APPLIED MICROBIOLOGY AND INFECTION CONTROL INCLUDING SAFETY

PLACEMENT: III SEMESTER

THEORY: 2 Credits (40 hours)

PRACTICAL: 1 Credit (40 hours) (Lab/Experiential Learning – L/E)

SECTION A: APPLIED MICROBIOLOGY

THEORY: 20 hours

PRACTICAL: 20 hours (Lab/Experiential Learning – L/E)

DESCRIPTION: This course is designed to enable students to acquire understanding of fundamentals of Microbiology, compare and contrast different microbes and comprehend the means of transmission and control of spread by various microorganisms. It also provides opportunities for practicing infection control measures in hospital and community settings.

COMPETENCIES: On completion of the course, the students will be able to:

1. Identify the ubiquity and diversity of microorganisms in the human body and the environment.
2. Classify and explain the morphology and growth of microbes.
3. Identify various types of microorganisms.
4. Explore mechanisms by which microorganisms cause disease.
5. Develop understanding of how the human immune system counteracts infection by specific and non-specific mechanisms.
6. Apply the principles of preparation and use of vaccines in immunization.
7. Identify the contribution of the microbiologist and the microbiology laboratory to the diagnosis of infection.

COURSE OUTLINE

T – Theory, L/E – Lab/Experiential Learning

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	3		Explain concepts and principles of microbiology and its importance in nursing	**Introduction:** • Importance and relevance to nursing • Historical perspective • Concepts and terminology • Principles of microbiology	• Lecture cum Discussion	• Short answer • Objective type
II	10	10 (L/E)	Describe structure, classification morphology and growth of bacteria Identify Microorganisms	**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 Microorganisms • Types of Staining – simple, differential (Gram's, AFB), special – capsular staining (negative), spore, LPCB, KOH mount. • Culture and media preparation – solid and liquid. Types of media – semi synthetic, synthetic, enriched, enrichment, selective and differential media. Pure culture techniques – tube dilution, pour, spread, streak plate. Anaerobic cultivation of bacteria	• Lecture cum Discussion • Demonstration • Experiential Learning through visual	• Short answer • Objective type
III	4	6 (L/E)	Describe the different disease producing organisms	**Pathogenic organisms** • Micro-organisms: Cocci – gram positive and gram negative; Bacilli – gram positive and gram negative • Viruses • Fungi: Superficial and Deep mycoses • Parasites • Rodents & Vectors ○ Characteristics, Source, portal of entry, transmission of infection, Identification of disease producing micro-organisms	• Lecture cum Discussion • Demonstration • Experiential learning through visual	• Short answer • Objective type
IV	3	4 (L/E)	Explain the concepts of	**Immunity**	• Lecture	• Short answer • Objective

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
			immunity, hyper sensitivity and immunization	• Immunity: Types, classification • Antigen and antibody reaction • Hypersensitivity reactions • Serological tests • Immunoglobulins: Structure, types & properties • Vaccines: Types & classification, storage and handling, cold chain, Immunization for various diseases • Immunization Schedule	• Discussion • Demonstration • Visit to observe vaccine storage • Clinical practice	type • Visit report

SECTION B: INFECTION CONTROL & SAFETY

THEORY: 20 hours

PRACTICAL/LAB: 20 hours (Lab/Experiential Learning – L/E)

DESCRIPTION: This course is designed to help students to acquire knowledge and develop competencies required for fundamental patient safety and infection control in delivering patient care. It also focuses on identifying patient safety indicators, preventing and managing hospital acquired infections, and in following universal precautions.

COMPETENCIES: The students will be able to:

1. Develop knowledge and understanding of Hospital acquired Infections (HAI) and effective practices for prevention.
2. Integrate the knowledge of isolation (Barrier and reverse barrier) techniques in implementing various precautions.
3. Demonstrate and practice steps in Hand washing and appropriate use of different types of PPE.
4. Illustrate various disinfection and sterilization methods and techniques.
5. Demonstrate knowledge and skill in specimen collection, handling and transport to optimize the diagnosis for treatment.
6. Incorporate the principles and guidelines of Bio Medical waste management.
7. Apply the principles of Antibiotic stewardship in performing the nurses'role.
8. Identify patient safety indicators and perform the role of nurse in the patient safety audit process.
9. Apply the knowledge of International Patient Safety Goals (IPSG) in the patient care settings.
10. Identify employee safety indicators and risk of occupational hazards.
11. Develop understanding of the various safety protocols and adhere to those protocols.

COURSE OUTLINE

T – Theory, L/E – Lab/Experiential Learning

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
I	2	2 (E)	Summarize the evidence based and effective patient care practices for the prevention of common healthcare associated infections in the healthcare	**HAI (Hospital acquired Infection)** • Hospital acquired infection • Bundle approach - Prevention of Urinary Tract Infection (UTI) - Prevention of Surgical Site Infection (SSI) - Prevention of Ventilator	• Lecture & Discussion • Experiential learning	• Knowledge assessment • MCQ • Short answer

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
			Setting	Associated events (VAE) - Prevention of Central Line Associated Blood Stream Infection (CLABSI) • Surveillance of HAI – Infection control team & Infection control committee		
II	3	4 (L)	Demonstrate appropriate use of different types of PPEs and the critical use of risk assessment	**Isolation Precautions and use of Personal Protective Equipment (PPE)** • Types of isolation system, standard precaution and transmission-based precautions (Direct Contact, Droplet, Indirect) • Epidemiology & Infection prevention – CDC guidelines • Effective use of PPE	• Lecture • Demonstration & Re-demonstration	• Performance assessment • OSCE
III	1	2 (L)	Demonstrate the hand hygiene practice and its effectiveness on infection control	**Hand Hygiene** • Types of Hand hygiene. • Hand washing and use of alcohol hand rub • Moments of Hand Hygiene • WHO hand hygiene promotion	• Lecture • Demonstration & Re-demonstration	• Performance assessment
IV	1	2 (E)	Illustrates disinfection and sterilization in the healthcare setting	**Disinfection and sterilization** • Definitions • Types of disinfection and sterilization • Environment cleaning • Equipment Cleaning • Guides on use of disinfectants • Spaulding's principle	• Lecture • Discussion • Experiential learning through visit	• Short answer • Objective type
V	1		Illustrate on what, when, how, why specimens are collected to optimize the diagnosis for treatment and management.	**Specimen Collection (Review)** • Principle of specimen collection • Types of specimens • Collection techniques and special considerations • Appropriate containers • Transportation of the sample • Staff precautions in handling specimens	• Discussion	• Knowledge evaluation • Quiz • Performance assessment • Checklist
VI	2	2 (E)	Explain on Bio Medical waste management & laundry management	**BMW (Bio Medical Waste Management)** *Laundry management process and infection control and prevention*	• Discussion • Demonstration • Experiential learning through	• Knowledge assessment by short answers, objective type • Performance

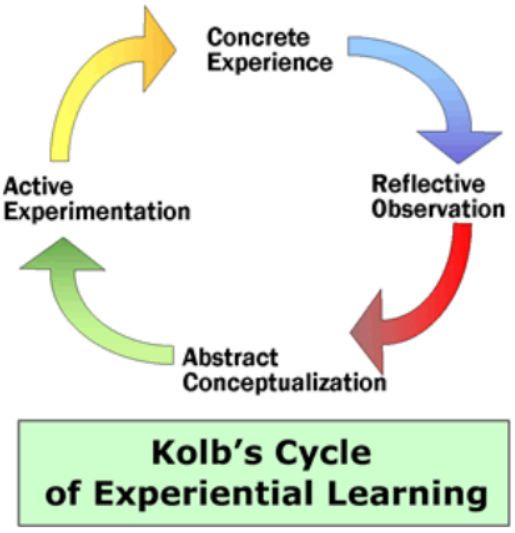
Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
				• Waste management process and infection prevention • Staff precautions • Laundry management • Country ordinance and BMW National guidelines 2017: Segregation of wastes, Colour coded waste containers, waste collection & storage, Packaging & labeling, Transportation	visit	Assessment
VII	2		Explain in detail about Antibiotic stewardship, AMR Describe MRSA/ MDRO and its prevention	**Antibiotic stewardship** • Importance of Antibiotic Stewardship • Anti-Microbial Resistance • Prevention of MRSA, MDRO in healthcare setting	• Lecture • Discussion • Written assignment –Recent AMR (Antimicrobial resistance) guidelines	• Short answer • Objective type • Assessment of assignment
VIII	3	5 (L/E)	Enlist the patient safety indicators followed in a health care organization and the role of nurse in the patient safety audit process Captures and analyzes incidents and events for quality improvement	**Patient Safety Indicators** • Care of Vulnerable patients • Prevention of Iatrogenic injury • Care of lines, drains and tubing's • Restrain policy and care – Physical and Chemical • Blood & blood transfusion policy • Prevention of IV Complication • Prevention of Fall • Prevention of DVT • Shifting and transporting of patients • Surgical safety • Care coordination event related to medication reconciliation and administration • Prevention of communication errors • Prevention of HAI • Documentation **Incidents and adverse Events** • Capturing of incidents • RCA (Root Cause Analysis) • CAPA (Corrective and Preventive Action) • Report writing	• Lecture • Demonstration • Experiential learning • Lecture	• Knowledge assessment • Performance assessment • Checklist/ OSCE • Knowledge assessment • Short answer

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
					• Role play • Inquiry Based Learning	• Objective type
IX	1		Enumerate IPSG and application of the goals in the patient care settings.	**IPSG (International Patient safety Goals)** • Identify patient correctly • Improve effective communication • Improve safety of High Alert medication • Ensure safe surgery • Reduce the risk of health care associated infection • Reduce the risk of patient harm resulting from falls • Reduce the harm associated with clinical alarm system	• Lecture • Role play	• Objective type
X	2	3 (L/E)	Enumerate the various safety protocols and its applications	**Safety protocol** • 5S (Sort, Set in order, Shine, Standardize, Sustain) • Radiation safety • Laser safety • Fire safety - Types and classification of fire - Fire alarms - Firefighting equipment • HAZMAT (Hazardous Materials) safety - Types of spill - Spillage management - MSDS (Material Safety Data Sheets) • Environmental safety - Risk assessment - Aspect impact analysis - Maintenance of Temp and Humidity (Department wise) - Audits • Emergency Codes • Role of Nurse in times of disaster	• Lecture • Demonstration/ Experiential learning	• Mock drills • Post tests • Checklist
XI	2		Explain importance of employee safety	**Employee Safety Indicators** • Vaccination • Needle stick injuries (NSI)	• Lecture • Discussion	• Knowledge assessment by short answers,

Unit	Time (Hrs)		Learning Outcomes	Content	Teaching/ Learning Activities	Assessment Methods
	T	P				
			indicators Identify risk of occupational hazards, prevention and post exposure prophylaxis.	prevention • Fall prevention • Radiation safety • Annual health check **Healthcare Worker Immunization Program and management of occupational exposure** • Occupational health ordinance • Vaccination program for healthcare staff • Needle stick injuries and prevention and post exposure prophylaxis	• Lecture method • Journal review	objective type • Short answer

***Experiential Learning:**

Experiential learning is the process by which knowledge iscreated through the process of experience in the clinical field. Knowledge results from the combination of grasping andtransforming experience. (Kolb, 1984). The experiential learning cycle begins with an experience that the student has had, followed by an opportunity to reflect on that experience.Then students may conceptualize and draw conclusions about what they experienced and observed, leading to future actions in which the students experiment with different behaviors. This begins the new cycle as the students have new experiences based on their experimentation. These steps may occur in nearly and order as the learning progresses. As perthe need of the learner, the concrete components and conceptual components can be in different order as they mayrequire a variety of cognitive and affective behaviors.



Kolb's Cycle of Experiential Learning

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