**Infection 1** **Year 2 Semester 2** **4 credit course**

**One day 8am – 12pm and 1-4pm and one afternoon 1 – 4 pm fixed days per week**

| Topic and Concepts | Specific Objectives | Teaching/ Learning activity | Time | Dept |
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| **1. Overview of microbiology in relation to human health** | 1. Understand the interactions of microorganisms in relation to human beings<br>2. State why medical undergraduates need to know about micro organisms<br>3. Understand what medical microbiologists do | Lecture | 1 h | Micro |
| **2. Proving causation of infection, causality.**<br>**3. Koch's postulates and its limitations** | 1. Describe how causation of infection can be proved by being able to state and explain Koch's postulates and it's limitations<br>2. Revision – to include a SGD | Lecture | ½ h<br>½ h | Micro |
| **4. Microbial classification and visualization** | 1. Describe the basis of microbial classification<br>2. Describe the basic structure of bacteria, fungi and viruses<br>3. State the methods by which microorganisms can be visualized and identified<br>4. Outline how these methods could be used to diagnose infective diseases | Lecture | ½ h | Micro and Parasit |
| **5. Classification of parasites** | 1. List the characteristics of different groups of protozoa, helminths - nematodes, cestodes & trematodes and arthopods | Lecture | ½ h | |
| **6. Microscopy** | 1. Be able to identify the parts of a compound light microscope<br>2. Be able to properly use the compound light microscope<br>3. Know the different types of microscopes available and their specific uses | Practical | 1 h x 5 groups | Micro & Parasit |
| **7. Microbial growth, dissemination and survival within and outside the human host** | 1. Describe the dynamics of growth in different types of micro organisms<br>2. List the different ways in which micro organisms survive for long periods within and outside the human host | Lecture | 1 h | Micro |
| **8. Parasites & People**<br>**Host parasite relationships** | 1. Define the terms host, saprophyte, commensal, parasite, endoparasite, ectoparasite, pathogen, obligatory parasite, facultative parasite, definitive host, intermediate host, reservoir host.<br>2. Describe the relationships of micro organisms and parasites to the human host ( contamination, colonization and infection)<br>3. List the difference between communicable and non communicable infections and exogenous and endogenous infections | Lecture | 1 h | Parasit |
| **9. The process by which organisms cause disease to host tissue** | 1. Define the term pathogenisis, immuno pathogenesis<br>2. List currently known modes of transmission – microbial entry<br>3. Describe essential steps in microbial infection – attachment, invasion, mechanisms of damage<br>4. Explain how common clinical manifestations of infections reflect these mechanisms of damage in various organs | Lecture | 1 h | Micro |

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| **10. Methods of preventing infections to include sterilization and disinfection** | 1. Define the terms sterilization, disinfection, anti septic, disinfectant.<br>2. Describe the principals underlying prevention of infection and ill health due to micro organisms and parasites | Lecture | 1 h | Micro |
| | 3. Gain the practical skill of performing hand hygiene, with knowledge of underlying principals, by different methods<br>4. Be able to perform skin asepsis with knowledge of underlying principals<br>5. Be aware of bactericidal, viricidal, fungicidal, tuberculocidal and parasite destroying chemical agents and their use.<br>6. Be able to choose the appropriate disinfection/ sterilization method for a given situation<br>7. Become familiar with the use of gloves (sterile and non sterile) and different types of masks in hospital practice<br>8. Be familiar with the Hospital Infection control manual | Practical<br><br>Seminar | 1 1/2 h x 4 groups<br><br>2h | Micro and Parasit |
| **Systematic microbiology – to inculcate how the biological properties of Bacteria, Fungi and Viruses determine human disease causation, diagnosis, management, prevention and control.** | | | | |
| **Introducing medically important viruses** | | | | |
| 11. Introduction to virology | Viruses – General properties and classification<br>Viral replication and methods of identification | Lecture | 1 h | Micro |
| 12. Viruses causing Hepatitis | | Lecture | 1 h | Micro |
| 13. Pox/ adeno/ parvo/ papova viruses | | Lecture | 1 h | Micro |
| 14. Herpes viruses | | Lecture | 1 h | Micro |
| 15. Respiratory viruses | Mechanisms by which viruses cause disease in humans<br><br>Host defenses against viruses | Lecture | 1 h | Micro |
| 16. Entero viruses and Viruses causing gastroenteritis | Main clinical features of viral infections/disease in humans | SGD (article) | 1 h | Micro |
| 17. Arbo viruses | Principles of diagnosis treatment and prevention viral infections/disease in humans | Lecture | 1 h | Micro |
| 18. Retro viruses/ oncogenic viruses/ prions | | Lecture | 1 h | Micro |
| 19. Viruses of zoonotic importance to include rabies | | Lecture | 1 h | Micro |

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| 20. Diagnostics in viral infections | 1. State the different methods used in diagnosis of viral infections<br>2. Briefly explain the limitations of each method.<br>3. Outline the principals of diagnosis in common viral infections seen in Sri Lanka – Dengue – Rapid diagnostic assays and PCR<br>4. Hepatitis – ELISA/ Rapid diagnostic assays<br>5. Influenza – FAT, Rapid diagnostic assays and PCR<br>6. Rabies – Microscopy and FAT | Lecture<br><br>Practical | 1 h<br><br>1 1/2 h x 4 groups | Micro<br><br>Micro |
| 21. Topics 12 -20- MCQs | 1. Objectives of topics 12 – 21 | SGD | 1 h | Micro |
| 22. Topics 12 -20- SAQs | 1. Objectives of topics 12 – 21 | SGD | 1 h | Micro |
| 23. Topics 12 -20- SAQs | 1. Objectives of topics 12 – 21 | SGD | 1 h | Micro |
| **Introducing medically important Bacteria** | | | | |
| 24. Introduction to bacteria Gram positive cocci to include staphylococci, | 1. Recall the infective bacteria and their major morphological and biological characteristics that determine visualization/ identification in the laboratory<br><br>2. Briefly state the basis of classification of bacteria and means by which bacteria are recognized as a cause of disease in a patient<br><br>3. Describe habitat, main mode(s) of transmission, morphology and growth characteristics in relation to identification, key virulence factors, pathogenicity and basis of clinical disease, principals of treatment and prevention | Lecture | 1 h | Micro |
| 25. Streptococci and Enterococci – | | Lecture | 1h | Micro |
| 26. Gram negative cocci to include *Neisseria* and *Branhemella* | | Lecture | 1 h | Micro |
| 27. Gram positive bacilli to include corynebacterium,bacillus, norcardia and listeria | | SGD (article) | 1 h | Micro |
| 28. Mycobacteria | | Lecture | 1 h | Micro |
| 29. Anaerobes including clostridia, actinomycetes and prevotella | | Lecture | 1 h | Micro |
| 30. Gram negative bacilli to include enterobacteriacae , pseudomonads and other NLF of clinical importance | | Lecture | 1 h | Micro |
| 31. Gram negative cocco bacilli to include haemohpilus, bordetella, legionella and pasteurella | | Lecture | 1 h | Micro |

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| 32. Vibrio, Campylobacter and Helicobacter | | Lecture | 1 h | Micro |
| 33. Spirochaetes | | Lecture | 1 h | Micro |
| 34. Chlamydia, Rickettsioses and Mycoplasma | | Lecture | 1 h | Micro |
| 35. Correct use of microscope, observation of smears and documentation of findings<br>36. Diagnosis of bacterial infections<br>37. Molecular diagnosis of infectious diseases<br>38. Hand washing | 1. To identify gram positive and negative bacteria<br>2. Be able to use a light microscope properly following a SOP<br>3. Explain the principles of common tests used to diagnose bacterial infections<br>4. Explain the principles of common molecular techniques used in the diagnosis of infectious diseases<br>5. Know the indications to perform hand hygiene<br>6. Follow the correct steps and perform hand hygiene in the indicated instances | Practical | 1 hour each for each practical | Micro |
| 39. Topics 26 - 35 – SAQs | 1. Objectives of topics 26 – 36 | SGD | 3 h | Micro |
| **Introducing medically important fungi** | | | | |
| 40. Superficial mycoses | 1. Describe fungi associated with human infections including laboratory diagnosis and principals of treatment | Lecture | 1h | Micro |
| 41. Sub cutaneous and deep mycoses | | Lecture | 1h | Micro |
| 42. Topics 26 - 38 – MCQs | 1. Objectives of topics 26 – 36 | SGD | 1 h | Micro |
| 43. Topics 26 - 38 – SAQs | 1. Objectives of topics 26 – 36 | SGD | 1 h | Micro |
| **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** | | | | |
| 44. Malaria | 1. List the human malarial parasites indicating the species found in Sri Lanka<br>2. Describe the life cycle<br>3. Identify stages that are useful in diagnosis<br>4. Describe the pathological and clinical consequences of the erythrocytic cycle including relapse & recrudescence<br>5. Outline laboratory methods of diagnosis<br>6. Identify points in the LC where preventive measures are applicable | Lecture | 1h | Parasit |
| 45. Intestinal Protozoa - amaoebae & ciliates | 1. Name the common intestinal amoebae & ciliates that infect humans<br>2. Outline the Life Cycle of *Entamoeba histolytica* indicating<br>3. the stages that cause pathogenic effects and are of diagnostic importance.<br>4. Describe the pathogenesis & clinical features of amoebiasis<br>5. Identify points in LC where preventive measures are applicable.<br>6. Outline the Laboratory methods of identification of organisms | Lecture | 1h | Parasit |

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| 46. Intestinal & Urogenital Protozoa - *Giardia, Trichomonas & Cryptosporidium* | 1. Name the intestinal and tissue flagellates that infect human and state their habitats in humans<br>2. Name the intestinal coccidian that infect humans<br>3. Outline the Life cycle of *Giardia intestinais, Trichomonas vaginalis* and *Cryptosporidum parvum* indicating the infective, pathogenic & diagnostic stages.<br>4. Describe the pathogenesis & clinical features<br>5. Describe the laboratory diagnosis<br>6. Outline the points in LC of the above organisms where preventive measures are applicable. | Lecture | 1h | Parasit |
| 47. Haemoflagellates | 1. 1.Name the parasite(s) causing human leishmaniasis in Sri Lanka<br>2. 2.Name the vector of human leishmaniasis in Sri Lanka<br>3. 4.Describe the breeding habitats of the sandfly in Sri Lanka<br>4. 5.Describe the pathological and clinical consequences relating to infection with this parasite in Sri Lanka<br>5. Describe the methods of laboratory diagnosis of leishmaniasis<br>6. 7.Outline the management of leishmaniasis in Sri Lanka<br>7. Name the parasites & vectors causing trypanosomiasis<br>8. 9. Outline the geographical distribution, clinical features & laboratory diagnosis of African & American trypanosomiasis | Lecture | 1 h | Parasit |
| 48. Tissue Coccidia | 1. Name the tissue coccidian parasite that infect humans<br>2.Outline the life cycle<br>3. Indicate the stages that cause pathogenic effects and those that are diagnostic importance.<br>4. Identify points in LC where preventive measures are applicable.<br>5. Evaluate the laboratory methods diagnosis | Lecture | 1h | Parasit |
| 49.Helminths-Intestinal Nematodes *Ascaris,Necator,Trichuris, Enterobius vermicularis, Strongyloides stercoralis* | 1. List the different group of parasitic helminthes.<br>2. List the major characteristics of parasitic nematodes<br>3. List the common intestinal nematodes in humans<br>4. Outline the LCs with stages and events.<br>5. Write a comparative account of different LCs<br>6. State the stages that cause pathogenic effects and identify stages of diagnostic importance.<br>7. Outline the Laboratory methods of visualization /identification<br>8. Identify the points in LC where preventive measures are applicable. | Lecture | 2 h | Parasit |
| 50. Cestodes & Trematodes a.Cestodes | 1. 1..List the major characteristics of the different groups of parasitic cestodes & trematodes of human indicating those found in SL | Lecture | 1 h | Parasit |

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| *Taenia solium,T.saginata, Hymenolepsis diminuta, H nana,Echinococcus granulosus*<br><br>b.Trematodes Intestinal,tissue & blood trematodes | 2. Outline the LCs with stages and events<br>3. State the stages that cause pathogenic effects and identify those stages of diagnostic importance.<br>4. Outline the laboratory methods of diagnosis<br>5. Identify the points in LC where preventive measures are applicable | | | |
| 51. Athropods of medical importance 1 -Mosquitoes | 1. List the major mosquito bone diseases globally<br>2. List the mosquitoes of medical importance in Sri Lanka indicating the disease(s) that they transmit<br>3. Outline the LC of a mosquito<br>4. Describe the breeding habits of medically important mosquito species in Sri Lanka.<br>5. Outline the strategies used for control of these mosquito species in Sri Lanka. | Lecture | 1 h | Parasit |
| 52. Parasites of Global Importance | 1. List the major parasitic diseases of global importance<br>2. List the common parasites causing schistosomiasis and food borne trematode infections<br>3. Outline the mode of transmission of schistosomes & important food-borne trematodes<br>4. Briefly describe the clinical features of schistosomiasis & important food-borne trematodes<br>5.Outline the laboratory methods of diagnosis of these infections<br>6. 6. Outline the prevention & control of these infections | Lecture | 1h | |
| 53. Athropods of medical importance 2<br>a.) Flies<br>b).Fleas, Lice & Bugs<br>c)Ticks & Mites | 1. Define mechanical & biological vectors<br>2. Flies<br>• Explain the importance of housefly as a mechanical vector of disease<br>• List the other groups of flies that are medically important<br>• Briefly describe myiasis<br>3. Ticks/fleas/bugs<br>• Differentiate them from each other<br>• Describe their medical importance and available control methods<br>4. Mites<br>• Identify *Sarcoptes scabiei* mite<br>• Outline the life cycle | Lecture | 1 h | Parasit |

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| | 5. Lice<br>• Differentiate between the head, body and pubic louse<br>• Describe the treatment and control methods.<br>6. Describe chemical, biological, environmental manipulation, genetic & integrated vector control methods. | | | |
| 54. Animal bites and stings | 1. State the common animal bites in SL<br>2. State the primary and secondary effects of animal bites<br>3. Name the organisms that cause secondary infections of the animal bites<br>4. State the common marine animal and arthropod stings<br>5. List the effects of stings | Lecture | 1 h | Parasit |
| 55. Poisonous snakes and envenomation | 1. List the important snakes which belongs to the families- Elapidae, Viperidae and Colubridae<br>2. Name the poisonous snakes in Sri Lank<br>3. name the common ( important ) non-poisonous snakes in SL<br>4. recognize these (2&3) if shown a specimen/ an image (see demonstration on snakes)<br>5. State the major effects of snake venom in different groups of poisonous snakes in SL<br>6. State the principles underline the treatment and management of snake bites<br>7. State how snake bite can be prevented. | Lecture | 1 h | Parasit |
| 56. Demonstration on venomous snakes | 1. Recognize medically important snakes of Sri Lanka if shown specimens or image | Demonstration | 1 ( 1 x 4 ) | Parasit |
| 55 Demonstration on intestinal protozoa & helminths | 1. Recognize pathogenic and non pathogenic intestinal amoeba, intestinal & urogenital flagellates on the stained & wet smears<br>2. Identify the specimens of adults and eggs of intestinal nematodes | Demonstration | 1 (1 x 4 ) | Parasit |
| 57. Demonstration on tissue protozoa, arthropods | 1. Be able to identify the mosquitoes , flies fleas& mites of medical importance by their body markings<br>2. Identify Leishmania amastigotes on stained slide<br>3. Identify the trypomastigotes of trypanosomes on stained slide<br>4. Identify malarial parasites on stained thin & thick smear<br>5. Identify adult taenid segments and cestode larval stages<br>6. Identify schistosomes adult and eggs | Demonstration | 1 ( 1 x 4) | Parasit |

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| 58. Practical<br>a) Faecal smear preparation &examination for intestinal protozoan and helminthes<br><br>b) Thick &thin blood smear examination for Malaria parasites | Practical skills to be acquired<br><br>1Be able to properly use the compound light microscope<br>2) Know the principles regarding collection, storage and delivery/transport of faecal and blood specimens to a laboratory for diagnosis of parasitic infections<br>3) Be able to examine stained thin blood films and identify malaria parasites(*Plasmodium falciparum* and *Plasmodium vivax*)<br>4) Be able to prepare and examine wet smear of stools in saline and iodine to identify intestinal protozoal and helminth parasites | Practical | 4 (1 h x 4) | Parasit |
| 59. Topics 43 – 57 | 1. Objectives of topics 43 – 57 | SGD | 2 h | Parasit |
| 60. Topics 43 – 57 | 1. Objectives of topics 43 – 57 | SGD | 2 h | Parasit |
| 61. Topics 43 – 57 | 1. Objectives of topics 43 – 57 | SGD | 2 h | Parasit |