

Subject No. 6

MICROBIOLOGY

Total Hours: 90

Theory Hours: 60

Lab Hours: 30

AIM:

This course reorients the students to the fundamentals of microbiology and its various subdivisions .It provides opportunities to gain skill in handling and use of the microscope for identifying various microorganisms .It also provides opportunities for the safe handling of materials containing harmful bacteria and the methods of destroying the micro-organisms.

OBJECTIVES:

The course will enable the students to:

1. Identify common disease causing microorganisms
2. Basic principles of microbiology and its significance in health and disease.
3. Handling various infective specimens.
4. Various methods of sterilization and disinfection.
5. Role of the nurse in the hospital Infection control system.

COURSE CONTENTS:

Unit I – Introduction:

- Structure and classification of Microbes. Morphological types. Size and form of bacteria, structure, spore, flagella, capsule. Motility. Classification of organisms. Colonization.

Unit II - Identification of Micro-organism:

- Identification of micro-organism. Discussion of laboratory methods. Diagnosis of bacterial diseases.

Unit III - Growth and Nutrition of Microbes:

- Growth and nutrition of Microbes. Temperature. Moisture. Blood. Bacteria growth curve and culture media.

Unit IV - Destruction of Micro-organism:

- Sterilization and disinfections. Effect of heat and cold. Chemotherapy and antibiotics. Hospital infection control procedure and role of nurses

Unit V - Disease producing Micro-organisms:

- Gram positive Bacilli. Tuberculosis and leprosy. Anaerobes. Cocci. Spirochetes. Rickettsiae.

Unit VI - Pathogenic Fungi:

- Pathogenic fungi. Dermatophytes. Systemic Mycotic infection. Laboratory diagnosis of Mycotic infection.

Unit VII – Immunity:

- Immunity. Immunity and Hypersensitivity –Skin test. Antigen anti body reaction. Immunization of disease

Unit VIII - Parasites and vectors:

- Parasites and vectors. Characteristics and classification of parasites. Protozoal infection including amoebiasis.
- Helminthes infection. Diagnosis of parasitic infection .Vector and diseases transmitted by them.

Unit IX – Viruses:

- Classification and general characteristics of viruses. Diseases caused by viruses in men and animal and their control.

Unit X - Food borne infections:

- Micro-organisms transmitted through foods. Food poisoning. Food borne infections.

MICROBIOLOGY

Unit No. & Hrs.	Objectives	Contents						
		Must know 60%			Desirable to know 30%	Nice to know 10%		
I (03 hours)	At the end of unit students are able to Knowledge: Understand and describe the basic concepts of microbiology.	Structure and classification of Microbes: <ul style="list-style-type: none"> • Morphological types • Size and form of bacteria structure, spore, flagella capsule (2 hours) 			<ul style="list-style-type: none"> • Motility • Colonization. (1 hour) 			
Unit:1 Introduction								
Course outcome		Program outcome						
		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Describe the morphology of a bacterial cell with the help of a diagram and mention the functions of the various appendages		3	3	3	3	3	3	3
CO2: Illustrate the structure of Prokaryotic and Eukaryotic cell with well labeled diagram.		3	3	3	3	3	3	3
CO3: Interpret the classification of bacteria based on the shape and arrangements		3	3	3	3	3	3	3

CO4: Explain the classification of bacteria on the basis of nutrition.	3	3	3	3	3	3	3	
CO5: Classify the bacteria on the basis of optimum temperature of growth.	3	3	3	3	3	3	3	
CO6: Enlist the types of flagella with well labeled diagram. Explain in detail about flagella.	3	3	3	3	3	3	3	
CO7: Enlist the types of fimbriae with well labeled diagram. Explain in detail about fimbriae	3	3	3	3	3	3	3	
CO8: Explain in detail about bacterial spore with well labeled diagram.	3	3	3	3	3	3	3	
Unit No. & Hrs.	Objectives	Contents						
		Must know 60%			Desirable to know 30%	Nice to know 10%		
II (03 hours)	At the end of unit students are able to Knowledge: Know the identification of microorganisms.	Identification of micro-organism: • Discussion of laboratory methods (2hrs)			• Diagnosis of bacterial diseases (1 hour)			
Unit:II Identification of micro-organism								
Course outcome		Program outcome						
		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7

CO1: Explain in detail about Identification of micro-organism		3	3	3	3	3	3	3
CO2: Describe the more important and widely used tests to identify micro-organism.		3	3	3	3	3	3	3
CO3: Explain Ziehl-Neelsen stain		3	3	3	3	3	3	3
<i>Unit No. & Hrs.</i>	<i>Objectives</i>	<i>Contents</i>						
		<i>Must know 60%</i>				<i>Desirable to know 30%</i>	<i>Nice to know 10%</i>	
III (04 hours)	At the end of unit students are able to Knowledge: Understand and describe growth and nutrition of microorganisms.	Growth and nutrition of Microbes: • Temperature. Moisture. Blood .(2 hour) • Bacteria growth curve (1hour)				• Culture media (1 hours)		
Unit:III Growth and nutrition of Microbes								
Course outcome		Program outcome						
		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Describe growth and nutrition of microorganisms.		3	3	3	3	3	3	3
CO2: : Illustrate Bacteria growth curve with well labeled diagram.		3	3	3	3	3	3	3

CO3: Identify the factors influencing growth of micro organism.	3	3	3	3	3	3	3
CO4: Classify the culture media, necessary for growth of bacteria.	3	3	3	3	3	3	3
CO5: Enlist the types of liquid media. Explain about peptone.	3	3	3	2	3	3	3
CO6: Enumerate the characteristics of an ideal culture medium, Explain about methods of culture.	3	3	3	3	3	3	3
CO7: List out solid media and Explain special media.	3	3	3	3	3	3	3

<i>Unit No. & Hrs.</i>	<i>Objectives</i>	<i>Contents</i>		
		<i>Must know 60%</i>	<i>Desirable to know 30%</i>	<i>Nice to know 10%</i>
IV (06 hours)	At the end of unit students are able to Knowledge: Understand describe disinfection and sterilization. Skill: Perform disinfection of the care giving areas. Attitude: Recognizes the importance of disinfection in nursing practice.	Destruction of micro-organism: • Chemotherapy and antibiotics (2 hours) • Hospital infection control procedure And role of nurses.(2 hours)	• Sterilization and disinfections. (1 hr)	• Effect of heat and cold. (1 hour)

Unit:IV Destruction of micro-organism

Course outcome	Program outcome						
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Describe the importance of disinfection in nursing practice.	3	3	3	3	3	3	3
CO2: Explain disinfection and sterilization.	3	3	3	3	3	3	3
CO3: Explain Chemotherapy and antibiotics.	3	3	3	3	3	3	3
CO4: Illustrate Hospital infection control procedure And role of nurses	3	3	3	3	3	3	3
CO5: Determine the Effect of heat and cold in destruction of micro organism.	3	3	3	3	3	3	3
CO6: Explain in detail about Hot Air Oven.	3	3	3	3	3	3	3
CO7: Explain in detail about evaluation tests of disinfectant.	3	3	3	3	3	3	3
<i>Unit No. & Hrs.</i>	<i>Objectives</i>	<i>Contents</i>					
		<i>Must know 60%</i>			<i>Desirable to know 30%</i>	<i>Nice to know 10%</i>	
V (10 hours)	At the end of unit students are able to Knowledge: Understand and describe various disease producing microorganisms.	Disease producing micro-organisms: <ul style="list-style-type: none"> • Gram positive Bacilli (2 hour). • Anaerobes (2 hour). Cocci. (2 hour) • Spirochetes (2 hour). 			• Tuberculosis and leprosy. (3 hour)	Rickettsae (1 hour)	
Unit: V Disease producing micro-organisms							
Course outcome		Program outcome					

		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Explain Tuberculosis including mode of transmission, symptoms of tuberculosis and treatment of tuberculosis		3	3	3	3	3	3	3
CO2: Describe about tuberculosis including laboratory investigations, prevention, and DOT therapy.		3	3	3	3	3	3	3
CO3: List out the disease caused by Gram-positive bacilli, Explain in detail about pneumonia.		3	3	3	3	3	3	3
CO4: Explain in detail about the Spirochetes.		3	3	3	3	3	3	3
CO5: List out the common infections caused by Anaerobes, Explain in detail about Tetanus.		3	3	3	2	3	3	3
CO6: Enlist the diseases caused by gram-positive and gram-negative Cocci, Explain in detail about urinary tract infection including lab investigations treatment and prevention.		3	3	3	3	3	3	3
CO7: Explain in detail about the Rickettsiae.		3	3	3	3	3	3	3
<i>Unit No. & Hrs.</i>	<i>Objectives</i>	<i>Contents</i>						
		<i>Must know 60%</i>				<i>Desirable to know 30%</i>	<i>Nice to know 10%</i>	
	At the end of unit students are able to	Pathogenic fungi: • Dermatophytes (1 hour)				• Laboratory diagnosis of		

VI (04 hours)	Knowledge: Understand and describe various disease producing fungi.	• Systemic Mycotic infection (1 hours)	Mycotic infection. (2 hour)					
Unit:V1 Pathogenic fungi								
Course outcome		Program outcome						
		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Describe the types of fungal infection, and explain in detail about Aspergillosis.		3	3	3	3	3	3	3
CO2: Explain in detail about classification of fungi.		3	3	3	3	3	3	3
CO3: Illustrate the symptoms of candidiasis and Explain in detail about laboratory investigation and treatment for the client having candidiasis		3	3	3	3	3	3	3
CO4: Determine the Laboratory diagnosis of Mycotic infection.		3	3	3	3	3	3	3
CO5: Describe various disease producing fungi and Explain regarding athlete's foot.		3	3	3	3	3	3	3
Unit No. & Hrs.	Objectives	Contents						
		Must know 60%			Desirable to know 30%		Nice to know 10%	
	At the end of unit students are able to	Immunity: • Immunity and hypersensitivity –Skin test			Immunization of disease (2 hours)			

VII (06 hours)	Knowledge: Understand and describe immunity, hypersensitivity, and antigen antibody reactions. Attitude: Recognizes the importance of immunity.	(2 hours) • Antigen anti body reaction (2 hours)		
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Unit:VII Immunity

Course outcome	Program outcome						
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Describe Immunity and its types: Innate and Acquired immunity.	3	3	3	3	3	3	3
CO2: Explain about the Hypersensitivity and Types of Hypersensitivity reaction with the help of well labeled diagram.	3	3	3	3	3	3	3
CO3: Explain in detail about Type I hypersensitivity reaction: mechanism and clinical manifestation	3	3	3	3	3	3	3
CO4: Describe Type II hypersensitivity reaction: Mechanism and examples with the help of well labeled diagram.	3	3	3	3	3	3	3
CO5: Explain Type III hypersensitivity reaction: factors causing immune complex formation, mechanism and types.	3	3	3	3	3	3	3
CO6: Describe Type IV hypersensitivity reaction or Delayed type hypersensitivity	3	3	3	3	3	3	3

(DTH).								
CO7: Illustrate Antigen anti body reaction.	3	3	3	3	3	3	3	
CO8: Identify Immunization of disease.	3	3	3	3	3	3	3	
<i>Unit No. & Hrs.</i>	<i>Objectives</i>	<i>Contents</i>						
		<i>Must know 60%</i>			<i>Desirable to know 30%</i>	<i>Nice to know 10%</i>		
VIII (10 hours)	At the end of unit students are able to Knowledge: Understand and describe various parasites and vectors.	Parasites and vectors: <ul style="list-style-type: none"> • Characteristics and classification of parasites. (2 hrs) • Protozoal infection including amoebiasis (2 hours) • Helminthes infection (1 hour) • Diagnosis of parasitic infection (1 hour) 			<ul style="list-style-type: none"> • Vector and diseases transmitted by them (2 hours) 	<ul style="list-style-type: none"> • Diagnosis of vector 		
Unit:VIII Parasites and vectors								
Course outcome		Program outcome						
		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Explain in detail about giardiasis.	3	3	3	3	3	3	3	
CO2: Illustrate Characteristics and classification of parasites.	3	3	3	3	3	3	3	

CO3: Explain in detail about Tapeworm infection.	3	3	3	3	3	3	3	
CO4: Describe in detail regarding Malarial infection.	3	3	3	3	3	3	3	
CO5: List out the common vector borne diseases in India. Explain in detail about Chikungunya.	3	3	3	3	3	3	3	
CO6: Explain in detail about amoebiasis.	3	3	3	3	3	3	3	
Unit No. & Hrs.	Objectives	Contents						
		Must know 60%			Desirable to know 30%	Nice to know 10%		
IX (08 hours)	At the end of unit students are able to Knowledge: Understand and describe classification and characteristics of viruses.	Viruses: • Classification and general characteristics of viruses (4 hours)			Diseases caused by viruses in men (3hour)	Disease caused by animal and their control (1 hours)		
Unit:IX Viruses								
Course outcome		Program outcome						
		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Illustrate the Classification and general characteristics of viruses.	3	3	3	3	3	3	3	

CO2: Explain about Hepatitis A virus (HAV): properties, and mode of transmission, pathogenesis, clinical features and laboratory diagnosis.	3	3	3	3	3	3	3
CO3: Explain in detail about HIV/AIDS: pathogenesis, clinical manifestation and lab diagnosis.	3	3	3	3	3	3	3
CO4: Describe about Poliovirus: Characteristics, Mode of transmission, Pathogenesis, Clinical manifestation, laboratory diagnosis, Prevention and control.	3	3	3	3	3	3	3
CO5: Explain in detail about Dengue pathogenesis, clinical manifestation, lab diagnosis and treatment.	3	3	3	3	3	3	3
CO6: Identify the Diseases caused by viruses in men and Explain in detail about measles.	3	3	3	3	3	3	3
Unit No.	Objectives	Contents					
& Hrs.		Must know 60%			Desirable to know 30%	Nice to know 10%	
X (06 hours)	At the end of unit students are able to Knowledge: Understand and describe the microorganisms transmitted through food.	Micro-organisms transmitted through foods: • Food poisoning. Food borne infections • (4 hours)			Manifestation of food poisoning (1 hour)	Diagnosis of food Poisoning (1 hour)	
Unit: X Micro-organisms transmitted through foods							
Course outcome		Program outcome					

	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Describe the microorganisms transmitted through food	3	3	3	3	3	3	3
CO2: Explain in detail regarding Manifestation of food poisoning.	3	3	3	3	3	3	3
CO3: Explain about food poisoning including, symptoms, causes, diagnosis, and treatment.	3	3	3	3	3	3	3
CO4: Explain about food poisoning including, complication and prevention.	3	3	3	3	3	3	3
CO5: Explain about role of nurse in food poisoning.	3	3	3	3	3	3	3

SUBJECT INCHARGE

Ms. Nilima Rakshale

Professor

SRMMCON