the BoS in Microbiology if more than 2 weeks of leave is to be taken by you.
11. arrange for cover up of leave for training purposes (since this may be different from work cover up)
12. inform the BoS in Microbiology and give adequate time for the trainee to be moved to another training site if more than 1 month leave is to be taken, since off site cover is not acceptable in such a situation.

13. preferably take trainees, only after you take up your post fulltime and not during acting or visiting posts.
14. as far as possible, try to complete the appointment period of the trainees before reporting for duty in the next post when on transfer orders. If an immediate transfer cannot be avoided, the trainer should inform the BoS in time and get suggestions regarding the ongoing training of any trainees in the station.
15. handover the required letters of release/ attest to the satisfactory completion of training in the log book of the trainees on completion of an appointment by the trainee (it might be difficult for them to come later)
16. give constructive feedback continuously, which will help the trainees to improve both academically and professionally. Feedback on negative aspects of a trainee should be dealt with in a confidential manner.
17. make sure that a pregnant trainee does not handle specimens from high risk patients including tuberculosis.
18. provide a pleasant and disciplined environment in your laboratory for the trainee to work.

**B. As an academic appraiser, the trainer should**

1. have regular meetings with the trainees.
2. be accessible to the trainee and give your contact number and convenient times for meetings.
3. develop an approachable, friendly relationship so that trainees are not hesitant to contact you in times of need.
4. supervise the entries and ensure regular updates of your appraisee's portfolio.

**C. As a supervisor of a research project, the trainer should**

1. be realistic and ensure the trainee gets hands on experience to do research on his or her own.
2. not have too many goals which will burden the trainee who will find it difficult to finish the project within 4 months.
3. make sure that trainees submit duly filled forms and suggest the name of a reviewer to review the project proposal.
4. assist and advice trainees regarding obtaining funds in time for project commencement.
5. correct the trainee's presentation and writing (including spelling and grammar) before it is presented or sent to the reviewer or submitted for evaluation.
6. encourage them to publish or present in national and international scientific sessions.

**D. As a reviewer and assessor of a research project dissertation, the trainer should**

1. review the work done in the Sri Lankan context.
2. write a detailed report including the corrections and changes that a trainee has to attend to .
3. complete the review within the allocated time, otherwise trainees will face difficulties in attending to the corrections
4. remember that a delay in submission of your assessor report will delay the procedure of sending all the dissertations to the foreign examiner by the PGIM.

**E. As a role model the trainer should**

1. be exemplary in your dealings with colleagues of other disciplines and all personnel in the health care team.
2. always be punctual
3. be sympathetic to the trainees appreciating that they too have problems.
4. avoid criticizing other trainers and training sites.

**F. As an examiner the trainer should**

read and abide by the guidelines of the PGIM document.

## ANNEX 8. LIST OF TRAINERS

<b>Name</b>	<b>Qualifications</b>	<b>Designation</b>	<b>Affiliation</b>
Prof W Abeyewickreme	BSc, DTM&H, PhD	Professor, Dept of Parasitology	Faculty of Medicine, University of Kelaniya
Prof Nilmini Chandrasena	MBBS, Dip Med Micro, MD	Associate Professor in Parasitology	Faculty of Medicine, University of Kelaniya
Prof Nilanthi de Silva	MBBS, MSc, MD	Professor and Head, Dept of Parasitology	Faculty of Medicine, University of Kelaniya
Prof Deepika Fernando	MBBS, Dip Med Micro, MD, PhD	Professor, Dept of Parasitology	Faculty of Medicine, University of Colombo
Dr Kithsiri Gunawardena	MBBS, PhD	Senior Lecturer, Dept of Parasitology	Faculty of Medicine, University of Kelaniya
Dr Devika Iddawela	MBBS, PhD	Senior Lecturer and Head, Dept of Parasitology	Faculty of Medicine, University of Peradeniya
Prof Nadira Karunaweera	MBBS, PhD	Professor and Head, Dept of Parasitology	Faculty of Medicine, University of Colombo
Dr Sagarika Samarasinghe	MBBS, Dip Med Micro, MD	Consultant Parasitologist	Medical Research Institute
Dr Renu Wickremasinghe	BSc, PhD	Professor and Head, Dept of Parasitology	Faculty of Medical Sciences, University of Sri Jayewardenepura
Prof Mirani Weerasooriya	MBBS, PhD	Senior Professor and Head, Dept of Parasitology	Faculty of Medicine, University of Ruhuna



## ANNEX 9. MARKING SCHEME FOR ASSESSMENT OF DISSERTATION

### MARKING SCHEME FOR ASSESSMENT OF DISSERTATION

1. The dissertation will be marked using the following scheme:

<b>Component</b>	<b>mark</b>
Introduction	5
Literature review	20
Materials & Methods	15
Results	15
Discussion and conclusions	20
Presentation of dissertation	10
Oral presentation and viva voce	15
<b>Total</b>	<b>100</b>

### CRITERIA FOR ASSESSMENT OF DISSERTATION AND PRESENTATION

#### **Introduction:**

- Content and structure of the project has been set out clearly.
- Has identified the problem to be examined clearly.

#### **Literature Review**

- Evidence of in depth reading, covering historical and current literature on the topic.
- Inclusion of locally available data
- Presentation of a critical review of relevant literature.

#### **Materials and methods**

- The design of the study and the appropriateness of the research methodology.
- The systematic conduct of the study and the accurate collection and recording of data and/or information.
- Use of appropriate statistics

#### **Results**

- Clear and coherent presentation of the findings with statistical significance indicated where relevant
- Clear tables and figures with appropriate legends

#### **Discussion and conclusions**

- The interpretations of results are appropriate and valid from the work
- Conclusions and recommendation are drawn from the work.
- Critical comments made on the extent and limitations of the study.

### **Presentation of dissertation**

- General syntax and writing style.
  - Inclusion of References quoted
  - Typography.
  - Appropriate use of appendices and completeness of list of abbreviations
2. Two assessors (one local examiner + foreign examiner) should mark the dissertation. Examiners are expected to submit the dissertation marks (except for the viva voce exam component) at least two weeks before the commencement of the final exam.
  3. The candidate will be questioned on his / her dissertation during the viva voce examination at the main exam.
  4. If the difference in the total mark (out of 100) awarded by the two assessors is more than 10 marks, the assessors are expected to discuss the dissertation and come to an agreed mark at the viva voce examination.
  5. Candidates are expected to carry out the changes recommended by the examiners within 3 months of the examination. The local assessor should certify that the corrections have been carried out satisfactorily. Candidates will not be permitted to proceed with their post-MD overseas training until they have submitted the corrected dissertation and the local assessor has certified that the corrections are satisfactory.

## **ANNEX 10. FORMAT FOR POST-MD PROGRESS REPORTS**

### **FORMAT FOR POST-MD PROGRESS REPORTS**

(To be submitted by Supervisor to Director PGIM at 6 months and 12 months)

1. Name of trainee
2. Name of supervisor
3. Training institution and unit
4. Period covered by progress report: ..... (dd/mm/yy) to ..... (dd/mm/yy)
5. Description of work carried out by trainee in training institution
  - a. Course work
  - b. Teaching activities
  - c. Research projects
  - d. Any other
6. Any work carried out away from main training institution?
7. Meetings / conferences / seminars attended by trainee
8. Any publications / presentations by trainee
9. Interaction with colleagues and other staff
10. Overall progress
  - a. General comments
  - b. Summary:  
Highly satisfactory / satisfactory / unsatisfactory / very unsatisfactory

Signature of supervisor

Date