

Department of Microbiology Comilla Medical College, Cumilla



Lesson Plan

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Lesson Plan (Microbiology)

Topic: Bacterial structure:

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Bacterial structure'

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Bacterial structure
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on biological cell
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define prokaryotic and eukaryotic cells with examples.
2. Differences between prokaryotes and eukaryotes.
3. Different structures of bacterial cell and their functions.
4. Brief description of cell wall of Gram positive and Gram-negative bacteria.
5. Spores structure and clinical importance.
6. L-forms, protoplast, spheroplast, Clinical importance of L-form.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Related image
5–10	Introduction	Importance of bacterial structure
10–15	Definition	Prokaryotes and Eukaryotes
15–30	Structure	Cell wall, cell membrane, Capsule, pili, Flagella, Spore
30–40	Functions	Different structure of bacteria
40–55	Description	Different structure of bacteria
55–60	Summary	Take home message

Resources:

1. PowerPoint slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Draw structure of cell wall
2. Short note on cell membrane of bacteria
3. Read next topic: Bacterial classification

Lesson Plan (Microbiology)

Topic: Bacterial Classification:

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on '**Bacterial Classification**'

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Bacterial Classification
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on structure of bacteria
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Explain** the medical importance of classifying bacteria in clinical diagnosis and therapy.
2. **Describe** the morphological, staining, biochemical methods of classification.
3. **Select** appropriate diagnostic algorithms to identify a pathogen in clinical practice.
4. **Explain** the mechanism and structural basis behind Gram staining and Acid-fast staining.
5. **Identify** key medical pathogens belonging to major Gram-positive, Gram-negative, and atypical bacterial groups.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Show clinical images of diverse bacterial infections
5–10	Intro	Applications of classification in choosing empiric antibiotics, predicting virulence, and tracking epidemiological outbreaks.
10–15	Classification	Taxonomy, phenotypic vs. genotypic classification
15–30	Phenotypic Methods	Structural basis of Gram stain (peptidoglycan thickness) and Acid-fast stain (mycolic acid).
30–40	Classification pathways for laboratory identification	Using flowcharts to identify Gram-positive cocci/bacilli and Gram-negative cocci/bacilli.
40–50	Clinical correlation	Matching major classification categories with specific disease presentations and drug susceptibilities
50–55	Practical use	Walking students through an unknown patient sample algorithm to reach a definitive diagnosis.
55–60	Summary	Take home message

Resources:

1. PowerPoint slides
2. Clinical and microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. **Draw** a comprehensive classification flowchart separating medically important bacteria based on Gram stain, shape, and primary biochemical tests.
2. **Write a short note on:** Atypical bacteria (*Mycoplasma*, *Chlamydia*, *Rickettsia*) and why they cannot be classified by standard Gram staining.
3. **Read next topic:** Bacterial growth requirements and growth curve .

Lesson Plan (Microbiology)

Topic: Growth requirements of bacteria:

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Growth requirements of bacteria'

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Growth requirements of bacteria
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge of bacterial cell structure and replication (binary fission)
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** generation time, lag phase, log phase, stationary phase, and decline phase.
2. **Explain** the importance of understanding bacterial growth conditions and growth kinetics in diagnostic medicine.
3. **Describe** the physical and chemical requirements for bacterial growth, including oxygen, temperature, moisture, pH, and carbon sources.
4. **Select** the correct atmospheric and temperature setups required to culture specific clinical pathogens in a hospital lab.
5. **Explain** the physiological mechanisms driving each phase of the bacterial growth curve and the metabolic changes involved.
6. **Identify** the specific phases of the growth curve where bacteria are most susceptible to antibiotics and when sporulation occurs.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Related image
5–10	Intro	Applications of growth requirements and kinetics
10–15	Definition	Binary fission, generation (doubling) time, growth curve
15–30	Discussion	The Bacterial Growth Curve: details of the 4 distinct phases
30–40	Importance	Different phases of growth curve
40–50	Clinical and therapeutic correlations	Why log-phase bacteria are highly susceptible to cell wall inhibitors (e.g., Penicillins)
50–55	Clinical problem-solving question	why a blood culture from a patient on antibiotics or a slow-growing pathogen (like <i>M. tuberculosis</i>) exhibits an prolonged lag phase
55–60	Summary	Take home message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. **Draw** a fully labeled mathematical flowchart/graph of the classic Bacterial Growth Curve, explicitly highlighting what occurs to the viable cell count versus nutrient availability in each phase.
2. **Short note on:** Generation time differences between rapid growers (*E. coli*) and slow growers (*Mycobacterium tuberculosis*), and its clinical impact on laboratory turnaround time.
3. **Read next topic:** Bacterial Genetics.

Lesson Plan (Microbiology)

Topic: Bacterial Staining:

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on '**Bacterial Staining**'

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Bacterial Staining
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on structure of bacteria
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** simple staining, differential staining, negative staining, and special staining.
2. **Explain** the importance of bacterial staining in rapid presumptive clinical diagnosis.
3. **Describe** certain methods of staining (Gram staining, Ziehl-Neelsen staining) and outline their applications.
4. **Select** the appropriate staining method for specific clinical specimens and suspected pathogens.
5. **Explain** the chemical mechanism of action and structural basis behind Gram staining and Acid-Fast staining.
6. **State** the specific timings and concentrations of primary stains, mordants, decolorizers, and counterstains used.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Related image: Gram-positive purple cocci with Gram-negative pink bacilli, or a bright red Acid-Fast bacilli smear.
5–10	Intro	Applications of bacterial staining
10–15	Principle	Staining principles, smear preparation, heat fixation, and the categorization into simple, differential, and special stains.
15–30	Mechanism	Gram Staining and Ziehl-Neelsen (ZN) Staining
30–40	Laboratory Use	Preparation and execution in the lab: Smear preparation from culture media vs. direct patient specimen.
40–50	Clinical application	Rapid diagnosis of bacterial meningitis, pulmonary tuberculosis (Sputum ZN stain) etc.
50–55	Practical interpretation	Troubleshooting common error
55–60	Summary	Take home message

Resources:

1. PowerPoint slides
2. Related images (microscopic fields of positive/negative controls and clinical specimens)
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Positive and Gram-negative cell walls during each phase of the Gram stain.
2. **Short note on:** Negative staining (India Ink preparation) and its specific utility in medical microbiology.
3. **Read next topic:** Culture media.

Lesson Plan (Microbiology)

Topic: Bacterial Culture Media

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Bacterial Culture Media'

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Bacterial Culture Media
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on structure of bacteria
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** culture medium, inoculation, colonies, and pure culture.
2. **Explain** the importance of culture media in isolation, identification, and antibiotic susceptibility testing of pathogens.
3. **Describe** certain methods of classifying culture media (based on consistency and application) and outline their applications.
4. **Select** the appropriate culture medium for specific pathogens in clinical practice.
5. **Explain** the mechanism of action of certain selective, indicator and differential media.
6. **State** the composition, indicator, and preparation parameters of key clinical media.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Related image: High-contrast image of distinct bacterial colonies growing on Blood Agar (showing hemolysis) or MacConkey Agar (showing lactose fermentation).
5–10	Intro	Applications of culture media
10–15	Definition	Basic terminology: Culture media, basal media, solid vs. liquid media, and properties of Agar-Agar as a solidifying agent.
15–30	Mechanism	Methods of classification
30–40	Laboratory Use	Preparation and sterilization of culture media
40–50	Medical Use	Selection of media for patient specimens: Choosing specific media for stool cultures (<i>V. cholerae</i> on TCBS)/ sputum (<i>M. tuberculosis</i> on LJ)
50–55	Application	Practical interpretation: Analyzing colony morphology and media color changes to form a presumptive clinical diagnosis (e.g., pink colonies on MacConkey indicating lactose fermenters like <i>E. coli</i>).
55–60	Summary	Take home message: Choosing the correct culture media is a critical step in the definitive isolation and targeted therapeutic management of bacterial infections.

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. **Draw** a classification of bacterial culture media flowchart
2. **Short note on:** Indicator media
3. **Read next topic:** Bacterial staining

Lesson Plan (Microbiology)

Topic: Bacterial Pathogenesis

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Bacterial Pathogenesis'

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Bacterial Pathogenesis
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on structure of bacteria
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** pathogenicity, virulence, infection, and normal flora.
2. **Explain** the importance of understanding bacterial pathogenesis in clinical diagnosis and disease management.
3. **Describe** the stages of bacterial pathogenesis, including entry, colonization, invasion, and evasion of host defenses.
4. **Select** appropriate clinical interventions based on structural vs. toxic virulence factors of pathogens.
5. **Explain** the mechanism of action of major bacterial toxins (exotoxins vs. endotoxins).
6. **Differentiate** the properties, source, lethal dose, and heat stability of exotoxins and endotoxins.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Related image: Microscopic view of bacterial adherence (pili) to epithelial cells
5–10	Intro	Understanding how virulence factors dictate clinical features, disease severity, and vaccine design.
10–15	Definition	Pathogenicity vs. virulence, infectious dose (ID_{50}), lethal dose (LD_{50}), opportunistic infection
15–30	Mechanism	Methods of pathogenesis: Adherence factors (capsules, pili), invasion enzymes, and detailed structural mechanisms of toxin
30–40	Relation with disease	Effects of bacterial toxin on human body
40–50	Stages	Stages of infection process
50–55	Source of infection	Routes of transmission of bacteria
55–60	Summary	Take home message: Bacterial virulence factors bypass host immune defenses to cause tissue damage, defining the distinct clinical profile of each disease.

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. **Draw** a classification of bacterial virulence factors flowchart
2. **Short note on:** Pathogenicity Islands (PAIs) and their role in horizontal gene transfer.
3. **Read next topic:** Normal flora.

Lesson Plan (Microbiology)

Topic: Normal Flora

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on ‘**Normal Flora**’

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Normal Flora
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on Bacterial pathogenesis
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** resident flora, transient flora, commensalism, opportunism, and colonization resistance.
2. **Explain** the physiological importance and beneficial roles of normal flora in maintaining human health.
3. **Describe** the distribution of normal flora across major anatomical sites (skin, respiratory tract, GI tract, urogenital tract).
4. **Identify** sterile body sites that must remain completely free of microbes in a healthy individual.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Explaining that human bodies contain as many microbial cells as human cells, functioning like an acquired metabolic organ.
5–10	Introduction	Highlight how normal flora prevents pathogen overgrowth.
10–15	Definitions	Normal flora, Resident vs. Transient flora, Opportunism
15–30	Mechanism	How Flora Maintains Health & Resists Pathogens
30–40	Discussion	Distribution of normal flora across major anatomical sites
40–50	Clinical application	Opportunistic Infections in Vulnerable Tissues
50–55	Effects on human body	Beneficial and harmful effect
55–60	Take home message	Summarize the clinical paradigm: Normal flora protects the host but converts into aggressive opportunistic pathogens whenever structural anatomical barriers or immune defenses fail.

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Write down of normal flora in different human body sites
2. Short note: Opportunistic pathogen
3. Read next topic: Antimicrobial agents

Lesson Plan (Microbiology)

Topic: Sterilization and Disinfection:

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on ‘Sterilization and Disinfection’

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Sterilization and Disinfection’
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on structure of bacteria
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define sterilization, disinfection and antisepsis
2. Explain the importance of sterilization in medical science.
3. Describe certain methods of sterilization and disinfection, and outline their application.
4. Select appropriate method of sterilization in their clinical practice.
5. Explain the mechanism of action of certain sterilization method.
6. Time, temperature of certain sterilization method.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Related image
5–10	Intro	Applications of sterilization
10–15	Definition	Sterilization, disinfection and antisepsis
15–30	Mechanism	Methods of sterilizations: details of autoclaving, hot air oven and chemical methods.
30–40	Laboratory Use	Sterilization of medical equipment and culture media
40–50	Medical Use	Disinfection of body fluid spillage and equipment.
50–55	Application	Preparation of disinfectants and their use.
55–60	Summary	Take home message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Draw classification of sterilization flowchart
2. Short note on Tyndalization
3. Read next topic: Antimicrobial agents

Lesson Plan (Microbiology)

Topic: Antimicrobial Agents

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on '**Antimicrobial Agents**'

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Antimicrobial Agents
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on structure of bacteria
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** antibiotic, antimicrobial agent, bacteriostatic, bactericidal, minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC).
2. **Explain** the clinical importance of selective toxicity and the rational use of antimicrobials in medical science.
3. **Describe** certain methods of classifying antimicrobial agents (by mechanism, spectrum, and chemical structure) and outline their clinical application.
4. **Select** appropriate antimicrobial therapy based on patient factors, site of infection, and suspected pathogen properties.
5. **Explain** the precise molecular mechanism of action of major drug classes (e.g., cell wall inhibitors, protein synthesis inhibitors).
6. **Identify** key parameters of antibiotic administration, including specific mechanisms of bacterial resistance and cross-resistance.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Related image: A striking image of a Kirby-Bauer disc diffusion plate with large zones of inhibition vs. highly resistant bacterial colonies growing up to the disc edge.
5–10	Intro	Applications of antimicrobial agents: Prophylactic vs. empiric vs. definitive therapy; global clinical impact of the antimicrobial resistance (AMR) crisis.
10–15	Definition	Bactericidal vs. bacteriostatic, broad vs. narrow spectrum, therapeutic index, and understanding MIC/MBC values.
15–30	Mechanism	Methods of classification & mechanisms of action
30–40	Laboratory Use	Testing methods for susceptibility in clinical labs
40–50	Medical Use	Clinical application and resistance tracking, Managing multi-drug resistant (MDR) infections.
50–55	Application	Clinical problem-solving: Choosing an optimal antibiotic regimen based on a lab sensitivity report, keeping in mind tissue penetration (e.g., crossing the blood-brain barrier) and patient toxicity profiles.
55–60	Summary	Take home message: Rational antibiotic selection requires a precise match between drug mechanism, bacterial susceptibility, and patient safety to curb emerging resistance.

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. **Draw** a classification of antimicrobial agents flowchart categorized by their structural target site in a bacterial cell.
2. **Short note on:** Mechanisms of Beta-lactamase inhibitors
3. **Read next topic:** Bacterial Genetics and Resistance Plasmids.

Lesson Plan (Microbiology)

Topic: Bacterial Genetics

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Bacterial Genetics'

Field	Detail
Course	Microbiology (General Bacteriology)
Year	MBBS 4th Year
Topic	Bacterial Genetics
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on structure of bacteria
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** genome, plasmid, transposon, mutation, and horizontal gene transfer.
2. **Explain** the importance of bacterial genetics in medical science, especially regarding drug resistance.
3. **Describe** certain methods of horizontal gene transfer, and outline their application.
4. **Select** appropriate genetic target markers or molecular methods in their clinical practice.
5. **Explain** the molecular mechanism of action of horizontal gene transmission.
6. **State** the specific structural elements, vectors, and clinical examples of certain genetic modifications.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Related image
5–10	Introduction	Applications of bacterial genetics
10–15	Definition	Genotype vs. phenotype, R and F plasmids, transposons, bacteriophages
15–30	Mechanism	Methods of horizontal gene transfer (HGT): Transformation, Transduction, Conjugation
30–40	Laboratory Use	Genotypic verification of clinical isolates: Utilizing Polymerase Chain Reaction (PCR) assays to amplify and detect structural resistance markers (e.g., <i>mecA</i> gene for MRSA, <i>vanA</i> for VRE) and multi-locus sequence typing (MLST) for tracking outbreak strains.
40–50	Medical Use	Clinical correlation of genetic modifications: Recognizing plasmid-mediated pan-drug resistant outbreaks in intensive care units
50–55	Principle	Cloning and genetic engineering..
55–60	Summary	Take home message: Bacterial genomes are highly fluid dynamic systems; mobile genetic elements act as the principal evolutionary catalyst transforming manageable clinical infections into multi-drug resistant therapeutic crises.

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. **Draw** classification of horizontal gene transfer flowchart (Transformation vs. Transduction vs. Conjugation).
2. **Short note on:** Plasmid
3. **Read next topic:** Introduction of Immunology

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Structure of bacteria

Learning objective: (10 mins)

- Describe Prokaryotic and Eukaryotic cells
- Different structures of bacterial cell and their functions.
- Brief description of cell wall of Gram positive and Gram-negative bacteria.
- Spores structure and clinical importance.
- L-forms, protoplast, spheroplast.

List of content: Mentioned in curriculum

- Prokaryotic and Eukaryotic cells
- Structures of bacterial cell with functions
- Cell wall of Gram positive and Gram-negative bacteria
- Spore form of bacteria
- Cell wall deficient form of bacteria

Introduction: 10 min

Session discussion: 30 min

Group discussion: 20 min

Interactive discussion: 10 min

Feedback: 15 min

Assessment: 20 min

Conclusion: 5 min (take home message, evaluation by students)

Date & time:

Venue: Tutorial Class Room

Duration: 2 hour

Department of Microbiology

Comilla Medical College

Lesson Plan For Small Group Teaching (Tutorial)

Topic: Bacterial classification and Staining

Learning objective: (10 mins)

- Classify bacteria based on different aspects including staining and morphology
- Explain the theoretical basis of staining
- Clinical significance of certain staining including Gram stain, Z-N stain and Albert stain.

List of content: Mentioned in curriculum

- Nomenclature of Bacteria.
- Classification by staining, morphology, Oxygen requirement, temperature requirement.
- Staining- Theoretical basis and clinical significance of Gram and Z-N stain, Albert stain, Auramin-Rodamin stain
- Practical on staining: Gram, Z-N staining and Albert stain.

Introduction: 10 min

Session discussion: 30 min

Group discussion: 20 min

Interactive discussion: 10 min

Feedback: 15 min

Assessment: 20 min

Conclusion: 5 min (take home message, evaluation by students)

Date & time:

Venue: Tutorial Class Room

Duration: 2 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Sterilization

Learning objective: (10 mins)

- Define sterilization, disinfection and antisepsis
- Describe certain methods of sterilization and disinfection
- Outline their application
- Select appropriate method of sterilization in their clinical practice.

List of content: Mentioned in curriculum

- Definition, classification and applications of sterilization, disinfection and antisepsis
- Methods of sterilizations: details of autoclaving, hot air oven and chemical methods.
- Sterilization of medical equipment and culture media.
- Disinfection of body fluid spillage and equipment.
- Preparation of disinfectants and their use.

Introduction: 10 min

Session discussion: 30 min

Group discussion: 20 min

Interactive discussion: 10 min

Feedback: 15 min

Assessment: 20 min

Conclusion: 5 min (take home message, evaluation by students)

Date & time:

Venue: Tutorial Class Room

Duration: 2 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Antimicrobial agents

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Learning objective: (10 mins)

- Explain the mechanism of action of certain anti-microbial agents
- Explain their resistance pattern.
- Select appropriate antimicrobial agents

List of content: Mentioned in curriculum

- Definition of antibiotics, antimicrobial agents, chemotherapeutics, bacteriostatic, bacteriocidal, synergism, antagonism, selective toxicity etc.
- Classification of anti-microbial agents
- Mechanism of action on bacteria with examples
- Drug resistance: origin, mechanism, transmission and prevention
- Indication of combination of antibiotics in bacterial infection
- Hazards of indiscriminate use of antibiotics
- Defining MDR, XDR and PDR bacteria.
- Definition and importance of ESBL, MBL, MRSA, VRSA, VRE.

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Lesson Plan (Microbiology)

Topic: Basic Concepts of Immunology

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Basic Concepts of Immunology'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Basic Concepts of Immunology
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge of blood cells and host-parasite relationships
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** immunity and outline its basic classification.
2. **Explain** the clinical importance and historical role of immunology in modern medicine.
3. **Describe** the basic components of the immune system, including organs, cells, and soluble factors.
4. **Select** appropriate clinical examples to illustrate the components of innate immunity.
5. **Explain** the functional differences between innate and adaptive immune responses.
6. **Compare** active versus passive immunity with respect to protection window and memory.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–5	Attention	Prompt students with a clinical question: "Why does a newborn stay protected against measles for months, while a vaccine takes weeks to build immunity?"
5–10	Intro	Explain the central role of normal defences mechanisms in preventing microbial infections
10–15	Definition	Immunity, Innate Immunity, Adaptive Immunity
15–30	Classification	Immunity
30–40	Examples	Lymphoid Organs, Immunocompetent Cells, Soluble Factors
40–50	Differences	Active Vs Passive immunity, Humoral Vs Cell mediated immunity
50–55	Medical Use	Importance of active and passive immunity
55–60	Summary	Take home message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Draw immunity components flowchart
2. Short note on Active passive Immunity
3. Read next topic: Antigens and Immunogens

Lesson Plan (Microbiology)

Topic: Antigens and Immunogens

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Antigens and Immunogens'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Antigens and Immunogens
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic concepts of immunity
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** antigen, immunogen, hapten, epitope, and paratope
2. **Explain** the critical biological differences between an antigen and an immunogen.
3. **Describe** the factors and criteria that determine ideal immunogenicity.
4. **Select** clinical examples of haptens.
5. **Explain** the structural relationship between an epitope and a paratope.
6. **State** the clinical significance of cross-reacting antigens in human diseases.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention	Ask the class: "Why doesn't a small drug molecule like penicillin trigger an immune response on its own, yet it can cause fatal anaphylaxis in certain patients?"
5–10	Intro	Applications: Understanding how foreign microbial molecules trigger specific host defences
10–15	Definition	Antigen, Immunogen, Hapten.
15–30	Mechanism	Criteria of Immunogenicity
30–40	Difference	Epitope vs. Paratope, antigen Vs Immunogen
40–50	Medical Use	Hapten-Carrier Effect, Cross-reactivity
50–55	Application	Vaccine Design Counseling: Informing students why conjugate vaccines exist
55–60	Summary	Take-Home Message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Write down the criteria of an ideal antigen
2. Short note on Epitopes
3. Read next topic: Major histocompatibility complex (MHC/ HLA)

Lesson Plan (Microbiology)

Topic: Immunoglobulins and Antibodies

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Immunoglobulins and Antibodies'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Immunoglobulins and Antibodies
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic concepts of adaptive immunity, B-lymphocytes, and antigens
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** antibody and immunoglobulin.
2. **Describe** the basic structural units of an antibody molecule.
3. **Classify** immunoglobulins into five distinct classes based on their heavy chains.
4. **Explain** the specific biological properties and functions of IgG, IgM, IgA, IgE, and IgD.
5. **Differentiate** between primary and secondary antibody responses.
6. **State** the clinical significance of monoclonal antibodies and antibody-based diagnostic tests.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention	Show a schematic structure of a Y-shaped antibody
5–10	Intro	Understanding host humoral defense against common microbial diseases
10–15	Definition	Immunoglobulin (Ig), Antibody (Ab)
15–30	Discussion	Basic Y-Shaped Structure and its Functional Fragments:
30–40	Differences	Diagnostic Kinetics: Differentiating IgM vs. IgG
40–50	Functions	Class Properties of <i>IgG</i> , <i>IgA</i> , <i>IgE</i> , <i>IgD</i> and <i>IgM</i>
50–55	Application	Practical application in reading immunodiagnostic tests like Widal for Typhoid, Dengue ICT, and HBsAg screening
55–60	Summary	Take-Home Message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Draw a classical antibody structure
2. Short note on Monoclonal Antibodies
3. Read next topic: Complement System

Lesson Plan (Microbiology)

Topic: Immune response

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Immune response'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Immune response
Duration	60 minutes
Format	Lecture Class
Prerequisites	Prior knowledge of Antigens, Antibodies, Lymphocyte types, and MHC proteins
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define Humoral (Antibody-Mediated) Immunity and Cell-Mediated Immunity (CMI).
2. Describe how professional Antigen-Presenting Cells (APCs) activate naive CD4+ T helper cells.
3. Explain the specific pathways of B-cell activation, clonal expansion, and differentiation into plasma cells.
4. Identify the role of CD8+ Cytotoxic T cells in destroying intracellularly infected or modified host cells.
5. Differentiate between Primary and Secondary immune responses.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention	Warm-up question
5–10	Session Focus	Tracing how the host coordinates cellular elements to clear common bacterial and viral pathogens prevalent in local hospital settings
10–15	Definitions	Humoral Immunity, Cell-Mediated Immunity
15–30	Structural Layout	Phase 1: Antigen Processing & T-Cell Activation Phase 2: Humoral Pathway
30–40	Structural Layout	Phase 3: Cell-Mediated Pathway
40–50	Presentation Pathway	Primary vs. Secondary Kinetics
50–55	Clinical Link	Serological Evaluation
55–60	Summary	Take-Home Message

Resources:

1. PowerPoint slides
2. Related diagram
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Draw a diagram mapping the separate steps of an immune response
2. Short note on Primary vs. Secondary Response
3. Read next topic: Hypersensitivity Reactions

Lesson Plan (Microbiology)

Topic: The Complement System

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'The Complement System'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	The Complement System
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic concepts of innate immunity and antibody functions
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** the complement system and identify its primary site of synthesis.
2. **Describe** the three activation pathways: Classical, Alternative, and Lectin.
3. **Explain** the formation and role of C3 convertase, C5 convertase, and the Membrane Attack Complex (MAC).
4. **Identify** the major biological functions of complements (Opsonization, Chemotaxis, Anaphylatoxins, Lysis).
5. **State** the clinical presentations associated with specific complement component deficiencies.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention	Prompt students with a clinical emergency: "Why are individuals lacking terminal complement components highly vulnerable to recurrent, life-threatening <i>Neisseria meningitis</i> ?"
5–10	Introduction	Applications: Understanding how these heat-labile serum proteins bridge innate and adaptive immunity to clear pathogens
10–15	Definition	Complement, MAC
15–30	Mechanism	Activation Pathways: <i>Classical, Alternative, Lectin</i>
30–40	Biological functions	Biological Split Products of complements
40–50	Medical Use	Clinical significance of complements
50–55	Importances	Deficiencies of different complement factor
55–60	Summary	Take-Home Message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Draw complement activation flowchart
2. Short note on MAC
3. Read next topic: Major Histocompatibility Complex (MHC/HLA)

Lesson Plan (Microbiology)

Topic: Major histocompatibility complex (MHC/ HLA)

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Major histocompatibility complex (MHC/ HLA)'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Major histocompatibility complex (MHC/ HLA)
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge of T-lymphocytes (CD4+ and CD8+) and antigen processing
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define the Major Histocompatibility Complex (MHC) and Human Leukocyte Antigen (HLA).
2. Describe the differences between Class I and Class II MHC molecules.
3. Explain the cellular distribution of MHC Class I and Class II across human tissues.
4. Identify how Class I and Class II molecules present endogenous and exogenous antigens respectively.
5. State the concept of MHC restriction and its rule of 8.
6. Correlate HLA typing with clinical organ transplantation rejection and autoimmune disease links.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Warm-up question	Ask the class: "Why does the human immune system aggressively attack a perfectly healthy donated kidney, even if the blood types match perfectly?"
5–10	Session Focus	Understanding how the host tissue system defines "self" versus "non-self" to manage immune activation or tolerance
10–15	Definitions	MHC, HLA
15–30	Classification	Types of MHC & HLA
30–40	Tissue Mapping	Distribution of MHC
40–50	Application	Biological functions of MHC
50–55	Clinical Link	Disease Links with MHC
55–60	Class Wrap-up	Take-Home Message

Resources:

1. PowerPoint slides
2. Related diagram
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Comparison of MHC-I & MHC-II
2. Short note on MHC Restriction
3. Read next topic: Mechanisms of Immune Response

Lesson Plan (Microbiology)

Topic: Immunodeficiency Disorders and Immunotherapy

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on ‘Immunodeficiency Disorders and Immunotherapy’

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Immunodeficiency Disorders and Immunotherapy
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge of B-cell and T-cell development, antibody structure
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define immunodeficiency and differentiate between primary (congenital) and secondary (acquired) disorders.
2. Describe the classic clinical presentations, genetic bases, and laboratory findings of key primary immunodeficiencies (XLA, DiGeorge, SCID).
3. Explain the major causes of secondary immunodeficiencies, focusing on the pathophysiology of HIV/AIDS.
4. Identify the differences between active and passive immunotherapy strategies.
5. State the mechanisms of action for monoclonal antibodies.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Warm-up question	Ask the class: <i>"Why can a routine childhood live vaccine, like the BCG or MMR, prove fatal to a 6-month-old infant who appears otherwise healthy?"</i>
5–10	Session Focus	The spectrum of immune failure and correction
10–15	Definitions	Immunodeficiency vs. Immunotherapy
15–30	Classification	Types of Immunodeficiencies
30–40	Example	Primary (Congenital) & Secondary (Acquired) Immunodeficiencies
40–50	Application	Biological functions & Classification of Immunotherapy
50–55	Clinical Link	Distribution of Immunotherapy Targets
55–60	Summary	Take-Home Message

Resources:

1. PowerPoint slides
2. Related diagram
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Classify Immunodeficiency disorders with example
2. Short note on Immunotherapy
3. Read next topic: Immunodiagnostic tests

Lesson Plan (Microbiology)

Topic: Hypersensitivity

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Hypersensitivity'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Hypersensitivity
Duration	120 minutes
Format	Lecture Class
Prerequisites	Clear understanding of antibodies, complement activation, and T-cell subsets
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** hypersensitivity and identify the classic Coombs and Gell classification types.
2. **Describe** the immunopathogenic mechanism of Type I (Anaphylactic) hypersensitivity.
3. **Explain** the mechanisms of Type II (Antibody-mediated cytotoxic) and Type III (Immune complex-mediated) hypersensitivities.
4. **Identify** the cellular pathways driving Type IV (Delayed-type/Cell-mediated) hypersensitivity.
5. **State** classic, high-yield clinical examples for all four hypersensitivity types.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
8–10	Warm-up question	Ask the class: "Why does an allergic reaction to a drug happen within minutes, while a skin reaction to a tuberculosis screening test takes 48 to 72 hours to appear?"
11–20	Session Focus	Recognizing acute and chronic tissue-damaging immune reactions commonly encountered in emergency rooms and medical wards
21–30	Definitions & Classification	Hypersensitivity, Atopy, desensitization Classification: Broadly categorized into Type I, Type II, Type III, and Type IV.
31–60	Structural Layout	Type I (Immediate) & Type II (Cytotoxic) hypersensitivity
61–90	Structural Layout	Type III (Immune-Complex) & Type IV (Delayed) hypersensitivity
91–100	Presentation Pathway	Clinical feature of all of the 04 hypersensitivity
110–110	Clinical Link	Outline how specific tests confirm reactions
110–120	Class Wrap-up	Take-Home Message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Draw Mechanism of Type-I hypersensitivity
2. Short note: Anaphylactoid reaction
3. Read next topic: Transplantation and Tumor Immunity

Lesson Plan (Microbiology)

Topic: Immunodiagnostic tests

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Immunodiagnostic tests'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Immunodiagnostic tests
Duration	60 minutes
Format	Lecture Class
Prerequisites	Understanding of Antigen-Antibody interactions and antibody classes (IgM vs. IgG)
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define core terms: serology, antigen-antibody reactions, titer, and prozone phenomenon.
2. Describe standard classical reactions (Agglutination, Precipitation).
3. Select appropriate tests (ELISA, Lateral Flow, Western Blot) for matching infectious diseases.
4. Explain the mechanism of molecular immune techniques like Polymerase Chain Reaction (PCR).

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention	Warm-up question
5–10	Session Focus	Planning necessary lab investigations selecting the right tests to establish diagnosis for endemic diseases.
10–15	Definitions	Serology, Titer, Prozone Phenomenon
15–30	Example	Classical and Non-classical Techniques
30–40	Discussion	Molecular Diagnostic Expansion.
40–50	Explanation	ICT, ELISA, CFT
50–55	Clinical Link	Report Interpretation
55–60	Summary	Take home message

Resources:

1. PowerPoint slides
2. Animated images/video
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Classify different Immunodiagnostic tests with examples
2. Short note on ELISA
3. Read next topic: General Parasitology introduction

Lesson Plan (Microbiology)

Topic: Tolerance and Autoimmunity

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Tolerance and Autoimmunity'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Tolerance and Autoimmunity
Duration	60 minutes
Format	Lecture Class
Prerequisites	Knowledge of T/B-cell maturation, MHC restriction, and antigen presentation
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define immunological tolerance, central tolerance, peripheral tolerance, and autoimmunity.
2. Describe the mechanisms of central tolerance.
3. Explain the mechanisms of peripheral tolerance.
4. Identify the primary mechanisms triggering a breakdown of tolerance leading to autoimmunity.
5. State the genetic and environmental factors associated with autoimmune diseases.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention	Ask the class: "Why does an immune system engineered to protect the host suddenly turn on its own tissues, destroying its own joints and kidneys?"
5–10	Session Focus	Understanding how immune system homeostasis is maintained and why its breakdown causes debilitating systemic chronic diseases
10–15	Core Definitions	Immunological Tolerance, Autoimmunity
15–30	Mechanism	Central & Peripheral Tolerance
30–40	Mechanism	Mechanisms of Autoimmunity Breakdown
40–50	Presentation Pathway	Systemic Lupus Erythematosus (SLE), Rheumatoid Arthritis (RA)
50–55	Clinical Link	Example of autoimmune disorder.
55–60	Class Wrap-up	Take-Home Message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Construct a comparative flowchart detailing the differences between Central and Peripheral tolerance mechanism pathways.
2. Short note on Molecular Mimicry
3. Read next topic: Immunodeficiency disorders and immunotherapy

Lesson Plan (Microbiology)

Topic: Transplantation and Tumour immunity

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Transplantation and Tumour immunity'

Field	Detail
Course	Microbiology (Immunology)
Year	MBBS 4th Year
Topic	Transplantation and Tumour immunity:
Duration	60 minutes
Format	Lecture Class
Prerequisites	Basic knowledge on MHC
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. **Define** graft classifications (autograft, isograft, allograft, xenograft)
2. **Describe** the immunopathogenic mechanisms of Hyperacute, Acute, and Chronic transplant rejections.
3. **Explain** the development and presentation of Graft-versus-Host Disease (GVHD).
4. **Classify** tumor antigens into Tumor-Specific Antigens (TSAs) and Tumor-Associated Antigens (TAAs).
5. **Identify** the cellular pathways driving immunological surveillance against tumors.
6. **State** the diagnostic and clinical value of monitoring specific tumor markers.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Warm-up question	Ask the class: "Why can a bone marrow transplant from a donor occasionally turn around and physically attack the entire body of the recipient patient?"
5–10	Session Focus	Understanding pre-transplant cross-matching, managing bone marrow transplant recipients, and interpreting clinical tumor diagnostic markers (1.8).
10–15	Definitions	Graft, Allograft, Xenograft, Transplantation, Tumour marker
15–30	Structural Layout	Graft Rejection Mechanisms
30–40	Prevention	Graft rejection prevention
40–50	Presentation	Graft-versus-Host Disease (GVHD)
50–55	Clinical Link	Diagnostic Biomarkers
55–60	Class Wrap-up	Take-Home Message

Resources:

1. PowerPoint slides
2. Related images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment:

1. Outline of graft rejection.
2. Short note on Tumor Immunosurveillance
3. Read next topic: Immunodeficiency disorders

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Basic Immunology

Learning objective: (05 mins)

- Explain the importance of history and role of immunology in modern medicine
- Describe the basic components of immune system including classification
- Explain the normal defense mechanism
- Explain the functional differences between innate and adaptive immune responses.

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

List of content: Mentioned in curriculum

- Brief historical background of immunology
- Basic concepts of immunity: Definition, classification
- Components of immunity with examples.
- Organs, cells and soluble components of immunity

Introduction: 05 min

Session discussion: 15 min

Group discussion: 10 min

Interactive discussion: 05 min

Feedback: 05 min

Assessment: 10 min

Conclusion: 05 min (take home message, evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Antigen & Antibody

Learning objective: (05 mins)

- Define antigen, immunogen, hapten, epitope, and paratope
- Explain the critical biological differences between an antigen and an immunogen.
- Explain the Criteria of immunogenicity.
- Define antibody and immunoglobulin.
- Describe the basic structural units of an antibody molecule.
- Classify immunoglobulins into five distinct classes based on their heavy chains.

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

List of content: Mentioned in curriculum

- Definitions: antigen, immunogen, hapten, epitope, paratope.
- Criteria of immunogenicity.
- Definition, classification, structure, biological properties and functions of immunoglobulin
- Monoclonal antibodies.

Introduction: 05 min

Session discussion: 15 min

Group discussion: 10 min

Interactive discussion: 05 min

Feedback: 05 min

Assessment: 10 min

Conclusion: 05 min (take home message, evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: MHC & Complement

Learning objective: (05 mins)

- Define the Major Histocompatibility Complex (MHC) and Human Leukocyte Antigen (HLA).
- Describe the differences between Class I and Class II MHC molecules.
- State the concept of MHC restriction and its rule of 8.
- Define the complement system and identify its primary site of synthesis.
- Describe the three activation pathways: Classical, Alternative, and Lectin.
- Identify the major biological functions of complements

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

List of content: Mentioned in curriculum

- Definition, types and distribution of MHC
- Clinical and biological significance of MHC
- Definitions, activation of Complement
- Biological functions and clinical significance of Complement
- Complement deficiency disorders

Introduction: 05 min

Session discussion: 15 min

Group discussion: 10 min

Interactive discussion: 05 min

Feedback: 05 min

Assessment: 10 min

Conclusion: 05 min (take home message, evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Hypersensitivity & Transplantation

Learning objective: (05 mins)

- Define hypersensitivity and identify the classic Coombs and Gell classification types.
- Describe the immunopathogenic mechanism of Type I (Anaphylactic), Type II (Antibody-mediated cytotoxic), Type III (Immune complex-mediated) & Type IV (Delayed-type/Cell-mediated) hypersensitivity.
- State classic, high-yield clinical examples for all four hypersensitivity types.
- Define graft classifications (autograft, isograft, allograft, xenograft)
- Describe the immunopathogenic mechanisms of Hyperacute, Acute, and Chronic transplant rejections.
- Explain the development and presentation of Graft-versus-Host Disease (GVHD).

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

List of content: Mentioned in curriculum

- Definitions & classifications of hypersensitivity.
- Mechanisms & clinical significance of Type I, II, III, IV hypersensitivity with examples.
- Atopy, desensitization.
- Definitions & types of graft.
- Outline the causes & prevention of graft rejection.

Introduction: 05 min

Session discussion: 15 min

Group discussion: 10 min

Interactive discussion: 05 min

Feedback: 05 min

Assessment: 10 min

Conclusion: 05 min (take home message, evaluation by students)

Lesson Plan (Microbiology)

Topic: Introduction of Virus

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on ‘**Introduction of Virus**’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Introduction of virus
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define viruses
2. Identify common viral diseases prevalent in Bangladesh
3. Describe the basic structure of viruses
4. Outline the basic steps of viral replication
5. Classify viruses
6. Describe the basic principles and methods used in the laboratory diagnosis of viral diseases.
7. Discuss the major classes of antiviral agents

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related image
5-15	Introduction	Definition
15-30	Structure	Importance of virus structure
30-60	Replication	Replication
60-80	Classification	Classification
80-100	Common disease	Common viral disease
100-120	Summery	Take home message

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Draw and level of Virus
2. Outline of viral replication
3. Read next topic: Herpes virus

Lesson Plan (Microbiology)

Topic: Herpes Virus

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on ‘Herpes Virus’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Herpes Virus
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Classify herpesviruses
2. Describe the important characteristics of herpesviruses
3. Explain the modes of transmission
4. Outline the pathogenesis of herpesvirus infections
5. Identify the important clinical complications associated with herpesvirus infections.
6. Describe the laboratory diagnosis of herpesvirus infections
7. Discuss the principles of management of herpesvirus infections, including antiviral therapy and supportive treatment.

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related image
5-15	Introduction	structure
15-30	Classification	Classification
30-60	Replication	Replication
60-80	Diagnosis	Lab diagnosis
80-100	Clinical presentation	Complication
100-120	Summery	Take home message

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Draw and level of Virus
2. Outline of viral replication
3. Read next topic: Orthomyxo and paramyxo virus

Lesson Plan (Microbiology)

Topic: Orthomyxo and paramyxo virus

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on

‘Orthomyxo and paramyxo virus’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Orthomyxo and paramyxo virus
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on RNA virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the important characteristics of orthomyxoviruses and paramyxoviruses.
2. Explain the modes of transmission
3. Outline the pathogenesis
4. Identify the important clinical complications
5. Describe the laboratory diagnosis
6. Discuss the principles of management
7. Explain the preventive measures,

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related image
5-15	Introduction	Structure
15-30	Transmission	Transmission
30-60	Clinical feature	Complication
60-80	Diagnosis	Lab diagnosis
80-100	Prevention	Prevention
100-120	Summery	Take home message

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Draw and level of Virus
2. Outline of Vaccination of virus
3. Read next topic: Hepatitis virus

Lesson Plan (Microbiology)

Topic: Hepatitis virus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Hepatitis virus'

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Hepatitis virus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on DNA & RNA virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Classify the medically important hepatitis viruses
2. Describe the important characteristics of hepatitis viruses
3. Explain the modes of transmission
4. Outline the pathogenesis of viral hepatitis
5. Identify the important complications of viral hepatitis
6. Describe the laboratory diagnosis of viral hepatitis
7. Discuss the principles of management
8. Explain the preventive measures for viral hepatitis

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related image
5-10	Introduction	General characteristics
10-20	Classification	Classification
20-30	Clinical feature	Complication
30-40	Diagnosis	Lab diagnosis
40-50	Prevention	Prevention
50-60	Summery	Take home message

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Outline of complication of virus
2. Outline of Vaccination of virus
3. Read next topic: Polio virus

Lesson Plan (Microbiology)

Topic: Polio virus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Polio virus'

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Polio virus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on RNA virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the important characteristics of poliovirus
2. Outline the pathogenesis of poliomyelitis
3. Identify the important complications of poliovirus infection
4. Describe the laboratory diagnosis
5. Discuss the principles of management
6. Explain the preventive measures for poliomyelitis

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related question
5-10	Introduction	Characteristics
10-20	Transmission	Transmission
20-30	Pathogenesis	Pathogenesis
30-40	Presentation	Clinical Feature
40-50	Lab Diagnosis	Lab Diagnosis
50-60	Summery	Take Home Message

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Outline of complication of virus
2. Outline of Vaccination of virus
3. Read next topic: Rabies virus

Lesson Plan (Microbiology)

Topic: Rabies virus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on
‘Polio virus’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Rabies virus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on RNA virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the important characteristics of rabies virus
2. Explain the modes of transmission
3. Outline the pathogenesis
4. Identify the major clinical complications
5. Describe the laboratory diagnosis
6. Discuss the principles of management
7. Explain the preventive measures
8. Compare the advantages and disadvantages of available rabies vaccines

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention / Introduction	Clinical case or question
5–10	Introduction	Important characteristics of Poliovirus
10–20	Transmission & Pathogenesis	Transmission & Pathogenesis
20–30	Clinical Features & Complications	Clinical Features & Complications
30–40	Laboratory Diagnosis	Laboratory Diagnosis
40–50	Management	Management
50–57	Prevention	Prevention
57–60	Summary / Assessment	Recap of key points followed by short questions or MCQs to assess understanding.

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Outline of complication of virus
2. Outline of Vaccination of virus
3. Read next topic: Rota virus

Lesson Plan (Microbiology)

Topic: HIV

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on ‘HIV’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	HIV
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on viral replication
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Classify HIV and identify the major types and important subtypes of human immunodeficiency virus.
2. Describe the important characteristics
3. Explain the modes of transmission
4. Outline the pathogenesis
5. Describe the laboratory diagnosis
6. Discuss the principles of treatment
7. Explain the preventive measure

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0–5	Attention / Introduction	Clinical case or question
5–10	Introduction	Important characteristics of HIV
10–20	Transmission & Pathogenesis	Transmission & Pathogenesis
20–30	Clinical Features & Complications	Clinical Features & Complications
30–40	Laboratory Diagnosis	Laboratory Diagnosis
40–50	Management	Management
50–57	Prevention	Prevention
57–60	Summary / Assessment	Recap of key points followed by short questions or MCQs to assess understanding.

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Outline of Structure of virus
2. Outline the opportunistic infection of HIV virus
3. Read next topic: Dengue virus

Lesson Plan (Microbiology)

Topic: Rota virus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on

‘Rota virus’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Rota virus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on RNA virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the important characteristics of rotavirus,
2. Explain the modes of transmission
3. Outline the pathogenesis
4. Describe the laboratory diagnosis
5. Discuss the principles of treatment of rotavirus gastroenteritis
6. Explain the preventive measures

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention / Introduction	Clinical case: Infant with acute watery diarrhoea and dehydration. Discuss the importance of rotavirus gastroenteritis in childhood diarrhoea.
5–12	Introduction	Important characteristics of Rotavirus: Classification, structure, genome, serogroups, and important biological properties.
12–20	Transmission	Transmission
20–32	Pathogenesis & Clinical Features	Pathogenesis & Clinical Features
32–40	Laboratory Diagnosis	Laboratory Diagnosis
40–50	Treatment	Treatment
50–56	Prevention	Prevention
56–60	Summary / Assessment	Summary of key points followed by short questions or MCQs assessing transmission, pathogenesis, diagnosis, treatment, and prevention.

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Outline of complication of virus
2. Outline of Vaccination of virus
3. Read next topic: Dengue virus

Lesson Plan (Microbiology)

Topic: Dengue virus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on

‘Dengue virus’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Dengue virus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on RNA virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the important characteristics of dengue virus
2. Classify dengue fever
3. Explain the mode of transmission
4. Outline the pathogenesis
5. Describe the laboratory diagnosis
6. Discuss the principles of treatment and management
7. Explain the preventive measures for dengue

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Points
0–5	Attention / Introduction	Clinical case: Patient with high-grade fever, headache, retro-orbital pain, myalgia, and thrombocytopenia. Brief introduction to dengue as an important mosquito-borne viral disease.
5–12	Introduction	Important characteristics of Dengue virus: Classification, structure, genome, serotypes (DENV-1 to DENV-4), vector, and important biological properties.
12–20	Classification	Clinical classification of dengue
20–28	Transmission	Transmission
28–38	Pathogenesis & Clinical Features	Pathogenesis & Clinical Features
38–47	Laboratory Diagnosis	Laboratory Diagnosis
47–54	Treatment / Management	Treatment / Management
54–58	Prevention	Prevention
58–60	Summary / Assessment	Recap of key points and short questions/MCQs on dengue classification, transmission, pathogenesis, diagnosis, treatment, and prevention.

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Outline of Complication of Dengue fever
2. Read next topic: Chikungunya virus

Lesson Plan (Microbiology)

Topic: Chikungunya virus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Chikungunya virus'

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Chikungunya virus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on RNA virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the important characteristics and classification of Chikungunya virus.
2. Explain the mode of transmission
3. Explain the pathogenesis
4. Describe the important clinical manifestations and complications.
5. Explain the laboratory diagnosis
6. Discuss the principles of treatment and supportive management.
7. Describe the preventive measures.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Point
0–5	Attention & Introduction	Clinical case/image of a patient with fever and severe joint pain; introduction to Chikungunya
5–15	Important Characteristics	Classification, structure, antigenic characteristics
15–22	Transmission	Transmission
22–30	Epidemiology	Geographic distribution; endemic and epidemic occurrence; seasonal variation;
30–40	Pathogenesis	Virus entry and replication, mechanism of prolonged arthralgia
40–50	Laboratory Diagnosis	Laboratory Diagnosis
50–55	Treatment	Treatment
55–60	Prevention & Summary	Vector control, take-home message

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Outline of Chikungunya virus
2. Read next topic: Corona virus

Lesson Plan (Microbiology)

Topic: Corona virus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on

‘Corona virus’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Corona virus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on RNA virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the important characteristics and classification of medically important coronaviruses.
2. Explain the epidemiology and geographical distribution
3. Describe the modes of transmission
4. Explain the pathogenesis and immune response associated with coronavirus infections.
5. Describe the clinical features and complications of COVID-19
6. Explain the laboratory diagnosis
7. Discuss the principles of treatment and supportive management of COVID-19.
8. Describe the preventive measures

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Point
0–5	Attention & Introduction	Clinical case/image of COVID-19
5–15	Important Characteristics	Important Characteristics
15–22	Epidemiology & Transmission	Epidemiology of common human coronaviruses & Transmission
22–30	Pathogenesis	Pathogenesis
30–38	Organs Involved & Clinical Features	Clinical Features
38–48	Laboratory Diagnosis	Laboratory Diagnosis
48–55	Prevention & Treatment	Prevention & Treatment
55–60	Summary	key points; take-home message and question-answer session

Resources:

1. PowerPoint slides
2. Electron microscopic image/diagram of coronavirus
3. Transmission and pathogenesis flowcharts
4. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Outline of Corona virus
2. Read next topic: Other emerging virus (Avian flu, Nipah, Zika, Ebola,), Oncogenic virus

Lesson Plan (Microbiology)

Topic: Emerging & Oncogenic virus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on

‘Emerging & Oncogenic virus’

Field	Details
Course	Virology
Year	MBBS 4 th Year
Topic	Emerging & Oncogenic virus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on Emerging virus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define emerging and re-emerging viral diseases.
2. Identify important emerging viral diseases
3. Describe the important characteristics and classification of the causative viruses.
4. Explain the modes of transmission and epidemiological factors
5. Describe the pathogenesis and mechanisms.
6. Identify the important clinical features and complications
7. Explain the appropriate laboratory methods for diagnosis.
8. Discuss the principles of prevention and control.

Content Outline and Time Allocation:

Time (min)	Activity	Content / Key Point
0–5	Attention & Introduction	Clinical case/outbreak image; definition of emerging viral diseases; factors contributing to emergence and re-emergence
5–15	Important Characteristics	Important Characteristics Nipah virus, Zika virus and Ebola virus; animal reservoirs and zoonotic potential
15–25	Avian & Swine Influenza	Modes of transmission; pathogenesis; major clinical features
25–35	SARS, MERS & Nipah	Important characteristics, modes of transmission; pathogenesis; major clinical features; complications
35–43	Zika & Ebola	Modes of transmission; pathogenesis; major clinical features
43–52	Laboratory Diagnosis	Laboratory Diagnosis
52–57	Prevention & Control	Prevention & Control
57–60	Summary	Take-home message and question-answer session

Resources:

1. Power point slides
2. Microscopic images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

Outline of emerging virus & Oncogenic virus

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: General virology

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Learning objective:

1. Define viruses and describe the general characteristics and medical importance of viruses.
2. Identify common viral diseases prevalent in Bangladesh
3. Describe the basic structure of a virus
4. Outline the major steps of viral replication
5. Classify viruses
6. Describe the principles and methods of laboratory diagnosis of viral diseases,
7. Describe the major classes of antiviral agents
8. Relate viral structure and replication to the diagnosis, treatment, and prevention of viral diseases.

List of content: Mentioned in curriculum

- Introduction to virology, common viral diseases in Bangladesh.
- Basic structure of virus
- Outline of viral replication
- Classification
- Lab diagnosis of viral diseases
- Antiviral agents
-

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Herpes viruses

Learning objective:

1. Classify herpesviruses
2. Describe the important characteristics
3. Identify the major diseases caused by herpesviruses
4. Describe the important clinical features
5. Explain the modes of transmission
6. Outline the pathogenesis
7. Describe the laboratory diagnosis
8. Discuss the principles of treatment and
9. Explain the preventive

List of content: Mentioned in curriculum

- Classification, important characteristics, diseases
- Important clinical features, transmission, pathogenesis, complications
- Laboratory diagnosis, treatment and prevention
- Latency and reactivation of Herpes viruses.

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Hepatitis viruses

Learning objective:

1. Classify the medically important hepatitis viruses
2. Describe the important characteristics
3. Identify the major diseases caused by hepatitis viruses
4. Explain the modes of transmission
5. Outline the pathogenesis of viral hepatitis
6. Identify the major complications
7. Describe the laboratory diagnosis
8. Discuss the principles of management
9. Explain the preventive measures

List of content: Mentioned in curriculum

- Classification, important characteristics
- Diseases, transmission, pathogenesis, complications
- Laboratory diagnosis, prevention and management.

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Orthomyxo and paramyxo viruses

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Learning objective:

1. Describe the important characteristics of orthomyxoviruses and paramyxoviruses
2. Identify the important diseases caused by orthomyxoviruses and paramyxoviruses.
3. Describe the important clinical features of infections caused by these viruses.
4. Explain the modes of transmission
5. Outline the pathogenesis
6. Identify the important complications
7. Describe the laboratory diagnosis
8. Discuss the principles of management and treatment viral infections.

List of content: Mentioned in curriculum

- Important characteristics
- Diseases, important clinical features, transmission
- Pathogenesis, complications
- Laboratory diagnosis and prevention
- Management.

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Lesson Plan (Microbiology)

Topic: Introduction of parasite

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on

‘Introduction of parasite’

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Introduction
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on parasite
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Define parasitology and explain its scope and importance in medical science.
2. Define the terms: Parasite, Host, Parasitism, Vector
3. Classify parasites according to their habitat
4. Classification of host with examples.
5. Explain the basic host–parasite relationship
6. Identify common parasitic diseases prevalent in Bangladesh,
7. Relate common parasites to their major modes of transmission

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
8-10	Attention	Related image
11-20	Introduction	Importance of parasitology
21-30	Definition	Host and Parasite
31-60	Classification	Classification of Host and Parasite
61-90	Transmission	Modes of transmission
91-110	Common disease	Common parasitic disease
111-120	Summery	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Classification of parasite
2. Read next topic: Entamoeba

Lesson Plan (Microbiology)

Topic: Entamoeba

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Entamoeba'

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Entamoeba
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on Entamoeba
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Classify *Entamoeba histolytica* among medically important intestinal protozoa.
2. Describe the morphology of the trophozoite, pre-cyst and cyst forms.
3. Explain the life cycle of *E. histolytica*
4. Describe the mode of transmission
5. Explain the pathogenesis of intestinal amoebiasis.
6. Describe extraintestinal amoebiasis, particularly amoebic liver abscess.
7. Differentiate pathogenic *E. histolytica* from morphologically similar non-pathogenic amoebae, where relevant.

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related image
5-10	Morphology	Morphology of trophozoite, pre-cyst and cyst
10-15	Life cycle	Show the life cycle of <i>E. histolytica</i>
15-30	Pathogenesis	Clinical feature
30-40	Lab diagnosis	Diagnosis
40-55	Extraintestinal amoebiasis	Complication
55-60	Summery	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Write down the pathogenesis of intestinal amoebiasis.
2. Read next topic: Giardia

Lesson Plan (Microbiology)

Topic: Giardia intestinalis and Trichomonas vaginalis

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on ‘G. intestinalis and T. vaginalis’

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	‘G. intestinalis and T. vaginalis’
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on Giardia & Trichomonas
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Classify *Giardia intestinalis* and *Trichomonas vaginalis*
2. Describe the morphology
3. Explain the life cycle and mode of transmission of both parasites.
4. Identify the infective and diagnostic stages of each parasite.
5. Explain the pathogenesis of giardiasis and trichomoniasis.
6. Describe the clinical manifestations
7. Explain the laboratory diagnosis of giardiasis and trichomoniasis

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
8-10	Attention	Related image
11-20	Morphology	Morphology of <i>Giardia intestinalis</i> and <i>Trichomonas vaginalis</i>
21-30	Transmission	Transmission
31-60	Pathogenesis	Pathogenesis
61-90	Clinical feature	Clinical feature
91-110	Lab diagnosis	Lab diagnosis
111-120	Summery	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Draw structure of Trophozoite of Giardia
2. Short note on Steatorrhea
3. Read next topic: Leishmania species

Lesson Plan (Microbiology)

Topic: *Leishmania* species

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on “*Leishmania* species.”

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	<i>Leishmania</i> species
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge of protozoa and host–parasite relationship
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Classify medically important *Leishmania* species
2. Describe the morphology of the amastigote and promastigote forms of *Leishmania*.
3. Explain the life cycle of *Leishmania* and the role of the sandfly vector.
4. Describe the geographical distribution and mode of transmission of leishmaniasis.
5. Explain the pathogenesis of visceral leishmaniasis.
6. Describe the clinical features and complications of visceral leishmaniasis (kala-azar).
7. Describe post-kala-azar dermal leishmaniasis (PKDL).
8. Explain the laboratory diagnosis of different forms of leishmaniasis.
9. Describe the principles of treatment and prevention of leishmaniasis.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Point
5-10	Attention	Clinical image of kala-azar / sandfly vector
10-20	Classification & Morphology	Classification of <i>Leishmania</i> ; morphology of amastigote and promastigote
20-40	Life Cycle	Life cycle of <i>Leishmania</i> ; role of human host and sandfly vector
40-60	Visceral Leishmaniasis	Epidemiology, pathogenesis and clinical features of kala-azar
60-80	Other Forms	PKDL, cutaneous and mucocutaneous leishmaniasis
80-100	Laboratory Diagnosis	Specimens, demonstration of LD bodies, culture, serological and molecular methods
100-110	Treatment & Prevention	Principles of treatment, vector control and preventive measures
110-120	Summary	Take-home message

Resources:

1. Power point slides
2. Microscopic images of LD bodies/amastigotes
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Write down the life cycle and pathogenesis of visceral leishmaniasis.
2. Read the next topic: *Plasmodium* species.

Lesson Plan (Microbiology)

Topic: Plasmodium species

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on ‘Plasmodium species’

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Plasmodium species
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on Sporozoite
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

- Classify medically important *Plasmodium* species causing human malaria.
- Describe the geographical distribution and epidemiology of malaria, with emphasis on Bangladesh.
- Explain the life cycle of *Plasmodium*
- Explain the mode of transmission of malaria.
- Describe the pathogenesis of malaria.
- Describe the clinical features of malaria caused by different *Plasmodium* species.
- Explain the major complications of severe malaria
- Describe the laboratory diagnosis of malaria
- Differentiate the important morphological features of common human *Plasmodium* species in peripheral blood smears.
- Describe the principles of treatment of malaria.
- Outline the preventive and control measures for malaria, including vector control and personal protection.

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related image
5-10	Introduction	Geographical distribution of Plasmodium
10-20	Morphology	Different stage of Plasmodium species
20-40	Life cycle	Life cycle Plasmodium
40-50	Pathogenesis	Flow chart of pathogenesis
50-70	Presentation	Clinical feature
70-90	Lab diagnosis	Lab diagnosis
90-100	complication	complication
100-110	Treatment and prevention	Treatment
110-120	Summary	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Draw structure of life cycle of plasmodium
2. Short note Black water fever
3. Read next topic: Acanthamoeba, Negleria, Toxoplasma

Lesson Plan (Microbiology)

Topic: Acanthamoeba, Negleria, Toxoplasma

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Acanthamoeba, Negleria, Toxoplasma'

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Acanthamoeba, Negleria, Toxoplasma
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge Protozoa
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Classify *Toxoplasma gondii* among medically important protozoan parasites.
2. Describe the morphology, life cycle of *T. gondii*, *Acanthamoeba*, *Naegleria*.
3. Describe the modes of transmission, pathogenesis and clinical manifestations of *T. gondii*, *Acanthamoeba*, *Naegleria*.
4. Discuss the importance of congenital toxoplasmosis.
5. Discuss the laboratory diagnosis of toxoplasmosis.
6. Outline the principles of treatment and preventive measures for toxoplasmosis.

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related problem-based question
5-10	Introduction	Free-living amoebae and <i>Toxoplasma gondii</i> ; medical importance and overview of diseases caused
10-20	Acanthamoeba	Morphology and life cycle; habitat and transmission; clinical manifestations
20-30	Naegleria fowleri	Morphology and life cycle, pathogenesis, clinical feature
30-50	Toxoplasma gondii	Morphology and life cycle; definitive and intermediate hosts; modes of transmission; clinical manifestations, laboratory diagnosis, treatment and prevention
50-60	Summary	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Short note on free living amoeba
2. Read next topic: Coelostome

Lesson Plan (Microbiology)

Topic: Intestinal nematodes

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Intestinal nematodes'

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Intestinal nematodes
Duration	180 minutes
Format	Lecture class
Prerequisites	Basic knowledge on Nematodes
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

- Classify the medically important intestinal nematodes.
- Describe the geographical distribution and epidemiology of common intestinal nematode infections.
- Describe the morphology of different nematode
- Explain the life cycle of the important intestinal nematodes.
- Describe the modes of transmission and risk factors for intestinal nematode infections.
- Explain the pathogenesis of intestinal nematode infections.
- Explain the concepts of larva migrans and larva currens.
- Describe hyperinfection syndrome, particularly in *Strongyloides stercoralis* infection.
- Explain the laboratory diagnosis of intestinal nematode infections.

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related image
5-20	Introduction	Classification
20-40	Morphology	structure of different stages
40-60	<i>Ascaris lumbricoides</i>	Details
60-80	<i>Trichuris trichiura</i>	Details
80-120	Hook worm	Details
120-150	<i>Enterobius vermicularis</i> ,	Details
150-170	<i>Strongyloides stercoralis</i> .	Details
170-180	Summery	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Draw structure of different egg of intestinal nematodes
2. Short note on Larva migrans
3. Read next topic: Tissue nematodes

Lesson Plan (Microbiology)

Topic: Tissue Nematodes

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on 'Tissue Nematodes'

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Tissue Nematodes
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on Parasite
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Classify medically important tissue nematodes.
2. Describe the morphology of important tissue nematodes.
3. Explain the life cycle and mode of transmission of important tissue nematodes.
4. Describe the pathogenesis and clinical features of tissue nematode infections.
5. Discuss the laboratory diagnosis of important tissue nematode infections.
6. Outline the treatment and preventive measures of tissue nematode infections.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Point
5–10	Attention	Related image/clinical case of tissue nematode infection
10–20	Classification	Classification and medically important tissue nematodes
20–40	Morphology & Life Cycle	Morphology and life cycle of <i>Trichinella spiralis</i> , filarial worms, and other important tissue nematodes
40–60	Transmission & Pathogenesis	Mode of transmission, vectors, pathogenesis, and tissue involvement
60–80	Clinical Features	Clinical manifestations of trichinellosis, lymphatic filariasis, subcutaneous filariasis, and other tissue nematode infections
80–100	Lab Diagnosis	Microscopy, blood examination, antigen detection, molecular methods, and other diagnostic approaches
100–110	Treatment & Prevention	Principles of treatment, vector control, personal protection, and preventive measures
110–120	Summary	Take-home message and key points

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Write down the life cycle and pathogenesis of *Wuchereria bancrofti*
2. Read the next topic: Cestodes and Trematodes.

Lesson Plan (Microbiology)

Topic: Cestode and Trematode

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on

‘Cestode and trematode’

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Cestode and trematode
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on helminth
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the general characteristics and basic structure of cestodes and trematodes.
2. Differentiate cestodes from trematodes
3. Classify medically important cestodes and trematodes
4. Describe the morphology of the medically important cestodes and trematodes included in the curriculum.
5. Explain the life cycle of important cestodes and trematodes,
6. Describe the mode of transmission and risk factors for infection.
7. Explain the pathogenesis of important diseases caused by cestodes and trematodes.
8. Describe the major clinical features and complications of important cestode and trematode infections.
9. Explain the laboratory diagnosis medically important cestodes and trematodes

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
5-10	Attention	Related problem-based question
10-20	Classification	Classification and medically important cestode and trematode.
20-40	Morphology & Life Cycle	Morphology & Life Cycle of medically important cestode and trematode.
40-60	Transmission & Pathogenesis	Transmission & Pathogenesis of medically important cestode and trematode.
60-80	Clinical Features & complications	Clinical Features & complications of medically important cestode and trematode.
80-100	Lab Diagnosis	Lab Diagnosis of medically important cestode and trematode.
100-110	Treatment & Prevention	Treatment & Prevention of medically important cestode and trematode.
110-120	Summery	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Short note on Neurocysticercosis
2. Read next topic: Echinococcus

Lesson Plan (Microbiology)

Topic: Echinococcus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on ‘Echinococcus’

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Echinococcus
Duration	60 minutes
Format	Lecture class
Prerequisites	Basic knowledge on Echinococcus
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Describe the morphology of the adult worm, eggs and larval (hydatid cyst) stages.
2. Explain the life cycle of *Echinococcus*
3. Identify the infective and diagnostic stages of the parasite.
4. Describe the mode of transmission of echinococcosis to humans.
5. Explain the pathogenesis and development of hydatid cysts in different organs.
6. Describe the clinical features and complications of hydatid disease
7. Describe the principles of treatment of hydatid disease.
8. Outline preventive and control measures for echinococcosis

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related image
5-10	Morphology	Morphology of <i>Echinococcus</i>
10-15	Transmission	Transmission of <i>Echinococcus</i>
15-30	Life cycle	Pathogenesis of <i>Echinococcus</i>
30-40	Complication	Complications of hydatid disease
40-55	Lab diagnosis	Lab diagnosis of <i>Echinococcus</i>
55-60	Summery	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Draw structure of Hydatid cyst
2. Short note on Hydatid disease
3. Read next topic: Schistosoma

Lesson Plan (Microbiology)

Topic: Additional parasite

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on

‘Additional parasite’

Field	Details
Course	Microbiology (Parasitology)
Year	MBBS 4 th Year
Topic	Additional parasite
Duration	120 minutes
Format	Lecture class
Prerequisites	Basic knowledge on Parasite
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives (At the end of the lecture, students should be able to):

1. Mode of transmission
2. Brief description of characteristics
3. What are diseases they produce
4. What is the clinical feature they produce
5. How can you diagnose

Content Outline and Time Allocation:

Time(min)	Activity	Content/Key point
0-5	Attention	Related question
5-15	Introduction	Morphology
20-40	Characteristics	Characteristics
40-60	Transmission	Mode of Transmission
60-80	Diseases	Disease
80-110	Lab diagnosis	Lab diagnosis
110-120	Summery	Take home message

Resources:

1. Power point slides
2. Microscopical images
3. Whiteboard

Assessment:

1. Formative: Interactive questioning
2. Summative: 2-3MCQs

Assignment:

1. Short note on Oncogenic parasite
2. Short note on Megaloblastic anaemia by *Diphylobothrium latum*
3. Read next topic: Mycology

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Introduction to parasitology

Learning objective:

- Mention the important characteristics and epidemiology of common parasitic diseases
- Define the terms: Parasite, Host, Parasitism, Vector
- Classify parasites according to their habitat
- Classification of host with examples.
- Explain the basic host–parasite relationship
- Relate common parasites to their major modes of transmission

List of content: Mentioned in curriculum

- Introduction to parasitology
- Common parasitic diseases of Bangladesh
- Terms and definitions
- Classifications of parasites according to habitat
- Host: definition, classification with examples.

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Intestinal protozoa

Learning objective:

- Describe the morphology of *Entamoeba histolytica* & *Giardia intestinalis*
- Explain the life cycle of
- Describe the mode of transmission
- Explain the pathogenesis of intestinal amoebiasis.
- Describe extraintestinal amoebiasis, particularly amoebic liver abscess.

List of content: Mentioned in curriculum

- Classification of *Entamoeba histolytica* & *Giardia intestinalis*
- Geographical distribution
- Morphology
- Clinical features
- Pathogenesis
- Laboratory diagnosis and treatment.

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Leishmania

Learning objective:

- Classify medically important *Leishmania* species
- Describe the morphology
- Explain the life cycle
- Explain the pathogenesis of visceral leishmaniasis.
- Describe the clinical features and complications of visceral leishmaniasis (kala-azar).
- Describe post-kala-azar dermal leishmaniasis (PKDL).
- Explain the laboratory diagnosis of different forms of leishmaniasis.
- Describe the principles of treatment and prevention of leishmaniasis.

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

List of content: Mentioned in curriculum

- Geographical distribution
- Morphology
- Lifecycle, disease, clinical features,
- Pathogenesis
- Laboratory diagnosis and treatment.
- Cutaneous leishmaniasis: Causative agents, pathogenesis, lab diagnosis and management.

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Plasmodium species

Learning objective:

- Classify medically important *Plasmodium* species
- Explain the life cycle of *Plasmodium*
- Explain the mode of transmission of malaria.
- Describe the pathogenesis of malaria.
- Describe the clinical features of malaria caused by different *Plasmodium* species.
- Explain the major complications of severe malaria
- Describe the laboratory diagnosis of malaria
- Describe the principles of treatment of malaria.

List of content: Mentioned in curriculum

- Epidemiology
- Morphology
- Lifecycle, Disease, Clinical Features
- Pathogenesis, Complications
- Laboratory Diagnosis
- Treatment And Prevention.

Introduction: 10 min

Session discussion: 30 min

Group discussion: 20 min

Interactive discussion: 20 min

Feedback: 15 min

Assessment: 20 min

Conclusion: 5 min (take home message, evaluation by students)

Date & time:

Venue: Tutorial Class Room

Duration: 2 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Intestinal Nematodes

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Learning objective:

- Classify the medically important intestinal nematodes.
- Describe the morphology of different nematode
- Explain the life cycle of the important intestinal nematodes.
- Describe the modes of transmission and risk factors for intestinal nematode infections.
- Explain the pathogenesis of intestinal nematode infections.
- Explain the laboratory diagnosis of intestinal nematode infections.

List of content: Mentioned in curriculum

- Geographical Distribution, Morphology
- Lifecycle, Disease, Clinical Features
- Pathogenesis
- Laboratory diagnosis of *Ascaris lumbricoides*, Hook worm, *Trichuris trichiura*, *Enterobius vermicularis*, *Strongyloides stercoralis*.
- Larva migrans and larva currens.
- Hyperinfection syndrome

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Tissue nematodes

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Learning objective:

- Classify medically important tissue nematodes.
- Describe the morphology of important tissue nematodes.
- Explain the life cycle and mode of transmission of important tissue nematodes.
- Describe the pathogenesis and clinical features of tissue nematode infections.
- Discuss the laboratory diagnosis of important tissue nematode infections.
- Outline the treatment and preventive measures of tissue nematode infections.

List of content: Mentioned in curriculum

- Morphology
- Lifecycle, Disease (Classical and Occult Filariasis, Tropical Pulmonary Eosinophilia), Clinical Features
- Pathogenesis, Complications
- Laboratory diagnosis and treatment of filariasis.
- Periodicity of microfilaria. Provocative Test.

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Feedback: 10 min

Assessment: 10 min

Conclusion: 5 min (take home message, evaluation by students)

Lesson Plan (Microbiology)

Topic: Collection of Samples, Transportation and Storage

This lesson plan is designed for a 60-minute large group lecture for 4th-year MBBS students, focusing on 'Collection of Samples, Transportation and Storage'.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Collection of Samples, Transportation and Storage
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of clinical microbiology and common clinical specimens
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Describe the general principles of clinical sample collection.
2. Identify appropriate samples for common microbiological investigations.
3. Explain the correct methods for collection of common clinical samples.
4. Describe the principles of transportation of clinical samples.
5. Identify common transport media and their uses.
6. Explain the appropriate storage conditions for different clinical samples.
7. Identify common errors in sample collection, transportation and storage.
8. Describe the criteria for rejection of unsuitable samples.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Image/question showing properly and improperly collected clinical samples; importance of specimen quality
5–10	Introduction	Importance of proper sample collection, transportation and storage; effect on laboratory diagnosis
10–20	Sample Collection	General principles; aseptic technique; appropriate container; adequate quantity; labelling and documentation
20–30	Common Samples	Collection of blood, urine, sputum, stool, pus/wound specimens, CSF and other body fluids
30–40	Transportation	Time and temperature requirements; transport media; leak-proof containers; biosafety precautions
40–50	Storage	Appropriate storage conditions; room temperature, refrigeration and freezing; effects of delay and improper storage
50–55	Sample Rejection	Unlabelled or mislabeled samples; insufficient quantity; leakage; wrong container; contamination; delayed transport
55–60	Summary	Key points; take-home message; question-answer session

Resources

1. PowerPoint slides
2. Images of clinical specimen collection
3. Different specimen containers
4. Transport media
5. Whiteboard

Assessment

1. Formative: Interactive questioning and case-based discussion
2. Summative: 2–3 MCQs

Assignment

1. Write the general principles of clinical sample collection.
2. Describe the transportation and storage requirements of common clinical samples.
3. List the common criteria for rejection of clinical specimens.
4. Read the next topic: Laboratory Diagnosis of Infectious Diseases.

Lesson Plan (Microbiology)

Topic: Microbial Diseases of the Gastrointestinal and Hepatobiliary Tracts and Food Poisoning

This lesson plan is designed for a **60-minute large group lecture for 4th-year MBBS students**, focusing on the important microbial diseases affecting the gastrointestinal and hepatobiliary tracts, as well as food poisoning.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Microbial Diseases of the Gastrointestinal and Hepatobiliary Tracts and Food Poisoning
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of bacteriology, virology and parasitology
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Classify the important microbial causes of gastrointestinal and hepatobiliary diseases.
2. Identify the important microbial causes of diarrhoea and dysentery.
3. Describe the important bacterial causes of food poisoning and their mechanisms of disease.
4. Discuss the principles of treatment and prevention of these infections.
5. Explain the importance of food hygiene, safe water and sanitation in prevention of gastrointestinal infections and food poisoning.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Clinical image/case of acute diarrhoea or food poisoning; importance of gastrointestinal infections
5–10	Introduction	Overview of microbial diseases of the gastrointestinal and hepatobiliary tracts; modes of transmission
10–20	Gastrointestinal Diseases	Important bacterial, viral and parasitic causes of diarrhoea and dysentery; cholera, enteric fever,
20–30	Clinical Features and Pathogenesis	Clinical Features and Pathogenesis
30–40	Food Poisoning	Food intoxication and food infection
40–48	Hepatobiliary Diseases	Important microbial causes of hepatitis and hepatobiliary infections
48–55	Laboratory Diagnosis and Management	Laboratory Diagnosis and Management
55–60	Prevention and Summary	Food hygiene, take-home message

Resources

1. PowerPoint slides
2. Clinical images and flowcharts
3. Whiteboard

Assessment

1. **Formative:** Interactive questioning and case-based discussion
2. **Summative:** 2–3 MCQs

Assignment

1. Classify the important microbial causes of diarrhoea and dysentery.
2. Read the next topic: **Microbial Diseases of the Respiratory Tract.**

Lesson Plan (Microbiology)

Topic: Microbial Diseases of the Genito-Urinary System

This lesson plan is designed for a **60-minute large group lecture for 4th-year MBBS students**, focusing on the important microbial diseases affecting the genito-urinary system.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Microbial Diseases of the Genito-Urinary System
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of bacteriology, virology, mycology and parasitology
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Classify the important microbial causes of genito-urinary tract infections.
2. Describe the important characteristics of common genito-urinary pathogens.
3. Explain the modes of transmission of common genito-urinary infections.
4. Describe the pathogenesis and clinical features of important urinary tract infections.
5. Identify the common microbial causes of sexually transmitted infections.
6. Describe the important clinical features and complications of major sexually transmitted infections.
7. Explain the laboratory diagnosis of important genito-urinary infections.
8. Discuss the principles of treatment and management of these infections.
9. Explain the preventive measures for genito-urinary and sexually transmitted infections.
10. Describe the importance of proper specimen collection for diagnosis of genito-urinary infections.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Clinical case/image of urinary tract infection or sexually transmitted infection; importance of genito-urinary infections
5–10	Introduction	Overview and classification of microbial diseases of the genito-urinary system; routes of infection and transmission
10–20	Urinary Tract Infections	Common pathogens; cystitis, urethritis, pyelonephritis; important clinical features and complications
20–30	Sexually Transmitted Infections	Gonorrhoea, syphilis, chlamydial infections, genital herpes, genital warts, trichomoniasis and other important STIs
30–40	Pathogenesis and Clinical Features	Modes of transmission; mechanisms of infection; important clinical features and complications
40–50	Laboratory Diagnosis	Appropriate specimens; urine examination and culture; urethral/genital specimens; microscopy, culture, antigen detection, serology and molecular tests
50–55	Treatment and Prevention	Principles of antimicrobial therapy; partner management; safe sex practices; vaccination; screening and prevention
55–60	Summary	Key points; take-home message; question-answer session

Resources

1. PowerPoint slides
2. Clinical images and flowcharts
3. Microscopic images of important pathogens
4. Images of specimen collection and transport
5. Whiteboard

Assessment

1. **Formative:** Interactive questioning and case-based discussion
2. **Summative:** 2–3 MCQs

Assignment

1. Classify the important microbial causes of urinary tract infections.
2. Outline the laboratory diagnosis of urinary tract infection.

Lesson Plan (Microbiology)

Topic: Microbial Diseases of the Upper and Lower Respiratory Tracts

This lesson plan is designed for a **60-minute large group lecture for 4th-year MBBS students**, focusing on important microbial diseases affecting the upper and lower respiratory tracts.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Microbial Diseases of the Upper and Lower Respiratory Tracts
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of bacteriology, virology, mycology and immunology
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Classify the important microbial causes of diseases of the upper and lower respiratory tracts.
2. Describe the important characteristics of common respiratory pathogens.
3. Explain the modes of transmission of important respiratory infections.
4. Describe the pathogenesis and clinical features of common upper respiratory tract infections.
5. Describe the pathogenesis and clinical features of important lower respiratory tract infections.
6. Identify the common microbial causes of pneumonia, bronchitis, bronchiolitis and other respiratory infections.
7. Describe the complications of important respiratory tract infections.
8. Explain the laboratory diagnosis of common respiratory tract infections.
9. Discuss the principles of treatment and management of microbial respiratory diseases.
10. Explain the preventive measures, including vaccination and infection-control practices.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Clinical case/image of pneumonia or upper respiratory tract infection; importance of respiratory infections
5–10	Introduction	Overview and classification of microbial diseases of the respiratory tract; modes of transmission
10–20	Upper Respiratory Tract Diseases	Common causes of rhinitis, pharyngitis, tonsillitis, sinusitis, otitis media and epiglottitis; important pathogens and clinical features
20–30	Lower Respiratory Tract Diseases	Bronchitis, bronchiolitis and pneumonia; common bacterial, viral, fungal and other microbial causes
30–40	Pathogenesis and Clinical Features	Routes of infection; mechanisms of respiratory tract disease; important clinical features and complications
40–50	Laboratory Diagnosis	Appropriate specimens; sputum, throat swab, nasopharyngeal swab, blood and other specimens; microscopy, culture, antigen detection, serology and molecular diagnosis
50–55	Treatment and Prevention	Principles of antimicrobial therapy; vaccination; respiratory hygiene; infection-control measures
55–60	Summary	Key points; take-home message; question-answer session

Resources

1. PowerPoint slides
2. Clinical images and flowcharts
3. Microscopic images of important respiratory pathogens
4. Whiteboard

Assessment

1. **Formative:** Interactive questioning and case-based discussion
2. **Summative:** 2–3 MCQs

Assignment

1. Classify the important microbial causes of upper and lower respiratory tract infections.
2. Outline the laboratory diagnosis of pneumonia.
3. Compare the common microbial causes of upper and lower respiratory tract infections.

Lesson Plan (Microbiology)

Topic: Microbial Diseases of the Central Nervous System (CNS)

This lesson plan is designed for a **60-minute large group lecture for 4th-year MBBS students**, focusing on important microbial diseases affecting the central nervous system.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Microbial Diseases of the Central Nervous System
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of bacteriology, virology, mycology and parasitology
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Classify the important microbial causes of diseases of the central nervous system.
2. Describe the important characteristics of common neurotropic microorganisms.
3. Explain the routes of entry and modes of transmission of CNS infections.
4. Describe the pathogenesis and clinical features of important CNS infections.
5. Identify the common microbial causes of meningitis, encephalitis and brain abscess.
6. Describe the important complications of microbial diseases of the CNS.
7. Explain the laboratory diagnosis of CNS infections.
8. Discuss the principles of treatment and management of CNS infections.
9. Explain the preventive measures for important microbial diseases of the CNS.
10. Describe the importance of proper collection and handling of CSF and other specimens for diagnosis.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Clinical case of meningitis or encephalitis; importance of early diagnosis and treatment
5–10	Introduction	Overview and classification of microbial diseases of the CNS; routes of infection and transmission
10–20	Meningitis	Important bacterial, viral, fungal and parasitic causes; acute and chronic meningitis; clinical features
20–30	Encephalitis and Other CNS Infections	Viral encephalitis, poliomyelitis, rabies, brain abscess and other important CNS infections
30–40	Pathogenesis and Clinical Features	Routes of entry; mechanisms of CNS infection; important clinical features and complications
40–50	Laboratory Diagnosis	CSF collection and examination; physical, biochemical and microscopic examination; culture, antigen detection, serology and molecular diagnosis
50–55	Treatment and Prevention	Principles of antimicrobial therapy; vaccination; chemoprophylaxis; prevention of transmission
55–60	Summary	Key points; take-home message; question-answer session

Resources

1. PowerPoint slides
2. Clinical images and flowcharts
3. Microscopic images of important CNS pathogens
4. CSF examination charts
5. Whiteboard

Assessment

1. **Formative:** Interactive questioning and case-based discussion
2. **Summative:** 2–3 MCQs

Assignment

1. Classify the important microbial causes of meningitis and encephalitis.
2. Outline the laboratory diagnosis of acute bacterial meningitis.

Lesson Plan (Microbiology)

Topic: Hospital-Acquired Infections (HAIs)

This lesson plan is designed for a **60-minute large group lecture for 4th-year MBBS students**, focusing on the important causes, transmission, prevention and control of hospital-acquired infections.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Hospital-Acquired Infections
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of bacteriology, infection control, sterilization and disinfection
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Define hospital-acquired infections (HAIs).
2. Describe the epidemiology and importance of hospital-acquired infections.
3. Classify the important types of hospital-acquired infections.
4. Identify the common microbial causes of hospital-acquired infections.
5. Explain the sources and modes of transmission of HAIs.
6. Describe the risk factors associated with hospital-acquired infections.
7. Discuss common HAIs, including catheter-associated urinary tract infection, surgical site infection, hospital-acquired pneumonia and bloodstream infection.
8. Explain the role of antimicrobial resistance in hospital-acquired infections.
9. Describe the principles of surveillance, prevention and control of HAIs.
10. Explain the importance of standard precautions, hand hygiene and proper sterilization and disinfection in preventing HAIs.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Clinical case of a patient developing infection after hospital admission; importance of HAIs
5–10	Introduction	Definition, epidemiology and importance of hospital-acquired infections; healthcare-associated infections
10–20	Classification and Causes	Types of HAIs; common bacterial, viral and fungal pathogens
20–30	Sources and Transmission	Endogenous and exogenous sources
30–40	Common HAIs	Catheter-associated UTI, surgical site infection, hospital-acquired pneumonia/ventilator-associated pneumonia and bloodstream infections
40–48	Risk Factors and Diagnosis	Patient-related and hospital-related risk factors
48–55	Prevention and Control	Hand hygiene, standard precautions, isolation, sterilization, disinfection, environmental cleaning, antimicrobial stewardship and infection-control practices
55–60	Summary	Key points; take-home message; question-answer session

Resources

1. PowerPoint slides
2. Images demonstrating hand hygiene and personal protective equipment
3. Whiteboard

Assessment

1. **Formative:** Interactive questioning and case-based discussion
2. **Summative:** 2–3 MCQs

Assignment

1. Define and classify hospital-acquired infections.
2. Describe the common sources and modes of transmission of HAIs.
3. Outline the prevention and control measures for hospital-acquired infections.

Lesson Plan (Microbiology)

Topic: Microbial Diseases of the Eye, Ear, Nose and Throat

This lesson plan is designed for a **60-minute large group lecture for 4th-year MBBS students**, focusing on important microbial diseases affecting the eye, ear, nose and throat.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Microbial Diseases of the Eye, Ear, Nose and Throat
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of bacteriology, virology, mycology and parasitology
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Classify the important microbial causes of diseases of the eye, ear, nose and throat.
2. Describe the important characteristics of common pathogens causing infections of the eye, ear, nose and throat.
3. Explain the modes of transmission and routes of infection.
4. Describe the pathogenesis and clinical features of common microbial diseases of the eye.
5. Describe the common microbial diseases of the ear, nose and throat.
6. Identify the important complications of microbial infections of these organs.
7. Explain the appropriate specimens and laboratory methods for diagnosis.
8. Discuss the principles of treatment and management of common infections.
9. Explain the preventive measures for microbial diseases of the eye, ear, nose and throat.
10. Describe the importance of proper specimen collection and infection-control practices in preventing transmission.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Clinical images of conjunctivitis, otitis media or tonsillitis; importance of infections of the eye, ear, nose and throat
5–10	Introduction	Overview and classification of microbial diseases; routes of infection and modes of transmission
10–20	Diseases of the Eye	Conjunctivitis, keratitis, trachoma, ophthalmia neonatorum and other important bacterial, viral, fungal and parasitic infections
20–30	Diseases of the Ear	Otitis externa, otitis media and other important microbial infections; causative organisms and complications
30–40	Diseases of the Nose and Throat	Rhinitis, sinusitis, pharyngitis, tonsillitis, diphtheria and other important microbial diseases
40–50	Laboratory Diagnosis	Appropriate specimens; swabs, conjunctival specimens, ear discharge and throat swabs; microscopy, culture, antigen detection and molecular methods
50–55	Treatment and Prevention	Principles of antimicrobial therapy; personal hygiene, vaccination, infection-control measures and prevention of transmission
55–60	Summary	Key points; take-home message; question-answer session

Resources

1. PowerPoint slides
2. Microscopic images of important pathogens
3. Whiteboard

Assessment

1. **Formative:** Interactive questioning and case-based discussion
2. **Summative:** 2–3 MCQs

Assignment

1. Classify the important microbial causes of diseases of the eye, ear, nose and throat.
2. Outline the laboratory diagnosis of bacterial conjunctivitis.
3. Read the next topic: **Hospital-Acquired Infections.**

Lesson Plan (Microbiology)

Topic: Pyrexia of Unknown Origin (PUO)

This lesson plan is designed for a **60-minute large group lecture for 4th-year MBBS students**, focusing on the causes, evaluation and microbiological diagnosis of pyrexia of unknown origin.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Pyrexia of Unknown Origin
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of infectious diseases, clinical microbiology and general medicine
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Define pyrexia of unknown origin (PUO).
2. Describe the classical criteria and important categories of PUO.
3. Classify the major causes of PUO.
4. Identify important infectious causes of PUO.
5. Describe the common non-infectious causes of PUO.
6. Explain the clinical approach to a patient with PUO.
7. Describe the appropriate laboratory investigations for diagnosis of PUO.
8. Explain the role of microbiological investigations in the evaluation of PUO.
9. Discuss the principles of management of PUO.
10. Explain the importance of avoiding inappropriate empirical antimicrobial therapy before appropriate investigations, when clinically safe.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Clinical case of a patient with prolonged fever without an obvious cause; importance of systematic evaluation
5–10	Introduction	Definition and criteria of PUO; classical and special categories of PUO
10–20	Causes of PUO	Infectious causes, malignancies, connective tissue diseases and miscellaneous causes
20–30	Infectious Causes	Tuberculosis, enteric fever, infective endocarditis, deep-seated abscesses, viral infections, malaria and other important infections
30–40	Diagnostic Approach	Detailed history, physical examination and stepwise laboratory investigations; importance of repeated examination
40–50	Microbiological Diagnosis	Blood culture, urine and other cultures, serology, molecular tests, malaria tests, tuberculosis investigations and imaging-guided specimen collection
50–55	Management	Treatment of the underlying cause; rational use of antimicrobial therapy; supportive management and specialist referral
55–60	Summary	Key points; take-home message; question-answer session

Resources

1. PowerPoint slide
2. Clinical case scenarios
3. Laboratory investigation charts

Assessment

1. **Formative:** Interactive questioning and case-based discussion
2. **Summative:** 2–3 MCQs

Assignment

1. Define and classify pyrexia of unknown origin.
2. Describe the major infectious causes of PUO.
3. Outline the microbiological investigations in a patient with PUO.

Lesson Plan (Microbiology)

Topic: Infectious Disease Control and Prevention

This lesson plan is designed for a **60-minute large group lecture for 4th-year MBBS students**, focusing on the principles and measures used for the control and prevention of infectious diseases.

Field	Details
Course	General Microbiology
Year	MBBS 4th Year
Topic	Infectious Disease Control and Prevention
Duration	60 minutes
Format	Large Group Lecture
Prerequisites	Basic knowledge of microbiology, epidemiology and communicable diseases
Venue	Lecture Gallery
Date and time	
Teacher	

Learning Objectives

At the end of the lecture, students should be able to:

1. Define the concepts of infection prevention and infectious disease control.
2. Describe the chain of infection and its components.
3. Explain the important modes of transmission of infectious diseases.
4. Describe the principles of breaking the chain of infection.
5. Discuss the role of personal hygiene, sanitation and safe water in disease prevention.
6. Explain the importance of vaccination and immunization in prevention of infectious diseases.
7. Describe standard precautions and transmission-based precautions.
8. Explain the role of hand hygiene, sterilization and disinfection in infection prevention.
9. Describe the principles of isolation, quarantine and contact tracing.
10. Discuss the importance of surveillance, outbreak investigation and antimicrobial stewardship in infectious disease control.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Point
0–5	Attention	Clinical/public health scenario of an infectious disease outbreak; importance of prevention and control
5–10	Introduction	Definition and importance of infectious disease prevention and control; objectives of control measures
10–20	Chain of Infection	Infectious agent, reservoir, portal of exit, mode of transmission, portal of entry and susceptible host
20–30	Breaking the Chain of Infection	Hand hygiene, personal protective equipment, isolation, sanitation, safe water, food hygiene and environmental control
30–40	Specific Prevention Measures	Vaccination, chemoprophylaxis, early diagnosis, treatment, contact tracing, quarantine and health education
40–50	Healthcare Infection Control	Standard precautions, transmission-based precautions, sterilization, disinfection, safe injection practices and prevention of hospital-acquired infections
50–55	Surveillance and Outbreak Control	Disease surveillance, notification, outbreak investigation, antimicrobial stewardship and public health response
55–60	Summary	Key points; take-home message; question-answer session

Resources

1. PowerPoint slides
2. Chain of infection diagram
3. Flowcharts of infection prevention and outbreak control

Assessment

1. **Formative:** Interactive questioning and case-based discussion
2. **Summative:** 2–3 MCQs

Assignment

1. Describe the chain of infection and methods of breaking each link.
2. Outline the standard precautions used for prevention of infectious diseases.
3. Describe the role of vaccination and surveillance in infectious disease control.

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Staphylococcus

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on 'Staphylococcus'.

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Staphylococcus
Duration	120 minutes
Format	Lecture Class
Prerequisites	General bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives:

1. Describe the morphology, classification and cultural characteristics of Staphylococci.
2. Differentiate *S. aureus*, *S. epidermidis* and *S. saprophyticus*.
3. Explain virulence factors and pathogenesis.
4. Describe clinical features and diseases caused by Staphylococci.
5. Describe selection, collection and transport of clinical specimens and laboratory diagnosis.
6. Discuss MRSA, VRSA, antimicrobial therapy, prevention and infection control.

Content Outline and Time Allocation:

Time (min)	Activity	Content/Key Points
0–10	Attention	Clinical case/image
10–20	Introduction	Classification, morphology, habitat
20–40	Characteristics	Culture, biochemical tests, identification
40–60	Mechanism	Virulence factors and pathogenesis
60–85	Medical Use	Diseases: skin, food poisoning, TSS, SSSS, bacteremia, endocarditis; <i>S. epidermidis</i> & <i>S. saprophyticus</i>
85–105	Laboratory diagnosis	Specimen selection, transport, Gram stain, culture, catalase, coagulase, AST, MRSA
105–115	Management	Treatment, MRSA/VRSA, prevention, infection control
115–120	Summary	Take-home message

Resources

1. PowerPoint slides
2. Clinical photographs
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare *S. aureus*, *S. epidermidis* and *S. saprophyticus*.
2. Short note on MRSA.
3. Read next topic: Streptococcus.

**Department of Microbiology
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Lesson plan for large group teaching (Lecture)

Topic: Streptococcus

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on 'Streptococcus'.

Field	Detail
Year	MBBS 4th Year
Topic	Streptococci
Duration	120 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe morphology, classification and cultural characteristics of streptococci.
2. Differentiate Group A Streptococcus, Streptococcus agalactiae and Streptococcus pneumoniae.
3. Explain virulence factors and pathogenesis.
4. Describe clinical manifestations and complications.
5. Discuss laboratory diagnosis including specimen collection and interpretation.
6. Outline treatment, antimicrobial resistance and prevention.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–10	Attention	Clinical case/image
10–20	Introduction	Classification, morphology, hemolysis
20–40	Characteristics	Culture, biochemical tests, Lancefield grouping
40–60	Mechanism	Virulence factors and pathogenesis
60–85	Medical Use	GAS, GBS, pneumococcal diseases, rheumatic fever, PSGN
85–105	Laboratory diagnosis	Specimens, Gram stain, culture, optochin, bile solubility, bacitracin, AST
105–115	Management	Treatment, prevention, pneumococcal vaccine
115–120	Summary	Take-home message

Resources

1. PowerPoint slides
2. Clinical photographs
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare GAS, GBS and pneumococcus.
2. Short note on rheumatic fever.
3. Read next topic: Neisseria.

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Lesson plan for large group teaching (Lecture)

Topic: Neisseria

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Neisseria'.

Field	Detail
Year	MBBS 4th Year
Topic	Neisseria
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe morphology, classification and cultural characteristics of Neisseria.
2. Differentiate Neisseria gonorrhoeae and Neisseria meningitidis.
3. Explain virulence factors and pathogenesis.
4. Describe clinical manifestations.
5. Discuss laboratory diagnosis including specimen collection and interpretation.
6. Outline treatment and prevention.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical image/case
5–10	Introduction	Classification, morphology
10–20	Characteristics	Culture, identification, virulence
20–35	Clinical	Gonorrhoea, meningococcal disease
35–50	Laboratory diagnosis	Specimens, Gram stain, culture, PCR
50–55	Management	Treatment, chemoprophylaxis, vaccines
55–60	Summary	Take-home message

Resources

1. PowerPoint slides
2. Clinical images
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare *N. gonorrhoeae* and *N. meningitidis*.
2. Short note on meningococcal vaccine.

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Lesson plan for large group teaching (Lecture)

Topic: *Corynebacterium diphtheriae*

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students.

Field	Detail
Year	MBBS 4th Year
Topic	<i>Corynebacterium diphtheriae</i>
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe morphology, cultural characteristics and identification.
2. Explain toxigenicity and pathogenesis of diphtheria.
3. Describe clinical features and complications.
4. Discuss laboratory diagnosis including specimen collection.
5. Outline treatment, antitoxin therapy and prevention by vaccination.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical image
5–10	Introduction	Morphology, classification
10–20	Characteristics	Culture, Albert stain, Elek test
20–35	Mechanism	Diphtheria toxin, pathogenesis
35–50	Clinical/Lab	Clinical features, complications, laboratory diagnosis
50–55	Management	Antitoxin, antibiotics, vaccination
55–60	Summary	Take-home message

Resources

1. PowerPoint slides
2. Clinical images
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Mechanism of diphtheria toxin.
2. DPT vaccination schedule.

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Lesson plan for large group teaching (Lecture)

Topic: Bacillus

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on ' Bacillus '.

Field	Detail
Year	MBBS 4th Year
Topic	Bacillus
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

- Describe morphology and characteristics of Bacillus spp.
- Differentiate B. anthracis and B. cereus.
- Explain pathogenesis and virulence.
- Discuss clinical features and laboratory diagnosis.
- Outline treatment and prevention.

Content Outline and Time Allocation

Content	Time
Introduction, morphology and classification	10 min
Culture, identification and virulence	10 min
Anthrax and food poisoning	15 min
Laboratory diagnosis	15 min
Treatment, prevention, summary	10 min

Resources

- Multimedia projector and PowerPoint slides
- Whiteboard and markers
- Clinical photographs
- Gram stain/colony photographs
- Relevant microbiology textbooks

Assessment

- Oral questioning during lecture
- MCQs at the end of class
- Short case discussion on anthrax or food poisoning

Assignment

1. Compare *Bacillus anthracis* and *Bacillus cereus*.
2. Write a short note on anthrax toxin.

Department of Microbiology

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Lesson plan for large group teaching (Lecture)

Topic: Clostridium and Other Anaerobic Bacteria

This lesson plan is designed for a 180-minute lecture for 4th-year MBBS students, focusing on ' Clostridium and Other Anaerobic Bacteria '.

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Clostridium and Other Anaerobic Bacteria
Duration	180 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe classification, morphology and cultural characteristics of Clostridium and other anaerobic bacteria.
2. Explain virulence factors and pathogenesis.
3. Discuss diseases caused by C. tetani, C. botulinum, C. perfringens, C. difficile and other anaerobes.
4. Describe specimen collection and laboratory diagnosis.
5. Discuss treatment, prevention and infection control.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–10	Attention	Clinical scenarios/images
10–25	Introduction	Classification, morphology, anaerobic culture
25–60	Characteristics	General characteristics, virulence factors
60–100	<i>Clostridium</i> spp.	<i>C. tetani</i> , <i>C. botulinum</i> , <i>C. perfringens</i>
100–130	<i>Clostridioides difficile</i> & others	Disease spectrum and pathogenesis
130–160	Laboratory diagnosis	Specimen collection, transport, anaerobic culture, toxin detection
160–175	Management	Treatment, prevention, immunization, infection control
175–180	Summary	Take-home messages & Q/A

Resources

7. PowerPoint slides
8. Clinical photographs
9. Whiteboard
10. Anaerobic culture diagrams

Assessment

1. Formative: Interactive questioning
2. Summative: MCQs and SAQs

Assignment

1. Compare tetanus and botulism.
2. Short note on gas gangrene.
3. Read next topic: Spirochetes.

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Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Lactose Fermenting Enterobacteriaceae (Escherichia coli and Klebsiella)

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students.

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Lactose Fermenting Enterobacteriaceae (Escherichia coli and Klebsiella)
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives:

1. Describe the morphology, classification and cultural characteristics of Escherichia coli and Klebsiella.
2. Explain important virulence factors and pathogenesis.
3. Describe major diseases caused by E. coli and Klebsiella.
4. Describe selection, collection and transport of clinical specimens and laboratory diagnosis.
5. Discuss antimicrobial therapy, prevention and control.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical case/image
5–10	Introduction	Classification, morphology, habitat
10–25	Characteristics	Culture, biochemical tests, antigenic structure, virulence factors
25–40	Medical Use	Diseases caused by <i>E. coli</i> and <i>Klebsiella</i>
40–55	Laboratory diagnosis	Specimen selection, transport, Gram stain, culture, biochemical identification, AST
55–60	Summary	Treatment, prevention, infection control, take-home message

Resources

1. PowerPoint slides
2. Clinical photographs
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare *Escherichia coli* and *Klebsiella*.
2. Short note on virulence factors of *E. coli*.
3. Read next topic: Non-lactose fermenting Enterobacteriaceae.

**Department of Microbiology
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Lesson plan for large group teaching (Lecture)

**Topic: Non-Lactose Fermenting Enterobacteriaceae
(Salmonella, Shigella, Proteus)**

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Non-Lactose Fermenting Enterobacteriaceae (Salmonella, Shigella, Proteus)
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe morphology, classification and cultural characteristics of Salmonella, Shigella and Proteus.
2. Explain virulence factors and pathogenesis.
3. Discuss important clinical diseases.
4. Describe specimen collection and laboratory diagnosis.
5. Discuss treatment, prevention and control.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical case/image
5–10	Introduction	Classification, morphology, habitat
10–25	Characteristics	Culture, biochemical reactions, antigenic structure, virulence factors
25–40	Medical Use	Typhoid fever, salmonellosis, bacillary dysentery, Proteus UTI and related infections
40–55	Laboratory diagnosis	Specimen collection, Gram stain, culture, biochemical tests, serology, AST
55–60	Summary	Treatment, prevention, infection control, take-home message

Resources

1. PowerPoint slides
2. Clinical photographs
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare Salmonella, Shigella and Proteus.
2. Short note on typhoid fever laboratory diagnosis

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Mycobacterium

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students, focusing on 'Mycobacterium'

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Mycobacterium
Duration	120 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe the morphology, classification and staining characteristics of Mycobacterium.
2. Explain virulence factors and pathogenesis of tuberculosis and leprosy.
3. Discuss clinical features of tuberculosis and leprosy.
4. Describe specimen collection and laboratory diagnosis.
5. Discuss treatment, prevention, BCG vaccination and infection control.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–10	Attention	Clinical case, acid-fast smear
10–25	Introduction	Classification, morphology, cell wall, staining
25–50	Characteristics	Culture, virulence factors, pathogenesis
50–80	Medical importance	Tuberculosis, leprosy, clinical manifestations
80–105	Laboratory diagnosis	Specimen collection, Ziehl–Neelsen stain, culture, GeneXpert, Mantoux, IGRA
105–115	Management	Treatment, MDR/XDR-TB, BCG, prevention
115–120	Summary	Revision and Q/A

Resources

1. PowerPoint slides
2. Clinical photographs
3. Whiteboard
4. AFB smear images

Assessment

1. Formative: Interactive questioning
2. Summative: MCQs and SAQs

Assignment

1. Compare tuberculosis and leprosy
2. Short note on GeneXpert

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Spirochetes

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on 'Spirochetes'.

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Spirochetes
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe the morphology, classification and characteristics of spirochetes.
2. Differentiate Treponema, Borrelia and Leptospira.
3. Explain pathogenesis and clinical manifestations.
4. Describe laboratory diagnosis.
5. Discuss treatment and prevention.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical case/image
5–10	Introduction	General characteristics and classification
10–25	Characteristics	Treponema pallidum: morphology, pathogenesis, syphilis
25–40	Medical importance	Borrelia and Leptospira: diseases and clinical features
40–55	Laboratory diagnosis	Dark-field microscopy, serology, VDRL/RPR, TPPA, PCR
55–60	Summary	Treatment, prevention and Q/A

Resources

1. PowerPoint slides
2. Clinical photographs
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare Treponema, Borrelia and Leptospira.
2. Short note on laboratory diagnosis of syphilis.

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: *Vibrio cholerae*

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students, focusing on '*Vibrio cholerae*'

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	<i>Vibrio cholerae</i>
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe morphology, cultural characteristics and classification of *Vibrio cholerae*.
2. Explain virulence factors and pathogenesis of cholera.
3. Discuss clinical features and complications.
4. Describe specimen collection and laboratory diagnosis.
5. Discuss treatment, prevention and vaccination.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical case/image
5–10	Introduction	Morphology, classification, habitat
10–25	Characteristics	Culture, biochemical tests, serotypes, cholera toxin, pathogenesis
25–40	Medical Use	Clinical features, dehydration, complications
40–55	Laboratory diagnosis	Specimen collection, dark-field microscopy, culture, TCBS agar, rapid tests
55–60	Summary	Treatment, ORS, antibiotics, prevention and vaccines

Resources

1. PowerPoint slides
2. Clinical photographs
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Short note on cholera toxin.
2. Compare classical and El Tor biotypes.

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Helicobacter and Campylobacter

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students.

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Helicobacter and Campylobacter
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe morphology, classification and cultural characteristics of Helicobacter and Campylobacter.
2. Differentiate Helicobacter pylori and Campylobacter jejuni.
3. Explain virulence factors and pathogenesis.
4. Describe clinical manifestations.
5. Discuss laboratory diagnosis, treatment and prevention.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical image/case
5–10	Introduction	Classification, morphology
10–25	Characteristics	Culture, identification, virulence; <i>Helicobacter pylori</i>
25–40	Clinical	Peptic ulcer disease; <i>Campylobacter enteritis</i> , GBS
40–55	Laboratory diagnosis	Urease test, urea breath test, stool antigen, culture
55–60	Summary	Treatment, prevention, take-home message

Resources

1. PowerPoint slides
2. Clinical images
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare *Helicobacter pylori* and *Campylobacter jejuni*.
2. Short note on the urea breath test.

Department of Microbiology

Comilla Medical College

Lesson plan for large group teaching (Lecture)

Topic: Haemophilus, Nocardia and Actinomycetes

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students.

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Haemophilus, Nocardia and Actinomycetes
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe morphology, classification and cultural characteristics of Haemophilus, Nocardia and Actinomycetes.
2. Differentiate these organisms based on microbiological features.
3. Explain important diseases and pathogenesis.
4. Discuss laboratory diagnosis.
5. Outline treatment and prevention.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical image/case
5–10	Introduction	Classification, morphology
10–25	Characteristics	<i>Haemophilus influenzae</i> : culture, virulence, diseases
25–40	Clinical	<i>Nocardia</i> and <i>Actinomycetes</i> : morphology, diseases, differentiation
40–55	Laboratory diagnosis	Specimens, Gram stain, acid-fast stain, culture, identification
55–60	Summary	Treatment, prevention, take-home message

Resources

1. PowerPoint slides
2. Clinical images
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare *Nocardia* and *Actinomyces*.
2. Short note on *Haemophilus influenzae* type b vaccine.

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Rickettsiae, Chlamydia and Mycoplasma

This lesson plan is designed for a 60-minute lecture for 4th-year MBBS students.

Field	Detail
Course	Microbiology (Systemic Bacteriology)
Year	MBBS 4th Year
Topic	Rickettsiae, Chlamydia and Mycoplasma
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Bacteriology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

1. Describe the morphology, classification and unique characteristics of Rickettsiae, Chlamydia and Mycoplasma.
2. Differentiate these organisms from typical bacteria.
3. Explain pathogenesis and important diseases caused by each group.
4. Describe specimen collection and laboratory diagnosis.
5. Discuss treatment and preventive measures.

Content Outline and Time Allocation

Time (min)	Activity	Content/Key Points
0–5	Attention	Clinical case/image
5–10	Introduction	General characteristics and classification
10–25	Rickettsiae	Morphology, pathogenesis, typhus and spotted fever, diagnosis
25–40	Chlamydia	Life cycle, diseases, laboratory diagnosis
40–55	Mycoplasma	Characteristics, atypical pneumonia, diagnosis, treatment
55–60	Summary	Comparison, prevention and Q/A

Resources

1. PowerPoint slides
2. Clinical photographs
3. Whiteboard

Assessment

1. Formative: Interactive questioning
2. Summative: 2–3 MCQs

Assignment

1. Compare Rickettsiae, Chlamydia and Mycoplasma.
2. Short note on Chlamydia life cycle.

Department of Microbiology Comilla Medical College

Lesson Plan for Small Group Teaching (Tutorial)

Topic: Staphylococcus

Learning Objectives (10 minutes)

- Define Staphylococcus and classify medically important species.
- Describe morphology, culture characteristics and virulence factors.
- Explain pathogenesis and diseases caused by Staphylococcus aureus.
- Differentiate S. aureus, S. epidermidis and S. saprophyticus.
- Describe laboratory diagnosis, treatment, MRSA and prevention.

Date & time:

Venue: Tutorial Class
Room

Duration: 1 hour

List of Content (Mentioned in Curriculum)

- Introduction and classification
- Morphology and culture characteristics
- Virulence factors
- Pathogenesis
- Clinical manifestations
- Laboratory diagnosis
- MRSA
- Treatment and prevention
- Comparison of S. aureus, S. epidermidis and S. saprophyticus

Introduction: 5 minutes

Session Discussion: 20 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 5 minutes

Assessment: 5 minutes

Conclusion: 5 minutes (Take-home message and evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Streptococci

Learning Objectives (10 minutes)

- Define Streptococci and describe classification.
- Describe morphology, culture characteristics and virulence factors.
- Differentiate major streptococcal species and Enterococcus.
- Explain pathogenesis and diseases caused by Streptococci.
- Describe laboratory diagnosis, treatment and prevention.

List of Content (Mentioned in Curriculum)

- Introduction and classification
- Morphology and culture characteristics
- Virulence factors
- Classification (Lancefield grouping, hemolysis)
- Streptococcus pyogenes
- Streptococcus pneumoniae
- Viridans streptococci
- Enterococcus
- Clinical manifestations
- Laboratory diagnosis
- Treatment and prevention
- Rheumatic fever and PSGN

Introduction: 10 minutes

Session Discussion: 40 minutes

Group Discussion: 20 minutes

Interactive Discussion: 10 minutes

Feedback: 15 minutes

Assessment: 10 minutes

Conclusion: 5 minutes (Take-home message and evaluation by students)

Date & time:

Venue: Tutorial Class
Room

Duration: 2 hours

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Neisseria

Learning Objectives (10 minutes)

- Define and classify Neisseria.
- Describe morphology, culture characteristics and virulence factors.
- Differentiate Neisseria gonorrhoeae and Neisseria meningitidis.
- Explain pathogenesis and clinical manifestations.
- Describe laboratory diagnosis, treatment, prevention and vaccination.

List of Content (Mentioned in Curriculum)

- Introduction and classification
- Morphology and culture characteristics
- Virulence factors
- Neisseria gonorrhoeae
- Neisseria meningitidis
- Pathogenesis and clinical manifestations
- Laboratory diagnosis
- Treatment
- Prevention and vaccination
- Comparison of N. gonorrhoeae and N. meningitidis

Introduction: 5 minutes

Session Discussion: 20 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 5 minutes

Assessment: 5 minutes

Conclusion: 5 minutes (Take-home message and evaluation by students)

Date & time:

Venue: Tutorial Class
Room

Duration: 1 hour

**Department of Microbiology
Comilla Medical College**

Lesson plan for small group teaching (tutorial)

Topic: Bacillus

Learning objectives: (5 mins)

- Describe morphology and classification of Bacillus.
- Explain pathogenesis and virulence factors of B. anthracis and B. cereus.
- Discuss laboratory diagnosis, treatment and prevention.

List of content: Mentioned in curriculum

- Introduction to Bacillus
- Morphology & culture
- B. anthracis: virulence, clinical features, diagnosis, treatment, prevention
- B. cereus food poisoning
- Summary

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Interactive discussion: 10 min

Feedback: 5 min

Assessment: 5 min

Conclusion: 5 min (Take-home message, evaluation by students)

Date & time:

Venue: Tutorial Class
Room

Duration: 1 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Clostridium and Other Anaerobes

Learning Objectives (10 minutes)

- Define anaerobic bacteria and classify medically important anaerobes.
- Describe morphology, culture characteristics and virulence factors of Clostridium species.
- Differentiate C. tetani, C. botulinum, C. perfringens and C. difficile.
- Explain diseases caused by Clostridium and other clinically important anaerobes.
- Describe laboratory diagnosis, treatment and prevention of anaerobic infections.

List of Content (Mentioned in Curriculum)

- Introduction to anaerobic bacteria
- Classification of anaerobes
- Morphology and culture characteristics
- Clostridium tetani
- Clostridium botulinum
- Clostridium perfringens
- Clostridioides difficile
- Other anaerobes (Bacteroides, Fusobacterium)
- Laboratory diagnosis
- Treatment and prevention

Introduction: 5 minutes

Session Discussion: 20 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 5 minutes

Assessment: 5 minutes

Conclusion: 5 minutes (Take-home message and evaluation by students)

Date & time:

Venue: Tutorial Class
Room

Duration: 1 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Enterobacteriaceae

Learning Objectives (10 minutes)

- Define Enterobacteriaceae and describe their general characteristics.
- Classify medically important members of Enterobacteriaceae.
- Describe morphology, culture characteristics and biochemical properties.
- Explain pathogenesis and diseases caused by Escherichia coli, Klebsiella, Salmonella, Shigella, Proteus and Yersinia.
- Describe laboratory diagnosis, antimicrobial resistance, treatment and prevention.

List of Content (Mentioned in Curriculum)

- Introduction and classification
- General characteristics
- Morphology and culture characteristics
- Virulence factors
- Escherichia coli
- Klebsiella
- Salmonella
- Shigella
- Proteus
- Laboratory diagnosis
- Antimicrobial resistance
- Treatment and prevention

Introduction: 10 minutes

Session Discussion: 40 minutes

Group Discussion: 20 minutes

Interactive Discussion: 10 minutes

Feedback: 15 minutes

Assessment: 10 minutes

Conclusion: 5 minutes (Take-home message and evaluation by students)

Date & time:

Venue: Tutorial Class
Room

Duration: 2 hours

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Spirochetes

Learning objectives: (5 mins)

- Describe the morphology and classification of spirochetes.
- Compare Treponema, Borrelia and Leptospira.
- Explain clinical features, laboratory diagnosis, treatment and prevention of important spirochetal diseases.

List of content: (Mentioned in curriculum)

- Introduction and general characteristics
- Treponema pallidum (syphilis)
- Leptospira interrogans (leptospirosis)
- Borrelia recurrentis/Borrelia spp.
- Laboratory diagnosis
- Treatment and prevention

Introduction: 5 min

Session discussion: 20 min

Group discussion: 10 min

Interactive discussion: 10 min

Feedback: 5 min

Assessment: 5 min

Conclusion: 5 min (Take-home message, evaluation by students)

Date & time:

Venue: Tutorial Class
Room

Duration: 1 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Haemophilus, Nocardia, Actinomycetes,
Helicobacter pylori & Campylobacter jejuni

Date & time:

Venue: Tutorial Class
Room

Duration: 2 hours

Learning objectives: (10 mins)

- Describe morphology and important characteristics.
- Explain pathogenesis, clinical manifestations and laboratory diagnosis.
- Discuss treatment and preventive measures of infections caused by these organisms.

List of content: (Mentioned in curriculum)

- Haemophilus influenzae
- Nocardia
- Actinomycetes (Actinomyces)
- Helicobacter pylori
- Campylobacter jejuni
- Laboratory diagnosis
- Treatment and prevention

Introduction: 10 min

Session discussion: 40 min

Group discussion: 20 min

Interactive discussion: 10 min

Feedback: 15 min

Assessment: 10 min

Conclusion: 5 min (Take-home message, evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Vibrio cholerae

Learning Objectives (10 minutes)

- Define Vibrio cholerae and describe its classification.
- Describe morphology, culture characteristics and antigenic structure.
- Explain the pathogenesis and clinical features of cholera.
- Describe laboratory diagnosis and management of cholera.
- Discuss prevention, control and oral cholera vaccines.

List of Content (Mentioned in Curriculum)

- Introduction and classification
- Morphology and culture characteristics
- Biochemical characteristics
- Antigenic structure and virulence factors
- Pathogenesis
- Clinical manifestations
- Laboratory diagnosis
- Treatment
- Prevention and control
- Oral cholera vaccines

Introduction: 5 minutes

Session Discussion: 20 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 5 minutes

Assessment: 5 minutes

Conclusion: 5 minutes (Take-home message and evaluation by students)

Date & time:

Venue: Tutorial Class
Room

Duration: 2 hour

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Rickettsia, Chlamydia and Mycoplasma

Learning objectives: (10 mins)

- Describe the morphology and characteristics of Rickettsia, Chlamydia and Mycoplasma.
- Explain pathogenesis, clinical features and laboratory diagnosis.
- Discuss treatment and prevention of important infections.

List of content: Mentioned in curriculum

- General characteristics
- Rickettsia
- Chlamydia
- Mycoplasma
- Laboratory diagnosis
- Treatment and prevention

Introduction: 10 min

Session discussion: 40 min

Group discussion: 20 min

Interactive discussion: 10 min

Feedback: 15 min

Assessment: 10 min

Conclusion: 5 min (Take-home message, evaluation by students)

Date & time:

Venue: Tutorial Class
Room

Duration: 2 hours

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Introduction to Mycology

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students.

Field	Detail
Year	MBBS 4th Year
Topic	Introduction to Mycology
Duration	60 minutes
Format	Lecture Class
Prerequisites	General Microbiology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

- Define medical mycology and classify medically important fungi.
- Describe morphology and structure of fungi.
- Differentiate yeasts, molds and dimorphic fungi.
- Explain fungal reproduction and laboratory diagnosis.
- Outline common fungal diseases and their significance.

Content Outline and Time Allocation

Content	Time
Clinical image/case; importance of medical mycology	0–5
Definition; classification of fungi	5–10
Morphology, structure, yeasts, moulds, dimorphic fungi, reproduction	10–25
Medically important fungi; host factors; routes of infection	25–40
Specimens, KOH mount, Gram stain, SDA, LPCB mount, identification	40–55
Key messages, questions, next topic	55–60
Case-based discussion	0–5
Key messages and questions	5–10

Resources

- PowerPoint slides
- Clinical photographs
- Whiteboard

Assessment

- Formative: Interactive questioning
- Summative: 2–3 MCQs

Assignment

- Write a short note on dimorphic fungi.

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Antifungal Agents and Antifungal Drug Resistance

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students.

Field	Detail
Year	MBBS 4th Year
Topic	Antifungal Agents and Antifungal Drug Resistance
Duration	120 minutes
Format	Lecture Class
Prerequisites	Introduction to Mycology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

- Classify antifungal agents.
- Explain mechanisms of action and clinical uses.
- Discuss adverse effects.
- Describe antifungal drug resistance.
- Explain antifungal susceptibility testing and stewardship.

Content Outline and Time Allocation

Content	Time
Clinical case	0–10
Classification	10–20
Polyenes, Azoles, Echinocandins	20–45
Allylamines, Flucytosine, others	45–65
Mechanisms	65–85
AFST, MIC, stewardship	85–105
Case discussion	105–115
Take-home messages	115–120

Resources

- PowerPoint slides
- Clinical photographs
- Whiteboard

Assessment

- Formative: Interactive questioning
- Summative: MCQs/SAQs

Assignment

- Compare antifungal classes.
- Short note on azole resistance.
- Read next topic: Rhinosporidiosis and Madura foot.

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Superficial and Cutaneous Mycoses

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students.

Field	Detail
Year	MBBS 4th Year
Topic	Superficial and Cutaneous Mycoses
Duration	60 minutes
Format	Lecture Class
Prerequisites	Introduction to Mycology
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

- Classify superficial and cutaneous mycoses.
- Describe etiologic agents and clinical features.
- Explain laboratory diagnosis.
- Discuss treatment and prevention.
- Differentiate superficial from cutaneous mycoses.

Content Outline and Time Allocation

Content	Time
Clinical images and importance	0–5
Definitions, classification	5–10
Pityriasis versicolor, tinea nigra, black/white piedra	10–25
Dermatophytes: Trichophyton, Microsporum, Epidermophyton; tinea infections	25–40
Specimens, KOH mount, Wood's lamp, SDA, LPCB	40–55
Treatment, prevention, key messages	55–60
Case discussion	0–5
Take-home messages	5–10

Resources

- PowerPoint slides
- Clinical photographs
- Whiteboard
- Fungal culture images

Assessment

- Formal oral questions and MCQs.

Assignment

- Compare superficial and cutaneous mycoses. Read: Subcutaneous mycoses.

**Department of Microbiology
Comilla Medical College**

Lesson plan for large group teaching (Lecture)

Topic: Subcutaneous Mycoses (Rhinosporidiosis and Madura Foot)

This lesson plan is designed for a 120-minute lecture for 4th-year MBBS students.

Field	Detail
Year	MBBS 4th Year
Topic	Subcutaneous Mycoses (Rhinosporidiosis and Madura Foot)
Duration	120 minutes
Format	Lecture Class
Prerequisites	Superficial & Cutaneous Mycoses
Venue	Lecture Gallery
Date and Time	
Teacher	

Learning Objectives

- Classify subcutaneous mycoses.
- Describe etiology, pathogenesis and clinical features of rhinosporidiosis and Madura foot.
- Explain laboratory diagnosis.
- Discuss treatment and prevention.
- Differentiate eumycetoma and actinomycetoma.

Content Outline and Time Allocation

Content	Time
Clinical photographs/case scenario	0–10
Definition, classification of subcutaneous mycoses	10–20
Rhinosporidiosis: etiology, epidemiology, pathogenesis, clinical features	20–45
Laboratory diagnosis, treatment and prevention of rhinosporidiosis	45–70
Madura foot (eumycetoma): etiology, pathogenesis, clinical features	70–95
Diagnosis, grains, KOH, histopathology, culture, differentiation from actinomycetoma	95–110
Case-based discussion	110–115
Key messages and questions	115–120

Resources

- Multimedia projector and PowerPoint slides
- Whiteboard and markers
- Clinical photographs
- Relevant microbiology textbooks

Assessment

- Oral questioning during lecture
- MCQs at the end of class

Assignment

- Differentiate rhinosporidiosis and Madura foot.

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Rhinosporidiosis and Madura Foot

Date & time:

Venue: Tutorial Class
Room

Duration: 1 hour

Learning Objectives (5 minutes)

- Describe etiology and epidemiology.
- Explain pathogenesis and clinical features.
- Discuss laboratory diagnosis.
- Outline treatment and prevention.

List of Content (Mentioned in Curriculum)

- Rhinosporidiosis: agent, transmission, clinical features
- Laboratory diagnosis
- Treatment and prevention
- Madura foot (Eumycetoma): etiology, clinical features
- Diagnosis, treatment and prevention
- Differentiation from actinomycetoma

Introduction: 5 minutes

Session Discussion: 20 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 5 minutes

Assessment: 5 minutes

Conclusion: 5 minutes (Take-home message and evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (tutorial)

Topic: Antifungal agents and antifungal drug resistance

Date & time:

Venue: Tutorial Class Room

Duration: 1 hour

Learning Objectives (5 minutes)

- Classify antifungal agents.
- Describe mechanism of action, spectrum and adverse effects.
- Explain mechanisms of antifungal drug resistance.
- Discuss rational antifungal use.

List of Content (Mentioned in Curriculum)

- Classification
- Polyenes, Azoles, Echinocandins, Allylamines, Flucytosine
- Mechanism of action
- Clinical uses and adverse effects
- Drug resistance: mechanisms, laboratory detection, prevention

Introduction: 5 minutes

Session Discussion: 20 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 5 minutes

Assessment: 5 minutes

Conclusion: 5 minutes (Take-home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Date & time:

Venue: Tutorial room

Duration: 2 hours

Topic: Gram staining (General Bacteriology)

Introduction and attendance collection: 10 mins

Learning Objectives

- Explain the principle of Gram staining.
- Perform Gram staining correctly.
- Differentiate Gram-positive and Gram-negative bacteria.
- Interpret staining results accurately.

Demonstration of Gram Staining Procedure: 30 mins

Student Practical Session: 35 mins

Checklist

- Prepare smear correctly
- Heat fix properly
- Perform crystal violet, iodine, decolorizer and safranin steps correctly
- Focus microscope properly
- Identify Gram-positive and Gram-negative bacteria correctly

Group discussion: 10 mins

Interactive discussion: 10 mins

Feedback: 05 mins

Assessment: 10 mins

Conclusion: 10 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: AFB staining (General Bacteriology)

Date & time:

Venue: Tutorial room

Duration: 2 hours

Introduction and attendance collection: 10 mins

Learning Objectives

- Explain the principle of Ziehl-Neelsen AFB staining.
- Prepare and stain a smear correctly.
- Identify acid-fast bacilli under the microscope.
- Interpret and report AFB staining results.

Demonstration of AFB Staining Procedure: 30 mins

Student Practical Session: 35 mins

Checklist

- Proper smear preparation
- Correct staining technique
- Correct microscope focusing
- Identification of AFB
- Accurate reporting

Group discussion: 10 mins

Interactive discussion: 10 mins

Feedback: 05 mins

Assessment: 10 mins

Conclusion: 10 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Demonstration of Culture Media (General Bacteriology)

Date & time:

Venue: Microbiology
Laboratory

Duration: 3 hours

Introduction and attendance collection: 10 mins

Learning Objectives

- Define culture media and explain its importance.
- Classify different types of culture media.
- Identify commonly used culture media and their applications.
- Demonstrate preparation and handling of culture media.
- Explain storage and quality control.

Checklist

- Properly identified different culture media.
- Explained the use of each medium.
- Demonstrated aseptic handling.
- Identified selective, differential and enriched media.
- Maintained laboratory safety.

Demonstration session: 60 mins

Hands-on practical: 60 mins

Group discussion: 10 mins

Interactive discussion: 10 mins

Feedback: 10 mins

Assessment: 10 mins

Conclusion: 10 mins (Take home message, evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Demonstration of Colony Morphology (General Bacteriology)

Date & time:

Venue: Microbiology
Laboratory

Duration: 1 hour

Introduction and attendance collection: 10 mins

Learning Objectives

- Describe the characteristics of bacterial colonies.
- Identify colony size, shape, margin, elevation, surface, pigment and opacity.
- Differentiate common colony morphologies on culture media.
- Interpret colony morphology for presumptive identification.

Checklist

- Observed colony morphology correctly.
- Identified colony characteristics accurately.
- Handled culture plates safely using aseptic technique.
- Recorded observations correctly.

Session Discussion: 10 mins

Group discussion: 10 mins

Interactive discussion: 10 mins

Feedback: 05 mins

Assessment: 10 mins

Conclusion: 05 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Date & time:

Venue: Tutorial room

Duration: 2 hours

Topic: Gram staining (Systemic Bacteriology)

Introduction and attendance collection: 10 mins

Learning objectives:

- Explain the principle of Gram staining.
- Prepare and stain a bacterial smear correctly.
- Differentiate Gram-positive and Gram-negative bacteria.
- Interpret microscopic findings accurately.

Checklist:

- Prepared smear correctly.
- Performed heat fixation safely.
- Applied crystal violet, iodine, decolorizer and safranin correctly.
- Observed stained smear under oil immersion.
- Reported Gram reaction correctly.

Demonstration session: 30 mins

Hands-on practical: 30 mins

Session discussion: 15 mins

Interactive discussion: 10 mins

Feedback: 05 mins

Assessment: 10 mins

Conclusion: 10 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: AFB staining (Systemic Bacteriology)

Date & time:

Venue: Tutorial room

Duration: 2 hours

Introduction and attendance collection: 10 mins

Learning objectives

- Explain the principle of AFB staining.
- Demonstrate the Ziehl–Neelsen staining procedure.
- Identify acid-fast bacilli under the microscope.
- Interpret positive and negative staining results.
- Follow laboratory biosafety practices.

Checklist

- Prepared and labelled smear correctly
- Performed heat fixation safely
- Applied staining reagents in correct order
- Focused microscope correctly
- Identified AFB accurately and recorded findings

Demonstration: 30 mins

Hands-on practical: 30 mins

Group discussion: 15 mins

Interactive discussion: 10 mins

Feedback: 05 mins

Assessment: 10 mins

Conclusion: 10 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Demonstration of Culture Media (Systemic Bacteriology)

Date & time:

Venue: Microbiology
Laboratory

Duration: 2 hours

Introduction and attendance collection: 10 mins

Learning objectives

- Define culture media and its importance.
- Identify common types of culture media.
- Demonstrate preparation and use of basic culture media.
- Recognize applications of different media in systemic bacteriology.

Checklist

- Identified different culture media correctly.
- Handled media aseptically.
- Explained the purpose of each medium.
- Observed colony growth on demonstrated media.

Demonstration: 40 mins

Group discussion: 20 mins

Interactive discussion: 15 mins

Feedback: 10 mins

Assessment: 15 mins

Conclusion: 05 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Demonstration of Colony Morphology (Systemic Bacteriology)

Date & time:

Venue: Microbiology
Laboratory

Duration: 2 hours

Introduction and attendance collection: 10 mins

Learning objectives

- Describe the characteristics of bacterial colonies.
- Identify colony size, shape, margin, elevation, surface, pigment and hemolysis.
- Differentiate common bacterial colonies on culture media.
- Interpret colony morphology for presumptive identification.

Checklist

- Student properly observes colony morphology.
- Student identifies colony characteristics correctly.
- Student differentiates colony types accurately.
- Student records findings appropriately.

Demonstration: 35 min

Group discussion: 20 mins

Interactive discussion: 20 mins

Feedback: 10 mins

Assessment: 15 mins

Conclusion: 10 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Demonstration of Different Biochemical Tests for Systemic Bacteriology

Date & time:

Venue: Microbiology Laboratory

Duration: 4 hours

Introduction and attendance collection: 10 mins

Learning objectives

- Explain the principles of common biochemical tests.
- Demonstrate Catalase, Oxidase, Indole, Citrate, Urease, TSI and Motility tests.
- Interpret biochemical test results for bacterial identification.
- Correlate biochemical reactions with common pathogenic bacteria.

Checklist

- Performed tests using aseptic technique.
- Handled reagents correctly.
- Observed and recorded reactions accurately.
- Interpreted results correctly.

Demonstration: 60 mins

Hands-on practice: 60 mins

Group discussion: 30 mins

Interactive discussion: 30 mins

Feedback: 10 mins

Assessment: 30 mins

Conclusion: 10 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Preparation of Disinfectants

Date & time:

Venue: Microbiology
Laboratory

Duration: 1 hour

Introduction and attendance collection: 10 mins

Learning Objectives

- Define disinfectants and their uses.
- Prepare commonly used disinfectant solutions at correct concentrations.
- Demonstrate safe handling and labeling.
- Explain storage and disposal.

Checklist

- Selected correct disinfectant.
- Calculated dilution correctly.
- Prepared solution accurately.
- Used PPE.
- Labeled container properly.

Demonstration session: 10 mins

Group discussion: 10 mins

Interactive discussion: 10 mins

Feedback: 05 mins

Assessment: 10 mins

Conclusion: 05 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Demonstration of Inoculation, Incubation and Plate Reading (Disk Diffusion Method)

Date & time:

Venue: Microbiology
Laboratory

Duration: 4 hours

Introduction and attendance collection: 10 mins

Learning Objectives

- Explain the principle of inoculation, incubation and Kirby–Bauer disk diffusion method.
- Demonstrate correct inoculation of culture media.
- Describe proper incubation conditions.
- Interpret antibiotic susceptibility by measuring inhibition zones.
- Follow aseptic techniques and biosafety precautions.

Checklist

- Prepared work area using aseptic technique.
- Correctly inoculated Mueller-Hinton agar plate.
- Placed antibiotic discs appropriately.
- Labeled and incubated plates correctly.
- Measured zones of inhibition accurately.
- Interpreted results according to standard guidelines.

Demonstration of inoculation: 60 mins

Demonstration of incubation: 30 mins

Plate reading and interpretation (Disk Diffusion): 60 mins

Group discussion: 30 mins

Interactive discussion: 20 mins

Feedback: 10 mins

Assessment: 20 mins

Conclusion: 10 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Preparation of Disinfectants

Date & time:

Venue: Microbiology
Laboratory

Duration: 1 hour

Introduction and attendance collection: 10 mins

Learning Objectives

- Define disinfectants and their uses.
- Prepare commonly used disinfectant solutions at correct concentrations.
- Demonstrate safe handling and labeling.
- Explain storage and disposal.

Checklist

- Selected correct disinfectant.
- Calculated dilution correctly.
- Prepared solution accurately.
- Used PPE.
- Labeled container properly.

Demonstration session: 10 mins

Group discussion: 10 mins

Interactive discussion: 10 mins

Feedback: 05 mins

Assessment: 10 mins

Conclusion: 05 mins (Take home message, evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Date & time:

Venue: Tutorial room

Duration: 1 hour

Topic: Examination of Bone Marrow Smear for LD Body

Introduction and attendance collection: 10 mins

Learning Objectives

- Identify LD (Leishman-Donovan) bodies in bone marrow smear.
- Describe the morphology of LD bodies.
- Examine bone marrow smear under the microscope correctly.
- Interpret findings and correlate with visceral leishmaniasis.

Checklist

- Placed the slide correctly under the microscope.
- Adjusted focus properly.
- Identified LD bodies with at least two identifying features.
- Interpreted the findings correctly.

Session Discussion: 10 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 05 minutes

Assessment : 10 minutes

Conclusion : 05 minutes (Take home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Date & time:

Venue: Tutorial room

Duration: 1 hour

Topic: Examination of Blood Smear for Demonstration of Malarial Parasites

Introduction and attendance collection: 10 mins

Learning Objectives

- Prepare and examine thick and thin blood smears.
- Identify malarial parasites under the microscope.
- Differentiate Plasmodium species based on morphology.
- Interpret blood smear findings correctly.

Checklist

- Student properly placed the slide under microscope.
- Student properly focused the smear.
- Identified malarial parasite with two identifying features.
- Reported findings correctly.

Session Discussion: 10 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 05 minutes

Assessment : 10 minutes

Conclusion : 05 minutes (Take home message and evaluation by students)

Department of Microbiology Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Demonstration of PCR and RT-PCR

Date & time:

Venue: Tutorial room

Duration: 1 hour

Introduction and attendance collection: 10 mins

Learning Objectives

- Explain the principle of PCR and RT-PCR.
- Identify major components of PCR.
- Describe amplification steps.
- Interpret basic PCR/RT-PCR results.

Checklist

- Student identified PCR components.
- Student explained denaturation, annealing and extension.
- Student differentiated PCR from RT-PCR.
- Student interpreted result correctly.

Session Discussion: 10 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 05 minutes

Assessment : 10 minutes

Conclusion : 05 minutes (Take home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Date & time:

Venue: Tutorial room

Duration: 1 hour

Topic: Microscopic Examination of Skin Scraping

Introduction and attendance collection: 10 mins

Learning Objectives

- Understand the indications for skin scraping examination.
- Demonstrate proper collection and preparation of skin scrapings.
- Identify fungal elements (hyphae/yeast) under the microscope.
- Interpret microscopic findings and correlate with clinical diagnosis.

Checklist

- Student properly prepared the slide.
- Student correctly focused and adjusted the microscope.
- Student identified fungal elements correctly.
- Student interpreted the microscopic findings accurately.

Session Discussion: 10 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 05 minutes

Assessment : 10 minutes

Conclusion : 05 minutes (Take home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Microscopic Examination of Stool

Date & time:

Venue: Tutorial room

Duration: 4 hours

Introduction and attendance collection: 10 mins

Learning Objectives

- Collect and handle stool specimens correctly.
- Prepare normal saline and iodine wet mounts.
- Identify ova, cysts, trophozoites, larvae, yeast cells, RBCs, WBCs and fat globules.
- Interpret microscopic findings.

Checklist

- Proper specimen collection and labeling.
 - Correct wet mount preparation.
 - Proper microscope focusing.
 - Correct identification with two identifying features.
 - Accurate interpretation and biosafety.
- Demonstration of Procedure:** 60 minutes

Hands-on Practical Session: 90 minutes

Session Discussion: 20 minutes

Group Discussion: 20 minutes

Interactive Discussion: 20 minutes

Feedback: 10 minutes

Assessment : 30 minutes

Conclusion : 10 minutes (Take home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Microscopic examination of Urine

Date & time:

Venue: Tutorial room

Duration: 2 hours

Introduction and attendance collection: 10 mins

Learning Objectives

- Describe the physical, chemical and microscopic examination of urine.
- Identify RBCs, WBCs, epithelial cells, casts, crystals, bacteria, yeast and parasites.
- Interpret normal and abnormal urinary sediment findings.
- Correlate microscopic findings with common urinary tract diseases.

Checklist

- Proper collection and mixing of urine sample
- Correct preparation of urine sediment
- Proper microscope focusing
- Correct identification of urinary elements
- Accurate interpretation and reporting

Demonstration: 30 min

Hands-on practical: 30 min

Group Discussion: 15 minutes

Interactive Discussion: 10 minutes

Feedback: 10 minutes

Assessment : 05 minutes

Conclusion : 10 minutes (Take home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Date & time:

Venue: Tutorial room

Duration: 1 hour

Topic: Examination of Sputum and Urine by Ziehl–Neelsen (Z-N) Stain

Introduction and attendance collection: 10 mins

Learning Objectives

- Explain the principle of Z-N stain
- Demonstrate staining of sputum and urine smears
- Identify acid-fast bacilli under microscope
- Interpret positive and negative findings

Checklist

- Prepared smear correctly
- Performed Z-N staining correctly
- Focused microscope properly
- Identified AFB correctly
- Reported findings accurately

Session Discussion: 10 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 05 minutes

Assessment : 10 minutes

Conclusion : 05 minutes (Take home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Examination of Throat Swab

Date & time:

Venue: Tutorial room

Duration: 1 hour

Introduction and attendance collection: 10 mins

Learning Objectives

- Collect throat swab specimen correctly
- Prepare and examine Gram stained smear
- Identify common bacteria from throat swab
- Interpret findings and maintain biosafety

Checklist

- Proper specimen handling
- Correct smear preparation
- Proper microscope focusing
- Correct identification and interpretation

Session Discussion: 10 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 05 minutes

Assessment : 10 minutes

Conclusion : 05 minutes (Take home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Topic: Demonstration of Donning and Doffing

Date & time:

Venue: Tutorial room

Duration: 1 hour

Introduction and attendance collection: 10 mins

Learning Objectives

- Demonstrate correct sequence of donning PPE
- Demonstrate correct sequence of doffing PPE
- Prevent self-contamination during PPE removal
- Follow standard infection prevention and control practices

Checklist

- Performed hand hygiene correctly
- Wore gown, mask, eye protection and gloves in correct order
- Removed PPE in correct order without contamination
- Disposed PPE appropriately and performed hand hygiene

Session Discussion: 10 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 05 minutes

Assessment : 10 minutes

Conclusion : 05 minutes (Take home message and evaluation by students)

Department of Microbiology

Comilla Medical College

Lesson plan for small group teaching (Practical)

Date & time:

Venue: Tutorial room

Duration: 1 hour

Topic: Demonstration of Disposal of Medical Waste

Introduction and attendance collection: 10 mins

Learning Objectives

- Classify medical waste.
- Demonstrate proper segregation using color-coded containers.
- Describe safe collection, transport and disposal methods.
- Explain infection prevention and biosafety during waste handling.

Checklist

- Correctly identified medical waste categories.
- Used appropriate color-coded bins.
- Demonstrated safe handling with PPE.
- Explained final disposal methods correctly.

Session Discussion: 10 minutes

Group Discussion: 10 minutes

Interactive Discussion: 10 minutes

Feedback: 05 minutes

Assessment : 10 minutes

Conclusion : 05 minutes (Take home message and evaluation by students)