

Subject No. 5
MICROBIOLOGY

Total Hours: 60 hours

Theory Hours: 45 hours

Lab Hours: 15 hours

AIM:

- This course enables students to acquire understanding of fundamentals of Microbiology and identification of various microorganisms. It also provides opportunities for practicing infection control measures in hospital and community setting.

OBJECTIVES:

At the end of the course student will be able to:

- Explain concepts and principles of microbiology and their importance in Nursing.
- Understand the commensally, opportunistic and pathogenic organisms of human body and describe host parasite relationship.
- State the sources and modes of transmission of pathogenic and opportunistic organisms including vectors and their role in transmission of diseases.
- Be conversant with proper methods of collection, storage and transport of clinical material for microbiological investigations.
- Understand the principles of immunology and its application in the diagnosis and prevention of infectious diseases.

COURSE CONTENT:

Unit I – Introduction:

- Importance and relevance to nursing. Historical perspective. Concepts and terminology. Principles of microbiology.

Unit II - General characteristics of microbes:

- Structure and classification of Microbes. Morphological types. Size and form of bacteria. Motility. Colonization.
- Growth and nutrition of Microbes: Temperature, Moisture, Blood and body fluids. Laboratory methods for Identification of Micro organisms. Staining techniques, Gram staining, Acid fast staining, Hanging drop preparation. Culture, various Medias.

Unit III - Infection Control:

- Infection: Sources, portal of entry and exit, transmission. Asepsis. Disinfection; Types and methods. Sterilization: Types and methods. Chemotherapy and antibiotics. Biomedical waste management. Role of nurse.
- Hospital acquired infections. **Hospital infection control programme. – protocols, collection of samples**, preparation of reports, status of rate of infection in the unit / hospital., nurses **accountability, continuing education, etc.** role of nurse in prevention of new emerging infections (swine flu , Ebola virus

Unit IV - Pathogenic Organisms:

Micro organisms: Cocci- gram positive and gram negative. Bacilli- gram positive and gram negative. Spirochaete. Mycoplasma. Rickettsae. Chlamydiae Viruses. Fungi-Superficial and deep mycoses. Parasites. Rodents and vectors. Characteristics, source, portal of entry, transmission of infection

- Identification of disease producing micro organisms. Collecting, handling and transportation of various specimens. **Role of nurse.**
Advanced technology in identification of disease producing microbes.

Unit V – Immunity:

- Types. Classification. Antigen and antibody reaction. Hypersensitivity -Skin test. Serological test. Immuno-prophylaxis.
- Vaccines and sera -Types & classification, storage and handling, cold chain.
- Immunization for various diseases. Immunization schedule.

<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>		
I (5 Hrs)	Introduction: At the end of unit students are able to-- Knowledge: Understand and describe the importance of study of disease causing bacteria in humans.	<ul style="list-style-type: none"> • Importance and relevance to nursing. • Concepts and terminology (3 hour) 		<ul style="list-style-type: none"> • Principles of microbiology (1 hour) 		<ul style="list-style-type: none"> • Historical perspective. (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

CO-1: Define & describe the microbiological terminology & importance of microbiology for human being.	2	2	1	2	2	1	1
CO-2: Identify the principles of microbiology & application of it in nursing practice.	2	3	2	2	3	1	1
CO-3: Compare the historical perspective with the current era in microbiology field.	1	1	2	1	2	1	1
CO-4: Determine the Historical contributions of various microbiologists in microbiology field.	2	3	2	2	3	1	1

<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>			
II (10 Hrs)	General characteristics of microbes: At the end of unit students are able to Knowledge: Understand and explain basic principles of study of microbiology. Skill: Collect samples correctly for microbiological studies. Prepare slides and staining. Attitude: Incorporate this knowledge in nursing practice.	<ul style="list-style-type: none"> • Structure and classification of Microbes. • Morphological types, Size and form of bacteria . • Growth and nutrition of Microbes: Temperature, Moisture, Blood and body fluids. • Laboratory methods for Identification of Micro organisms. (6 Hours) 	<ul style="list-style-type: none"> • Staining techniques, Gram staining, Acid fast staining, Hanging drop preparation, • Culture; various Medias. (3 hours) 	<ul style="list-style-type: none"> • Motility. • Colonization. (1 hr) 			
Unit II - General characteristics of microbes:							
Course outcome		Program outcome					
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health	Lifelong learner	Critical thinker	Researcher

					care team and system			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO-1: Define, & classify various microbes.		2	2	1	2	3	1	1
CO-2: Identify, classify, draw & describe morphological types, size and forms of pathogenic & nonpathogenic bacteria.		2	2	2	2	3	1	1
CO-3: Identify various laboratory methods of identifying bacteria.		2	2	2	2	2	1	1
CO-4: Define, classify & gain skill in the staining technique of Gram staining, Acid fast staining, Hanging drop preparation of bacteria in microbiology lab.		3	2	2	2	2	1	1
CO-5: Define, classify & gain skill in technique of culturing medias of various bacteria in microbiology lab.		3	2	2	2	2	1	1
CO-6: Define, identify, and describe methods of motility & Colonization of various bacteria.		3	2	2	2	2	1	1
CO-7: Define Determine, Growth, growth curve, draw a diagram and nutrition of Microbes,& apply skill in culturing microbes in micro lab to identify & prevent disease causing agents		3	2	2	2	2	1	1
<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 (10 Hrs)	Infection Control: At the end of unit students are able to	<ul style="list-style-type: none"> Infection: Sources, portal of entry and exit, transmission. Asepsis 			<ul style="list-style-type: none"> Preparation of reports, status of rate of infection in the unit / 		<ul style="list-style-type: none"> Chemotherapy and antibiotics. (1 hours) 	

	<p>Knowledge: Understand and describe methods of disinfection and sterilization. Skill: Perform disinfection of unit and sterilization of various articles. Attitude: Appreciate the importance of sterilization and disinfection in infection control.</p>	<ul style="list-style-type: none"> Disinfection; Types and methods. Sterilization; Types and methods. Biomedical waste management. Role of nurse. Hospital acquired infections. Role of nurse in prevention of new emerging infections (swine flu, Ebola virus. (6 hours)) 	<ul style="list-style-type: none"> hospital. Hospital infection control programme. – Protocols, collection of samples, accountability, continuing education, etc. (3 hours) 	
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Unit III - Infection Control:

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
CO-1: Define & describe types, sources, portal of entry, exit, transmission & chain of Infection & its importance in community & clinical area.	3	3	2	2	2	1	1
CO-2: Define & describe the term Asepsis & its importance in nursing practice.	3	3	2	3	2	1	1
CO-3: Define, describe & compare the types and methods of Sterilization & Disinfection & Perform disinfection of unit & appreciate & incorporate the importance of sterilization of various articles in clinical area.	3	3	3	3	3	1	1

CO-4: Define, determine, Biomedical waste & importance of various methods of Biomedical waste management, & perform principles of it positively in hospital setting.	3	3	2	2	2	2	3
CO-5: Define the term Hospital acquired infections & identify its types, sources, prevention & perform the role of prevention of HAI.	3	3	2	3	2	1	2
CO-6: Define & describe Hospital infection control programme, acquire skill in making Protocols, collection of samples, accountability, continuing education, Preparation of reports, status of rate of infection in the unit / hospital.	3	3	2	3	2	1	1
CO-7: Define, identify & describe new emerging infections (swine flu, Ebola virus.)& perform the role in prevention of it.	3	3	2	3	2	1	1
CO-8: Define, describe & compare Chemotherapy and antibiotics & its uses & prevention of antibiotic resistance.	2	2	1	2	2	2	1
Unit No.	Contents						
& Hrs.	Objectives	Must know 60%		Desirable to know 30%		Nice to know 10%	
IV (12 Hrs.)	<p>Pathogenic Organisms: At the end of unit students are able to</p> <p>Knowledge: Understand and describe disease producing microbes for diagnosis of various patients in outdoor and indoor settings.</p> <p>Skill: Collect, preserve and send samples to laboratory in specified way.</p>	<ul style="list-style-type: none"> • Cocci- gram positive and gram negative • Bacilli- gram positive and gram negative. • Spirochaete • Mycoplasma. • Rickettsiae • Chlamydiae • Viruses • Fungi-Superficial and deep mycoses . • Parasites.Rodents and vectors. (7 		<ul style="list-style-type: none"> • Characteristics ,source ,portal of entry ,transmission of infection • Identification of disease producing micro organisms Collecting, handling and transportation of various specimens. • Role of nurse.(4 Hours) 		<ul style="list-style-type: none"> • Advanced technology in identification of disease producing microbes. (1hours) 	

	Attitude: Appreciate this knowledge and importance of collection of samples in diagnosis and treatment of patients.	Hours)						
Unit IV - Pathogenic 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
CO-1: Define & describe the Characteristics ,source ,portal of entry , identification of transmission of infection of – a. Gram positive and Gram negative Cocci. b. Gram positive and Gram negative Bacilli. c. Spirochaete. d. Rickettsae. e. Chlamydiae. f. Viruses. g. Superficial and deep mycoses & h. Parasites.Rodents and vectors.		2	2	1	2	2	1	1
CO-2: Define the term specimen, describe various methods of Collecting, handling and transportation of various specimens & perform the skill & nurses role effectively in Collecting, handling and transportation of various specimens in hospital settings.		2	2	2	2	2	1	1

CO-3: Identify, describe & apply advanced technology in identification of disease producing microbes.		2	2	2	2	2	1	1
Unit No. & Hrs.	Objectives	Contents						
		Must know 60%		Desirable to know 30%		Nice to know 10%		
V (08 Hrs)	At the end of unit students are able to Knowledge: Understand and describe the importance, types, classification of immunity. Attitude: Incorporate this knowledge in patient education.	<ul style="list-style-type: none"> Vaccines and sera -Types & classification, storage and handling, cold chain. Immunization for various diseases. Immunization schedule Immunoprophylaxis. (5 hour) 	<ul style="list-style-type: none"> Hypersensitivity - Skin test. Serological test. (2 hours) 	<ul style="list-style-type: none"> Antigen and antibody reaction. (1 hour) 				
Unit V – 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
CO-1: Define & describe the types, classification, storage and handling of Vaccines and sera, & maintaining cold chain.		2	3	2	3	3	1	1
CO-2: Define & describe & Identify Immunization for various diseases.		3	3	2	3	3	1	1
CO-3: Define & describe, guide & follows effectively the immunoprophylaxis, Immunization		3	3	3	3	3	1	1

schedule for various diseases.							
CO-4: Define & explain the Antigen, antibody and antibody reactions & its role in various diseases.	2	2	2	2	2	1	1
CO-5: Define & explain Hypersensitivity & its importance in Skin test, & various Serological tests in various diseases.	2	2	2	2	2	1	1