

Module Coordinator : Head Microbiology/ Head Parasitology or an appointed staff member from Department of Microbiology or Parasitology.

Resource pool**Department of Microbiology**

Dr. C. Gamage (Head/Microbiology)

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Prof. Kalana Maduwage

No. of credits 4

Component	Lectures	SGDs	Practical's	Seminar	Formative assessments /Assignment
General	7	1	4	2	
Bacteriology	12	2	1.5		1
Virology	10	1	1.5		2
Mycology	2				
Combined Microbiology					2
Parasitology	15	3	5.5		
Total	46	12			
Credit equivalents					5

Hours of credit equivalence = 61 lecture h

Total	Lectures	}	58h
	SGD		
	Seminars		2 h
	Practical's	Per student	12.5 h
Total time tabled hours 131			

Total credit hours 67.25

Topic	Time	Objectives	Dept	Resp/person	Teaching/ Learning activity	Comments
1. Overview of microbiology in relation to human health	1 h	<ol style="list-style-type: none"> 1. Explain the interactions of microorganisms in relation to human beings 2. State why medical undergraduates need to know about micro organisms 3. Describe what medical microbiologists and parasitologists do 	Micro	Module coordinator	Lecture	
<ol style="list-style-type: none"> 2. Proving causation of infection, causality - Koch's postulates and its limitations 3. Microbial classification and visualization 	1h	<ol style="list-style-type: none"> 1. Discuss how causation of infections can be proved by being able to state and explain Koch's postulates and it's limitations 2. Describe the basis of microbial classification 3. Describe the basic structure of bacteria, fungi and viruses 4. State the methods by which microorganisms can be visualized and identified Outline how these methods could be used to diagnose infective diseases 	Micro	Module coordinator	Lecture	Includes 2 hours for facilitator meetings
2. Introduction to Medical Parasitology and classification of parasites	1 h	<ol style="list-style-type: none"> 1. List the characteristics of different groups of protozoa, helminths (nematodes, cestodes, trematodes) and arthropods 	Parasit	Module coordinator	Lecture	
6. Microscopy	1.5 h x 4 groups	<ol style="list-style-type: none"> 1. Identify the parts of a compound light microscope 2. Perform light microscopy following a standard operating 	Micro and Parasit	Module coordinator	Practical	45min micro, 45min parasite

		<p>procedure and properly use the compound light microscope</p> <p>3. Name the different types of microscopes available and their specific uses</p>				Batch divided in to 6 groups
<p>7. Microbial growth, dissemination and survival within and outside the human host</p> <p>8. Host-parasite relationship</p> <p>9. The process by which organisms cause disease to host tissue</p>	1 h	<p>1. Describe the dynamics of growth in different types of micro organisms</p> <p>2. List the different ways in which microorganisms survive for long periods within and outside the human host</p> <p>3. Explain the terms Commensal/ normal flora, Colonizer/ transient flora and the concept of the ‘microbiome’</p> <p>4. Describe the relationships of microorganisms to the human host (contamination, colonization and infection)</p> <p>5. List the currently known modes of transmission – microbial entry</p> <p>6. Explain the terms exogenous and endogenous infections</p> <p>7. Explain the term pathogenesis,</p> <p>8. Describe steps that occur in establishment of microbial infections – e.g attachment, colonization, invasion, tissue damage</p> <p>9. Explain how common clinical manifestations of infections reflect these mechanisms of damage in various organs</p>	Micro	Module coordinator	Lecture	
<p>10. Inter-relationships among parasites, hosts and vectors</p>	1 h	<p>1. Define the following terms; parasite, host, endoparasite, ectoparasite, pathogen,</p>	Parasit	Module coordinator	Lecture	

		<p>commensal, obligatory parasite, facultative parasite, definitive host, intermediate host, reservoir host, and vectors (mechanical and biological)</p> <p>2. Describe the growth, survival and spread of protozoan and helminth parasites within and outside the human host</p>				
11. Methods of preventing infections to include sterilization and disinfection	1 h	<p>1. Define the terms sterilization, disinfection, anti-septic and disinfectant.</p> <p>2. Explain ‘Standard precautions’ in relation to ‘Infection Control’.</p> <p>3. Discuss the principles of infection prevention.</p>	Micro	Module coordinator	Lecture	
	1 h x 8 groups	<p>4. Perform hand hygiene, with knowledge of underlying principles, by different methods</p>	Micro	Module coordinator	Practical	1 hour per student, 8 group per batch
Topics 1 – 11	1 h	Objectives of topics 1 - 10	Micro and Parasit	Module coordinator	SGD	
Topics 1 – 11	3h + 2 facilitator meetings	Objectives of topics 1 - 10	Micro and Parasit	Module coordinator	Seminar and 2 meetings	Includes 2 hours for facilitator meetings
Introducing medically important Bacteria						

12. Introduction to bacteria including concepts in diagnosing bacterial infections	1h + 1.5 hr x 4 groups	<ol style="list-style-type: none"> List the methods available to diagnose bacterial infections <ol style="list-style-type: none"> Visualization Culture and Antibiotic susceptibility testing (ABST) Antigen detection Antibody detection Detection of nucleic acid Explain briefly the advantages and disadvantages of the given methods Discuss the how the methods mentioned in objective 1 can be used to diagnose common bacterial infections 	Micro	Module coordinator	Lecture + Practical	1h + 1.5 hour per student, 4 groups per batch
13. Staphylococci	1 h	<ol style="list-style-type: none"> Describe the medically important bacteria and their major morphological and biological characteristics that determine visualization/ identification in the laboratory Describe the habitat, main mode(s) of transmission, morphology and growth characteristics in relation to identification, key virulence factors, pathogenicity and basis of clinical disease, Discuss the principles of laboratory diagnosis and prevention of bacterial infections 	Micro	Module coordinator	Lecture	
14. Streptococci and Enterococci –	1h		Micro	Module coordinator	Lecture	
15. Gram negative cocci to include <i>Neisseria</i> and <i>Moraxella</i>	1 h		Micro	Module coordinator	Lecture	
16. Gram positive bacilli to include <i>Corynebacteria</i> , <i>Bacillus</i> , <i>Nocardia</i> and <i>Listeria</i>	1 h		Micro	Module coordinator	Lecture	
17. Mycobacteria	1 h		Micro	Module coordinator	Lecture	
18. Anaerobes including <i>Clostridia</i> , <i>Actinomycetes</i> and <i>Prevotella</i>	1 h		Micro	Module coordinator	Lecture	

		4. Describe the principles of treatment of bacterial infections				
19. Gram negative bacilli to include enterobacteriaceae, pseudomonads and other NLF of clinical importance including <i>Acinetobacter</i>	1 h		Micro	Module coordinator	Lecture	
20. Gram negative coccobacilli to include <i>Haemophilus</i> , <i>Bordetella</i> , <i>Legionella</i> and <i>Pasteurella</i>	1 h		Micro	Module coordinator	Lecture	
21. <i>Vibrio</i> , <i>Campylobacter</i> and <i>Helicobacter</i>	1 h		Micro	Module coordinator	Lecture	
22. Spirochaetes	1 h		Micro	Module coordinator	Lecture	
23. <i>Chlamydia</i> , Rickettsiales and <i>Mycoplasma</i>	1 h		Micro	Module coordinator	Lecture	
24. Correct use of microscope, observation of smears and documentation of findings	1 h x 4 groups	1. Perform light microscopy following a standard operating procedure 2. To identify Gram positive and negative bacteria	Micro	Module coordinator	Practical	1 hour per student, 4 groups per batch
Introducing medically important viruses						
25. Introduction to virology	1 h	1. Describe the general properties and classification of viruses	Micro	Module coordinator	Lecture	
26. Viruses causing Hepatitis	1 h	2. Explain the process of viral replication	Micro	Module coordinator	Lecture	
27. Pox/ adeno/ parvo/ papova viruses	1 h	3. Describe mechanisms by which viruses cause disease in humans	Micro	Module coordinator	Lecture	
28. Herpes viruses	1 h	4. State the main host defense mechanisms against viruses	Micro	Module coordinator	Lecture	
29. Respiratory viruses	1 h		Micro	Module coordinator	Lecture	

30. Entero viruses and Viruses causing gastroenteritis	1 h	5. Explain the main clinical features of viral infections/disease in humans	Micro	Module coordinator	Lecture /SGD (article)	Journal article based SGD
31. Arbo viruses	1 h	6. Evaluate the principles of laboratory diagnosis and prevention of viral infections	Micro	Module coordinator	Lecture	
32. Retro viruses/ oncogenic viruses/ prions	1 h	7. Describe the principles of treatment of viral infections	Micro	Module coordinator	Lecture	
33. Viruses of zoonotic importance to include rabies	1 h		Micro	Module coordinator	Lecture	
34. Diagnostics in viral infections	1 h 1.5 h x 4 groups	1. Discuss the different methods used in the laboratory diagnosis of common viral infections a) Visualization b) Antigen detection c) Nucleic acid detection c) Culture d) Viral specific antibody detection e) Molecular detection methods to include molecular diagnosis of infectious diseases- – to be included as Molecular diagnosis practical	Micro	Module coordinator	Lecture Practical	1h lecture + Practical – 1.5 h x 4 groups
35. Topics 25 to 37 MCQs	3 h	Objectives of topics 25 - 37	Micro	Module coordinator	SGD	3 SGDs, 1 hour each
Introducing medically important fungi						
36. Superficial mycoses	1h	1. Describe fungi associated with human infections including laboratory diagnosis and principals of treatment	Micro	Module coordinator	Lecture	
37. Sub cutaneous and deep mycoses	1h		Micro	Module coordinator	Lecture	

38. Topics 1 - 37 – MCQs	3h	Objectives of topics 1– 40	Micro	Module coordinator	SGD	3x 1 hour SGDs
39. Topics 1 – 38	2 h	Objectives of topics 1 – 40	Micro + Parasit	Module coordinator	Assignment	Training students on essay writing
<p>Systematic parasitology – Describe the pathology, pathogenesis, transmission, including source, mode of transmission, portal of entry, virulence and epidemiology of parasitic infections in Sri Lanka and globally. Explain the principles underlying and critically evaluate the methods used in the laboratory diagnosis of common parasitic diseases in Sri Lanka. Explain the principles of prevention and control of parasitic diseases.</p>						
40. Malaria	1h	<ol style="list-style-type: none"> 1. Name the human malarial parasites 2. Describe the life cycle of <i>Plasmodium</i> species 3. Discuss the diagnostic importance of erythrocytic stages in peripheral circulation. 4. Evaluate the methods of laboratory diagnosis 5. Discuss the preventive measures based on the life cycle. 	Parasit	Module coordinator	Lecture	
41. Invasive intestinal protozoa - (amoebae and ciliate)	1h	<ol style="list-style-type: none"> 1. Name the common intestinal amoebae and the ciliate that infect humans 2. Outline the life cycle of <i>Entamoeba histolytica</i> indicating the infective, pathogenic and diagnostic stages. 3. Describe the pathogenesis and clinical features of amoebiasis 4. Identify points in the life cycle where preventive measures are applicable. 5. Discuss the methods of laboratory diagnosis of the infections 	Parasit	Module coordinator	Lecture	

<p>42. Other intestinal and urogenital protozoa – <i>Giardia duodenalis</i>, <i>Cryptosporidium</i> species and <i>Trichomonas vaginalis</i></p>	<p>1h</p>	<ol style="list-style-type: none"> 1. Name the intestinal and tissue flagellates that infect humans and state their habitats 2. Name the intestinal coccidia that infect humans 3. Outline the life cycle of <i>Giardia duodenalis</i>, <i>Trichomonas vaginalis</i> and <i>Cryptosporidium</i> species indicating the infective, pathogenic and diagnostic stages. 4. Describe the pathogenesis and clinical features. 5. Evaluate the methods of laboratory diagnosis. 6. Discuss the preventive measures based on the life cycle 	<p>Parasit</p>	<p>Module coordinator</p>	<p>Lecture</p>	
<p>43. Haemoflagellates</p>	<p>1 h</p>	<ol style="list-style-type: none"> 1. Name the parasite(s) causing human leishmaniasis in Sri Lanka 2. Name the vector of human leishmaniasis in Sri Lanka 3. Discuss the prevention and control of leishmaniasis in Sri Lanka. 4. Describe the pathogenesis and clinical manifestations of leishmaniasis 5. Evaluate the methods of laboratory diagnosis of leishmaniasis 6. Name the parasites and vectors causing trypanosomiasis 7. Outline the geographical distribution, clinical features 	<p>Parasit</p>	<p>Module coordinator</p>	<p>Lecture</p>	

		and laboratory diagnosis of African and American trypanosomiasis				
44. Tissue coccidian (<i>Toxoplasma gondii</i> and <i>Sarcocystis species</i>)	1h	<ol style="list-style-type: none"> 1. Name the tissue coccidia that infect humans 2. Outline the life cycle of <i>Toxoplasma gondii</i> indicating the infective, pathogenic and diagnostic stages. 3. Discuss the prevention and transmission of toxoplasmosis 4. Evaluate the methods of laboratory diagnosis of toxoplasmosis (congenital and acquired) 	Parasit	Module coordinator	Lecture	
45. Helminths-Intestinal Nematodes <i>Ascaris lumbricoides</i> <i>Necator americanus</i> <i>Trichuris trichiura</i> <i>Enterobius vermicularis</i> <i>Strongyloides stercoralis</i>	2 h	<ol style="list-style-type: none"> 1. Name the common intestinal nematodes in humans 2. Describe the major morphological characteristics of parasitic nematodes 3. Outline the life cycle of intestinal helminths indicating the infective, pathogenic and diagnostic stages. 4. Describe the pathogenesis and clinical features. 5. Evaluate the methods of laboratory diagnosis of intestinal nematode infections 6. Discuss the prevention and control of intestinal nematode infections. 	Parasit	Module coordinator	Lecture	

<p>46. Tissue nematodes - filarial worms</p>	<p>1 h</p>	<ol style="list-style-type: none"> 1. Name the major tissue nematodes of humans indicating those found in Sri Lanka. 2. State their location in the human body. 3. Name the vectors of tissue nematodes found in Sri Lanka 4. Discuss the importance of periodicity of microfilaria in relation to transmission and diagnosis. 5. Outline the life cycle of <i>Wuchereria bancrofti</i> and <i>Brugia malayi</i> indicating the infective, pathogenic and diagnostic stages. 6. Evaluate the methods of laboratory diagnosis of filariasis 7. Discuss the prevention and control filariasis 	<p>Parasit</p>			
<p>47. Cestodes and Trematodes <u>a.Cestodes</u> <i>Taenia solium</i>, <i>Taenia. saginata</i>, <i>Hymenolepsis diminuta</i>, <i>Hymenolepsis nana</i>, <i>Echinococcus granulosus</i> <u>b.Trematodes</u> Intestinal, tissue and blood trematodes</p>	<p>1 h</p>	<ol style="list-style-type: none"> 1. State the major morphological characteristics of the different groups of parasitic cestodes and trematodes of humans 2. Outline the life cycles of cestodes and trematodes indicating the infective, pathogenic and diagnostic stages. 3. Evaluate the methods of laboratory diagnosis of cestode and trematode infections. 4. Discuss the prevention and control. 	<p>Parasit</p>	<p>Module coordinator</p>	<p>Lecture</p>	

48. Arthropods of medical importance 1 - mosquitoes	1 h	<ol style="list-style-type: none"> 1. Name the major mosquito borne diseases in Sri Lanka and worldwide indicating the disease(s) that they transmit 2. Outline the life cycle of a mosquito 3. Describe the breeding habits of medically important mosquito species in Sri Lanka indicating strategies used for prevention and control. 	Parasit	Module coordinator	Lecture	
49. Parasites of global importance	1h	<ol style="list-style-type: none"> 1. Name the parasitic diseases of global importance 2. Name the-parasites causing schistosomiasis and food borne trematode infections 3. Outline the mode of transmission of schistosomes and important food-borne trematodes 4. Describe the clinical features of schistosomiasis and important food-borne trematode infections. 5. State the methods of laboratory diagnosis of these infections 6. Outline the prevention and control strategies of these infections 	Parasit	Module coordinator	Lecture	
49. Arthropods of medical importance - 2 a.) Flies b)Fleas, lice and bugs c)Ticks and mites & 50. Animal bites and stings	1 h	<ol style="list-style-type: none"> 1. Define the terms mechanical and biological vectors (recall) 2. Flies <ul style="list-style-type: none"> • Explain the importance of housefly as a mechanical vector of disease • Name the other groups of flies that are medically important • Describe myiasis 3. Ticks/fleas/bugs <ul style="list-style-type: none"> • Differentiate ticks, fleas and bugs from each other 	Parasit	Module coordinator	Lecture	
			Parasit	Module coordinator	Lecture	

		<ul style="list-style-type: none"> • Outline their medical importance <p>4. Mites</p> <ul style="list-style-type: none"> • Name major morphological characteristics of <i>Sarcoptes scabiei</i> mite • Outline the life cycle <p>5. Lice</p> <ul style="list-style-type: none"> • Differentiate the three types of lice (head , body and pubic) • Name the drugs used for treatment <p>6. Describe the prevention and control methods of vectors and ectoparasites.</p> <ol style="list-style-type: none"> 1. State the common animal bites in Sri Lanka 2. State the primary and secondary effects of animal bites 3. Name the organisms that cause secondary infections of the animal bites 4. State the common marine animal and arthropod stings 5. Discuss the effects of stings 				
51. Poisonous snakes and envenomation	2 h	<ol style="list-style-type: none"> 1. Name the important snakes which belongs to the families- Elapidae, Viperidae and Colubridae 2. Name the poisonous snakes in Sri Lanka 3. Name the common (important) non-poisonous snakes in Sri Lanka 	Parasit	Module coordinator	Lecture	

		<ol style="list-style-type: none"> 4. Name the main phenotypic characteristics of these (2 and 3) if shown a specimen/ an image (see demonstration on snakes) 5. State the major effects of snake venom in different groups of poisonous snakes in Sri Lanka 6. State the principles underline the treatment and management of snake bites 7. State the precautions that should be taken to prevent snake bite 				
52. Demonstration on venomous snakes	1 hour x 4 groups	<ol style="list-style-type: none"> 1. Identify medically important snakes of Sri Lanka if shown specimens or image 	Parasit	Module coordinator	Demonstration	
53. Demonstration on intestinal protozoa and helminths	1 h x 4 groups	<ol style="list-style-type: none"> 1. Identify pathogenic and non pathogenic intestinal amoeba, intestinal and urogenital flagellates on the stained and wet smears 2. Identify the specimens of adults and eggs of intestinal nematodes 	Parasit	Module coordinator	Demonstration	
54. Demonstration on tissue protozoa, arthropods	1 h x 4 groups	<ol style="list-style-type: none"> 1. Be able to identify the mosquitoes , flies fleas and mites of medical importance by their body markings 2. Identify <i>Leishmania</i> amastigotes on stained slide 3. Identify the trypomastigotes of trypanosomes on stained slide 	Parasit	Module coordinator	Demonstration	

		<ol style="list-style-type: none"> 4. Identify malarial parasites on stained thin and thick smear 5. Identify adult taenid segments and cestode larval stages 6. Identify schistosomes adult and eggs 				
<p>55. Practical</p> <p>a) Faecal smear preparation and examination for intestinal protozoan and helminthes</p> <p>b) Thick and thin blood smear examination for malaria parasites</p>	1 h x 4 groups	<p>Practical skills to be acquired</p> <ol style="list-style-type: none"> 1. Be able to properly use the compound light microscope 2. Discuss the principles regarding collection, storage and delivery/transport of faecal and blood specimens to a laboratory for diagnosis of parasitic infections 3. Be able to examine stained thin blood films and identify malaria parasites (<i>Plasmodium falciparum</i> and <i>Plasmodium vivax</i>) 4. Be able to prepare and examine wet smear of stools in saline and iodine to identify intestinal protozoal and helminth parasites 	Parasit	Module coordinator	Practical	
56. Topics 40 - 55	3 h	<ol style="list-style-type: none"> 1. Objectives of topics 40 – 55 	Parasit	Module coordinator	SGD	3 x 1 hour SGDs

Examination Format

1 h -MCQ 20 questions

3 General (Micro and Parasit)

4 Virology

5 Bacteriology

1 Mycology

7 Parasitology

2 h- SAQ (8 SAQs of 15 minutes each)

5 Microbiology 15 min questions

3 Parasitology 15 min questions

OSPE A – Parasitology 5 questions

Distribution of Marks

MCQ 30%

SAQ 50%

Parasit Practical 5%

OSPE Parasit 7.5%

Micro practical 7.5%

100%