Mansoura University
Faculty of Medicine

Log Book

Microbiology Department

2016 - 2017

ختم القسم

إيصال تسليم Log Book

اسم الطالب : .....

الفرقة : .....

رقم الجلوس : .....

تاريخ التسليم : .....

توقيع المستلم : .....

رسالــة الكلــية

"تقديم مستوى عال التميز فى التعليم والتدريب الطبى
وتقديم خدمات صحية متميزة للمجتمع
عن طريق المراكز الطبية المتخصصة
وكذلك الإرتقاء بالبحث العلمى"

رؤيــة الكلــية

"أن نصنف إقليميا ونحقق التميز فى التعليم الطبى
والبحوث وخدمة المجتمع"

Course Specifications 2015-2016

Faculty: Medicine

Department: Medical microbiology and immunology

Course Specifications

Programme(s) on which the course is given:	MBBCH
Major or minor element of programme:	Major element
Department offering the programme:	Medical Microbiology and Immunology department
Department offering the course:	Medical Microbiology and Immunology department
Academic year / level:	Third
Date of specification approval:	3/2016

A- Basic information:

Title: Medical Microbiology and Immunology course for undergraduate students

Code: MIC Lectures: 90 h Tutorial/Practical: 60 h Total: 150 h

B- Professional Information:

1- Overall Aims of Course:

This course helps the student to aquire knowledge and skills in the field of medical microbiology and immunology and whether to be integrated with clinical application.

2- Intended Learning Outcomes of Course (ILOs):

a- Knowledge and Understanding:

a1- Illustrate general microbial morphology, physiology and genetics.
a2- Review the host parasite relationship and microbial pathogenesis.
a3- Describe the physiology of the immune system, its beneficial role, as well as its detrimental role in immunopathology.
a4- Recognize the most important infectious clinical conditions and outline the diagnosis, treatment and its preventive measures.
a5- Identify the morphology, culture character, antigenic structure and virulence factors of microorganisms of medical importance.
a6- Discuss the most important methods of decontamination and principles of infection control
a7- Recognize the basics of antimicrobial uses and resistance.
a8- List the uses of molecular technology in microbiology and immunology.

b- Intellectual Skills:

b1- Interpret results of microbiological, serological and molecular tests
b2- Formulate a systematic approach for laboratory diagnosis of common infectious clinical conditions and select the most appropriate tool to the identification of the causative organism.
b3- Evaluate the causal relationship of microbes and diseases.
b4- Categorize a microorganism as a bacterium, virus or fungus according to standard taxonomy.

c- Professional and Practical Skills:

c1- Illustrate medically important bacteria based on microscopic examination of stained preparations.
c2- Perform a Gram stain and a Ziehl-Neelsen stain and demonstrate the organism , according to morphology and characteristics of stained preparations.
c3- Elicit culture media ,biochemical tests and serological tests commonly used for bacterial identification and distinguish positive and negative results.
c4- Practice hand wash and apply different methods of physical and chemical methods of sterilization and infection control.

d- General and Transferable Skills:

d1- Work productively in a team.

3- Contents:

Topic	No. of hours	Lectures	Tutorial/Practical
Microbial Genetics: • Bacterial genetics, gene cloning. epigenetic. • Viral, fungal genetics.	17.5	13.5	4
Immunology: • Components of the immune system. • Innate immunity, complement. • Acquired immunity (humoral and cell mediated). • Tumour immunology. • Hypersensitivity, autoimmunity. • Transplantation immunology. • Important antigen-antibody reactions. • Immunodeficiency.	17.5	13.5	4
Bacteriology: ***a) General Bacteriology:*** • Morphology and structure of bacteria. • Classification of bacteria. • Bacterial physiology and growth. • General methods for identification of bacteria. • Antimicrobial Chemotherapy. ***b) Systematic Bacteriology:*** • Staphylococci, Streptococci, Neisseriae. • Corynebacterium, *Listeria.* • Actinomycetes, *Bacteroides.* • *Bacillus, Clostridium.* • *Mycobacterium,* Enterobacteriaceae. • *Vibrio, Pseudomonas, Yersinia.* • *Hemophilus, Bordetella, Brucella.* • Legionellae, Mycoplasma, Spirochaetes. • Rickettsiae and Chlamydiae ***c) Clinical Microbiology***	60.5	22.5	38

Medical Mycology.	17.5	13.5	4
Medical virology: ***a) General virology.*** ***b) Systematic virology:*** • Picornaviruses. • Arthropod-borne and rodent-borne viruses. • Reoviruses, Rotaviruses. • Orthomyxoviruses, Paramyxoviruses. • Rubella virus, Rabies virus. • Retroviruses, Adenoviruses. • Herpesviruses, Poxviruses, Parvoviruses. • Hepatitis viruses, tumour viruses. • Oncogenic viruses.	22	18	4
Nosocomial infections	11	9	2
Practical revision	4		4
Total	150	90	60

PRACTICAL CLASSES / SMALL GROUP SESSIONS:

1. Staining by Gram stain and Ziehl-Neelsen stain.
2. Sterilization: autoclave, hot air oven, bacteriological filters and chemical disinfectants.
3. Culture media: commonly used media such as nutrient agar, blood agar, MacConkey medium, Loffler's medium, Lowenstein-Jensen medium, anaerobic culture media, TCBS, triple sugar iron agar.
4. Biochemical Reactions: sugar fermentation tests, indole test, MR test, VP test, tests for enzyme production (catalase, coagulase, urease).
5. Serological Tests: slide agglutination, tube agglutination, single radial immunodiffusion, double diffusion (Elek's test), toxin-antitoxin neutralization (ASOT).
6. Slides: *Staphylococcus*, Streptococci, Peumococci in tissues, *Neisseria*, *Mycobacterium Tuberculosis*, *M. leprae*, *Bacillus anthracis*, *Clostridium tetani*, *C. diphtheriae*, Diphtheroids, Gram-negative bacilli, *Klebsiella* in culture, *Spirochaetes*, *Candida albicans*, mixtures.
7. Hand Wash.
8. Case studies: systematic approach, formulation of investigation of work-up and lines of management.
9. Microbiological (serological and molecular) test results and reports for analysis and commenting.

Topics	ILOs																
	Knowledge and Understanding								Intellectual Skills				Professional and Practical Skills				General and Transferable Skills
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	c1	c2	c3	c4	d1
Microbial Genetics	√	√					√	√				√	√	√	√	√	
Immunology			√							√							
Bacteriology	√	√		√	√		√	√	√	√	√	√	√	√	√	√	√
Medical Mycology	√	√		√	√		√			√	√	√					
Medical virology	√	√		√	√		√		√	√	√	√			√		
Nosocomial infections						√	√									√	√

4- Teaching and Learning Methods:

4.1- Lectures.
4.2- Practical classes.
4.3- Small group discussion.
4.4- Self assignment, Bureau hour (Tutorial).

STUDENT ASSESSEMENT:

Attendance Criteria:
Students should attend no less than 75 % of practical classes and/or small group sessions as an essential prerequisite to be legible for the final exams.

5 – Student Assessment Methods:

Method of student assessment	ILOs																
	Knowledge and Understanding								Intellectual Skills				Professional and Practical Skills				General and Transferable Skills
	a1	a2	a3	a4	a5	a6	a7	a8	b1	b2	b3	b4	c1	c2	c3	c4	d1
Mid-term (quizzes)/Term exam	√	√	√	√	√	√	√	√	√	√	√	√					
Final written exam	√	√	√	√	√	√	√	√	√	√	√	√					
Final structured practical exam (OSPE)	√			√	√	√	√		√	√			√	√	√	√	
Final structured oral exam	√	√	√	√	√	√	√	√	√	√	√	√					
Log book																√	√
Quizzes													√	√	√		

Assessment Schedule:

Assessment 1	Term exam	January
Assessment 2	Quizzes (Midterm)	6th week in the 1st term and the 2nd term
Assessment 3	Final written exam	at the end of the year
Assessment 4	Logbook	delivered at the end of the year
Assessment 5	OSPE	at the end of the year
Assessment 6	structured oral	at the end of the year

Weighting of Assessments:

Midterm 1 Quiz	2.5 marks
Midterm exam	30 marks
Midterm 2 Quiz	2.5 marks
Log book	5 marks
OSPE	40 marks
Final written exam	100 marks
Final structured oral exam	20 marks
Total	200 marks

6- List of References:

6.1- Course Notes,Handouts of lectures, Lectures in powerpoint presentations.

6.2- Essential Books (Text Books):-

Department theoretical books and practical manual: available for students to purchase from different bookshops at the faculty, 2010-2011.

6.3- Recommended Books:-

- JAWETZ, Melnick and Adelbergs Medical Microbiology, 2006.
- Zinsser Microbiology, 2001.
- Color atlas of microbiology, Koneman, 2006

6.4- Periodicals, Web Sites, …etc:-

- Journal of Medical Microbiology.
- Journal of Hospital Infection.
- Biology Web Site References:
  - www.asm.com.
  - http://www.microbe.org/microbes/virus_or_bacterium.asp
  - http://pathmicro.med.sc.edu/book/virol-sta.html.
  - http://www.microbelibrary.org/
  - http://www.tulane.edu/~dmsander/Big_Virology/BVHomePage.html
  - http://www.biology.arizona.edu/immunology/microbiology_immunology.html.

7- Facilities Required for Teaching and Learning:

• Lecture halls.
• Data shows & computer assistance.
• Laboratories (with sinks).
• Microscopes.

Course Coordinator : Dr. Dalia M. Moemen

Head of Department Prof. Dr. Mohammed Abou Elela
:

جدول المواصفات لمادة Microbiology & Immunology الدور الأول لعام ٢٠١٥-٢٠١٦

الموضوعات	الأسئلة والدرجات	نوعية الأسئلة					مجموع الأسئلة	مجموع الدرجات	الأوزان النسبية للموضوعات
		MCQ	OSPE	Oral	Short essay	Attendance			
Bacteriology	الأسئلة	١٢	١٠	٥	٥			٦٠	%٣٠
	الدرجة	١٢	١٠	١٠	٢٥				
Genetics	الأسئلة	٨	٣	١	٣			٣٠	%١٥
	الدرجة	٨	٣	٢	١٥				
Immunology	الأسئلة	١٠	٨	١	٣			٣٠	%١٥
	الدرجة	١٠	٨	٢	١٥				
Mycology	الأسئلة	٠	٨	١	٣			٣٠	%١٥
	الدرجة	٠	٨	٢	١٥				
Virology	الأسئلة	٠	٨	١	٤			٣٠	%١٥
	الدرجة	٠	٨	٢	٢٠				
Nosocomiology	الأسئلة	٠	٣	١	٢			٢٠	%١٠
	الدرجة	٠	٣	٢	١٠				
Log book	الأسئلة	-				-		٥	%٢,٥
	الدرجة	-				٥			
Ongoing assessment (Quiz)	الأسئلة	٥						٥	%٢,٥
	الدرجة	٥							
مجموع الأسئلة		٣٥	٤٠	١٠	٢٠	-	١٠٥		
مجموع الدرجات		٣٥	٤٠	٢٠	١٠٠	٥		٢٠٠	
الأوزان النسبية لنوع التقييم		%١٧,٥	%٢٠	%١٠	%٥٠	%٢,٥			%١٠٠

رئيس القسم

أ.د/ محمد أبو العلا

Mansoura University

Faculty of Medicine

Microbiology & Immunology

Department

Logbook &Laboratory Work Guide of Medical Microbiology and Immunology

For third year medical students

2014-2015

Student name: .....

Student number: .....

Number of practical section:.....

Group number: .....

Preface

The purpose of this study guide and workbook is to introduce the essentials of clinical and practical microbiology as well as to provide the student with an organized, user-friendly tool to better enable him or her to understand laboratory aspects of microbiology using an interactive format of lab quizzes. This book is composed of four sections, two of them are added this year. In the first section, the student studies medically important microorganisms, their characteristic morphologies, cultural characters and biochemical behavior, all help the student to establish a laboratory identification of medically important microbes. In the end of each session, the student is asked to observe the spots demonstrated in the laboratory and to draw some of these demonstrations in the workbook as a part of student's activities. The end of each session includes as well some highlight points that help the students to self assess the knowledge that they acquired from the session. The second section of this book comprises 120 clinical microbiology cases. The students will be classified into groups and each group will be trained with their tutor to prepare a powerpoint presentation on the case followed by group discussion. . The third section of the book includes the virtual lab, which help the students to use technology and to enhance the learning experience of them. The final section is the skill lab, which improve infection control practice and heighten awareness of risks associated with poor IC practice in health care setting, laboratory and community. We hope you enjoy this workbook and we also hope it makes your study of microbiology a bit easier. We thank all those who supported and helped in the preparation of this work.

Prof. Mohammad Abo Elela

Professor and Head of Medical
Microbiology & immunology Department

ATTENDENCE SHEET

Topic	Section Number	Date	Supervisor
Section I			
Biosafety, Microscopy and Staining Methods	1		
Sterilization and Disinfection (1)	2		
Sterilization and Disinfection (2)	3		
Culture Media (1)	4		
Culture Media (2)	5		
Collection of samples for Bacteriological Examination	6		
Methods of isolation of bacteria, identification of isolated bacteria and antibiotic sensitivity testing.	7		
Serological Tests (1)	8		
Serological Tests (2)	9		
Bacteriology cases : Staphylococci	10		
Bacteriology cases : Streptococci	11		
Bacteriology cases : Neisseria and Haemophilus	12		
Bacteriology cases :Clostridia	13		
Bacteriology cases: Corynebacteria	14		
Bacteriology cases: Mycobacteria	15		
Bacteriology cases : Enterobacteriaceae	16		
Bacteriology cases: Salmonella,Vibrio	17		
Bacteriology cases: Helicobacter and Brucella, Mycoplasma , Legionella & Chlamydia	18		
Bacteriology cases: Spirochetes (Treponema)	19		
Virology cases	20		
Mycology cases	21		
Standards of Infection Control measures for Hospital Acquired Infections.	22		
Section II: Microbiology skill lab (infection control skills)			

Course specification

Overall Aims of Course:

• To educate students about the basic features of general bacteriology, virology and mycology .

• To provide students with an understanding of the immune system, its protective functions and its role in the patho-physiology of infectious and non- infectious diseases.

• To learn about microbial genetics and advanced biotechnology techniques.

• To define the following terms: antimicrobial agent, antibiotic, chemotherapeutic agent and to describe the mechanisms of action of antimicrobial chemotherapeutic agent with the origin and the different mechanisms of drug resistance.

• To familiarize students with the common infections and diseases of medical importance, their microbial causes, as well as laboratory diagnosis, treatment, prevention and control of such diseases.

• To enable the students to practice the principles of sterilization and infection control.

Intended Learning Outcomes of Course (ILOs):

a-Knowledge and Understanding:

By the end of this course the student should be able to:

a1- Illustrate general bacterial morphology, physiology and genetics.

a2- Recognize the host parasite relationship and microbial pathogenesis.

a3- Explain the physiology of the immune system, its beneficial role, as well as its detrimental role in immunopathology (hypersensitivity, autoimmunity and transplant rejection).

a4- Recognize the most important infectious clinical conditions and outline the diagnosis, treatment, prevention and control of the most likely organisms causing such diseases.

a5- Describe the morphology, culture character, antigenic structure and virulence factors of microorganisms of medical importance.

a6- Describe the most important methods of decontamination and principles of infection control.

a 7- Describe the basics of antimicrobial uses and resistance.

A8- Understand the impact of molecular technology in microbiology and immunology.

b- Intellectual Skills:

By the end of this course the student should be able to:

b1- Interpret results of microbiological, serological and molecular tests

b2- Formulate a systematic approach for laboratory diagnosis of common infectious clinical conditions and select the most appropriate tool to the identification of the causative organism.

b3- Evaluate according to evidence the causal relationship of microbes and diseases.

b4- Categorize a microorganism as a bacterium, virus or fungus according to standard taxonomy.

c-Professional and Practical Skills:

By the end of this course the student should be able to:

c1-Elicit medically important bacteria based on microscopic examination of stained preparations.

c2-Perform a Gram stain and a Ziehl-Neelsen stain and identify, according to morphology and characteristics, stained preparations.

c3- Elicit culture media ,biochemical tests and serological tests commonly used for bacterial identification and distinguish positive and negative results.

c4- Perform hand wash and identify different methods of physical and chemical methods of sterilization.

c5- Use the virtual lab to learn standard practices and procedures, get familiarity with the equipments, apply the scientific method and develop the online critical thinking skills.

C6- Improve infection control practice by skill lab and heighten awareness of risks associated with poor IC practice in health care setting, laboratory and community.

d-General and Transferable Skills:

By the end of this course the student should be able to:

d1- Establish a concise scientific activity according to standard scientific thinking and integrity.

d2- Explain the danger of handling and use of infectious agents on community and environment as a part of their ethical heritage.

d3- Interact and communicate effectively with other health care professionals during infection control practice.

STUDENT ASSESSEMENT

Attendance Criteria:

Students should attend no less than 70 % of practical classes and/or small group sessions as an essential prerequisite to be legible for the final exams.

Student Assessment Methods:

5.1 - Written Exam	to assess	ILOs: a1-8
5.2 – MCQs	to assess	ILOs:a1-8, b1-4
5.3 - Practical examination	to assess	ILOs: a1-8, b1-4 ,c1-4
5.4 - Oral exam	to assess	ILOs:a1-8 , b1-4, c1-4, d1-3.

Assessment Schedule:

Mid year exam	35 marks
Oral Examination	20marks
Practical Examination	40 marks divided as
• Practical exam.	37 marks
• Skill lab	3 marks
Log book and Practical book	5 marks
Final Written Exam	100 marks
Total	200 marks

Contents

Section no: …… **Tutor**……

Date: ……

Title: MICROSCOPY

Objectives:

By the end of this session, students should acquire the following knowledge:

1- Types of microscopes.
2- Structure of ordinary light microscope.
3- Precautions for the use and care of microscopes.
4- Magnification power of the microscope.
5- Uses & principle of Dark ground microscope.
6- Uses & principle of Phase contrast microscope.
7- Uses & principle of Fluorescence microscope.
8- Uses, advantages, disadvantages& principle of Electron microscope.

Assessment questions

Complete the following sentences:

The magnification power of the ordinary light microscope is……

The resolution of electron microscope is ……

The oil used during microscopic examination is ……

The microscope used for examination of refractile organisms is……

The microscope used for examination of viruses is……

Mark	Supervisor

Section no: …… **Tutor**……

Date: ……

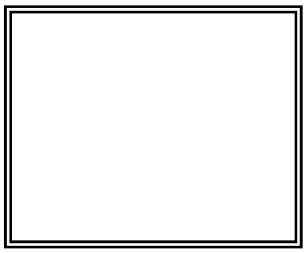
Title: Staining Methods

Objectives:

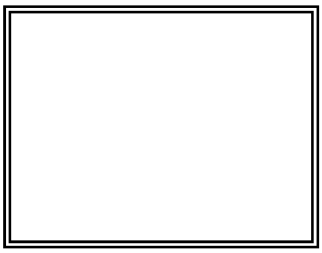
By the end of this session, students should acquire the following knowledge and skills:

1- How to prepare a dried fixed film.
2- Types of stains.
3- Procedure and principle of Gram stain.
4- Procedure and principle of Ziehl-Neelsen stain.
5- The use and procedure of Hanging drop preparation.

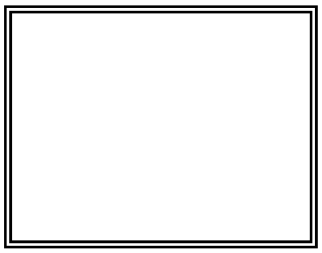
Student activities:



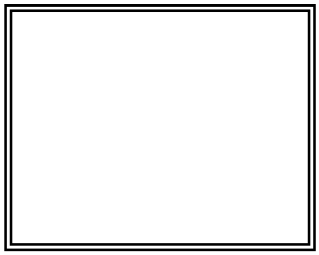
Gram positive cocci



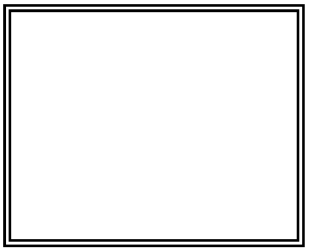
Gram positive bacilli



Gram negative cocci



Gram negative bacilli



Hanging Drop

Assessment questions

Organisms which resist decolourization & retain the colour of the basic dye are called:

a) Gram +ve. b) Gram -ve. c) Alcohol fast.

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

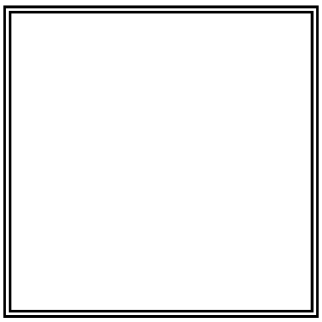
Title: Sterilization

Objectives:

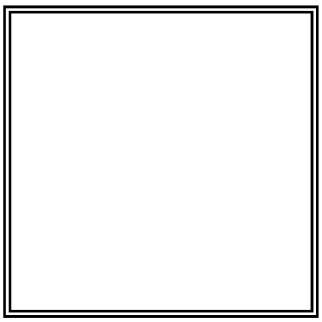
By the end of this session, students should acquire the following knowledge:

1. Definition of sterilization and disinfection.
2. The physical methods of sterilization and their uses.
3. The chemical methods of sterilization and their uses.
4. The difference between disinfection and antisepsis.

Student activities:



Broth culture of an organism before applying a disinfectant



Broth culture of an organism after applying a disinfectant

Assessment questions

Define sterilization:

……

Define disinfection:

……

Metal instruments can be sterilized by the following methods except:

a. Boiling.
b. Autoclave.
c. Koch's steamer.
d. Formaldehyde vapour.

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

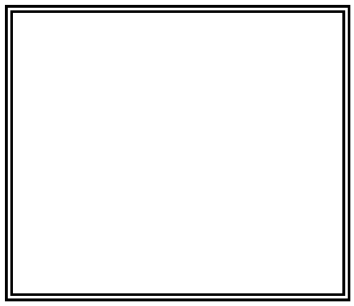
Title: Culture Media

Objectives:

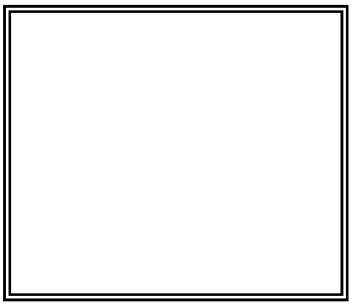
By the end of this section, students will acquire the following knowledge:

1. Importance of culture media.
2. Different types of culture media.
3. Methods of sterilization of different types of culture media.
4. Suitable media for culture of different groups of organisms and characteristics of growth.

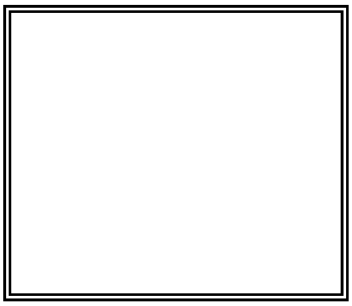
Student activities



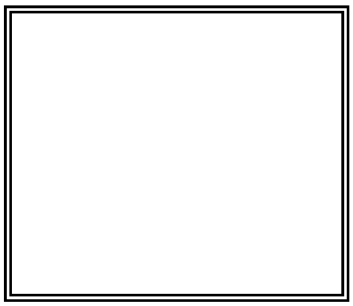
Nutrient agar plate



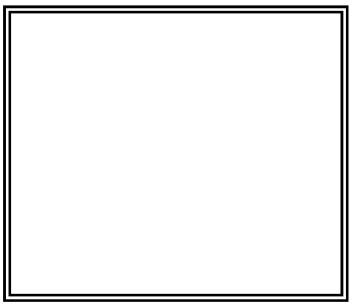
Nutrient agar slope



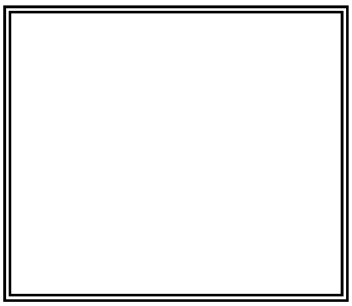
Deep agar



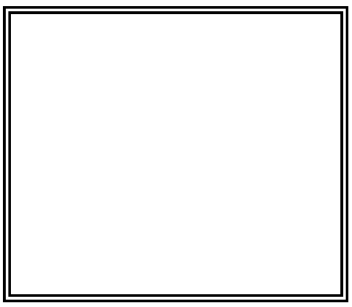
Blood agar plate



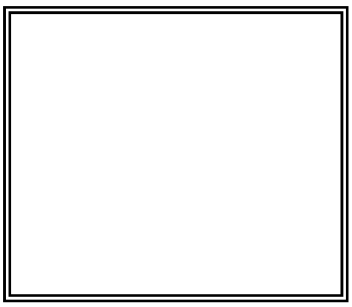
Chocolate agar plate



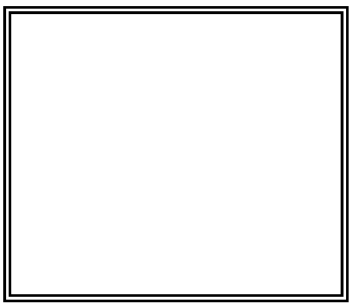
Loffler's serum slope



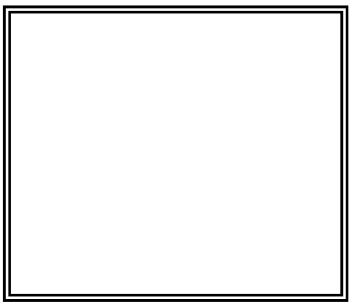
Dorset's egg slope



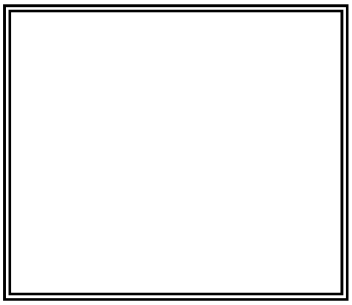
Lowenstein- Jensen medium



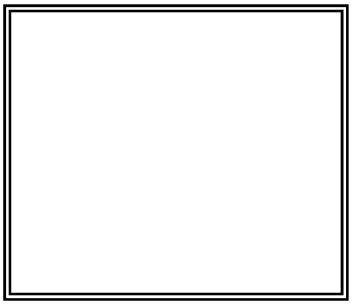
MacConkey's agar



CLED medium



Litmus milk media



Cooked meat media

Assessment questions

Match the following organisms with their respective culture media:

1. Neisseria gonorrhea	a. Blood agar
2. Tubercle bacilli	b. MacConkey's medium
3. Diphtheria bacilli	c. Dorset egg medium
4. Salmonella	d. Loffler serum
	e. Chocolate agar

Mark	Supervisor

Section no: …… **Tutor**……

Date: ……

Title: Collection of samples for bacteriological examination

Objectives:

By the end of this session, the student should be able to know the following:

1- The general rules that should be applied during collection of samples for laboratory diagnosis.
2- The appropriate samples required to diagnose a case of respiratory tract infection.
3- How to transport a respiratory specimen to the lab after collection.
4- The proper samples needed to diagnose a case of intestinal infection.
5- The appropriate methods of collection and transport of urinary specimens.
6- How to collect a CSF sample from a case of meningitis.
7- The appropriate samples required for diagnosis of wound sepsis.
8- The blood culture technique for diagnosis of septicemia.

Assessment questions

What is the proper bacteriological sample to diagnose a meningococcal carrier?

……

For each of the following gastrointestinal infections, mention the most suitable sample for diagnosis:

a- Cholycystitis: ……
b- Food poisoning: ……
c- Cholera chronic diarrhea: ……

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

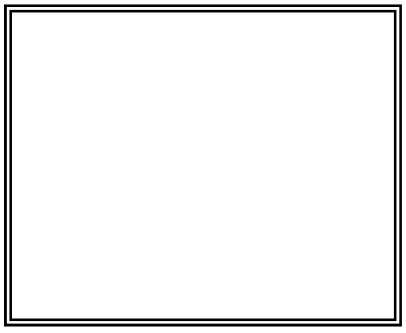
Title: Laboratory Diagnosis of Infection

Objectives:

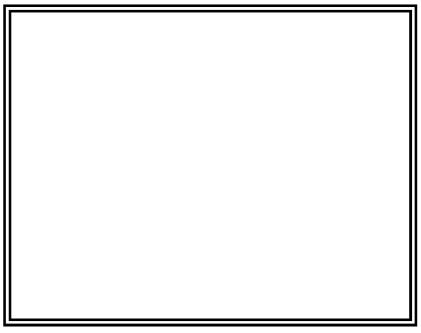
By the end of this session the student should be able to know and gain skills about the following:

1- The value of direct microscopic examination of specimens.
2- The plating out technique for culture of specimens.
3- The various methods for anaerobiosis.
4- The schematic identification of bacteria isolated from clinical specimens.
5- How to describe the colonial characters of isolated bacteria.
6- The scheme for description of microorganisms under a microscope.
7- The principles of some biochemical tests used for identification of isolated bacteria.
8- The value of animal inoculation in the identification of an unknown organism.
9- The different methods of bacterial typing.

Student activities:



Plating out technique



Antibiotic sensitivity plate

Assessment questions

What is the value of direct microscopic examination of specimens?

……

Mark	Supervisor

Section no: …… **Tutor**……

Date: ……

Title: Serological Tests

Objectives:

At the end of this session, the student should know:

1- Nature of antigen-antibody reactions.
2- Specificity and cross reactivity.
3- Factors affecting measurement of antigen-antibody reactions.
4- Types of serological tests (agglutination, precipitation, complement fixation).
5- The principle of each test.
6- Applications of serological tests.
7- Commonly used serological tests e.g. blood typing.

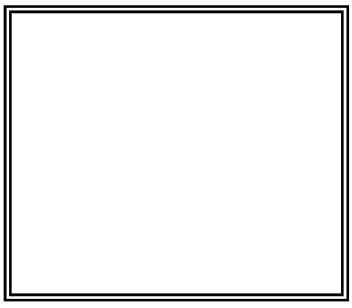
Student activities

A. The students should perform the following tests:

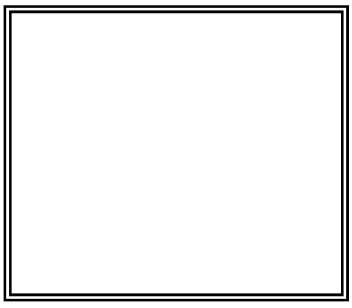
1- Blood grouping of various blood samples.
2- Latex agglutination tests: ASO and CRP

B. The students will observe the demonstrated Widal tube agglutination tests and interpret the positive results.

C. The students will observe the demonstrated Wasserman test and interpret its results.

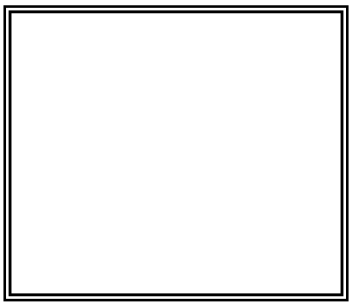


Slide agglutination



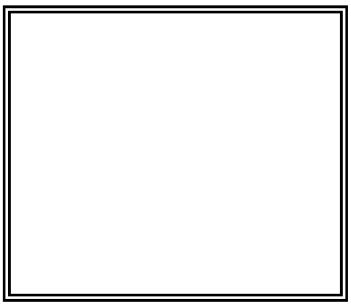
Widal test

Salmonella typhi

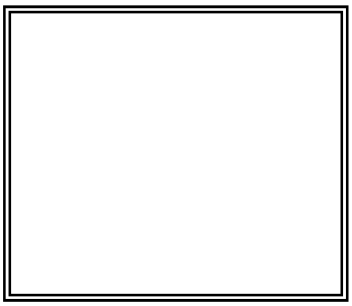


Widal test

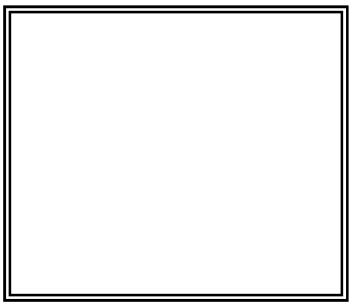
Salmonella paratyphi A



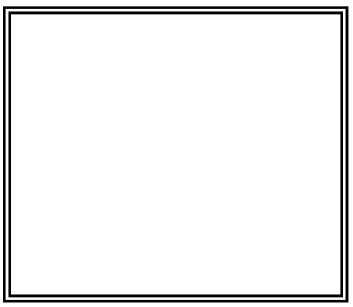
Single immunodiffusion



Double immunodiffusion



Immunofluorescence slide



Microtitration plate

Assessment questions

Mark the correct answer (√)

Direct coomb`s test is used for the diagnosis of

Hemolytic disease of the newborn	**Pregnancy**	**Rh typing**

Elek`s test used to detect the toxigenic Diphtheria bacilli is an example of

Agglutination test	**Complement fixation test**	**Precipitation test**

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

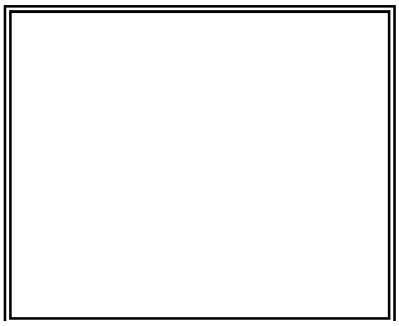
Title: Staphylococcal infections

Objectives:

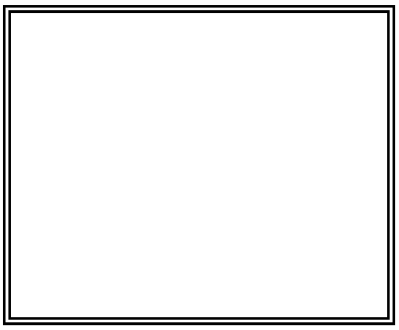
By the end of this session, the student should gain the following knowledge:

1- The different species of staphylococci.
2- The different diseases caused by Staph.aureus.
3- The appropriate samples to diagnose each of the staphylococcal diseases.
4- The morphological characters of staphylococci.
5- The cultural characters of staphylococci.
6- The principle of each of the biochemical tests used to identify Staph.aureus as well as the methods and interpretation of these tests.
7- How to differentiate the species of staphylococci.
8- How to diagnose staphylococcal food poisoning.
9- Phage typing of Staph.aureus.

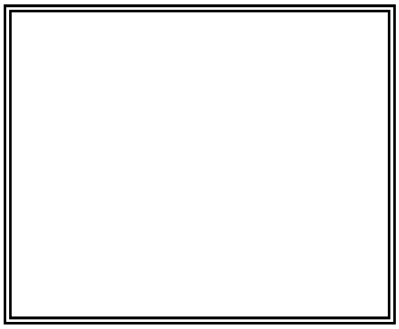
Student activities:



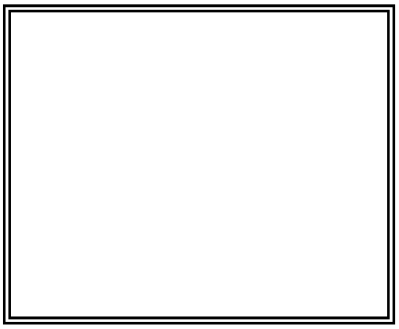
Gram stained film of Staphylococci in culture



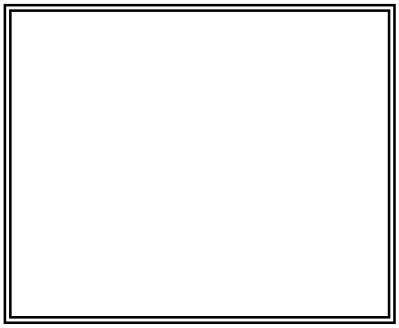
Coagulase Test



B- haemolyticColonies of Staph.aureus on blood agar



Catalase Test



Phage typing

Assessment questions

Staph.aureus shows the following type of arrangement:

a-Clusters. b- Chains.

c-Chinese letter. d- Pairs.

Which of the following media is selective for the isolation of Staph.aureus?

a- Nutrient agar

b- Blood agar

c- Mannitol salt agar

d- DNAase agar

List the cultural characters of Staphylococcal isolates

1- .....

2- .....

3- .....

4- .....

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

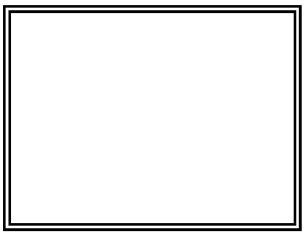
Title: Streptococci

Objectives:

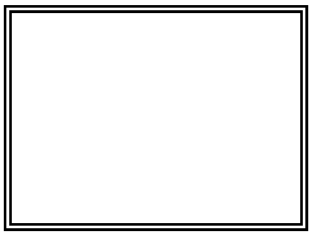
By the end of this session the student should be able to:

1. Identify Streptococci.
2. Know the basis of classification, grouping and typing of Streptococci.
3. Diseases caused by and remote complications of streptococcal infections.
4. Samples collected to diagnose each of streptococcal infections.
5. How samples are processed until an accurate diagnosis is obtained.

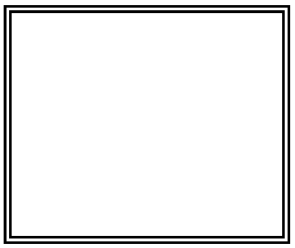
Student activities:



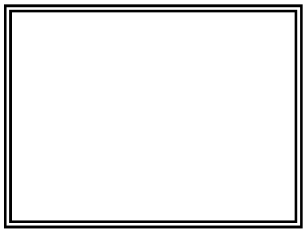
Gram stained film of *Strept. pyogenes* in



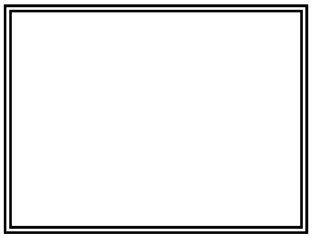
Gram stained film of *Strept. pneumoniae* in sputum



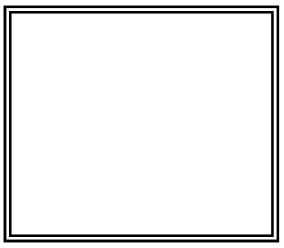
α- Haemolytic Colonies of *Strept. pneumoniae*



β-Haemolytic Colonies of Strept. pyogenes



Optochin sensitivity Test



Bile solubility Test

Assessment questions

List some specific tests that help in the diagnosis of scarlet fever

a. …… b……

c…… d……

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

Title: Neisseria

Objectives:

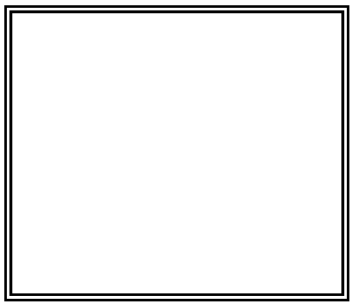
By the end of this session the student should be able to:

6. Identify Neisseria
7. Know the basis of classification and typing of Neisseria
8. Diseases caused Neisseria infections.
9. Samples collected to diagnose each disease.
5- How samples are processed until an accurate diagnosis is obtained.

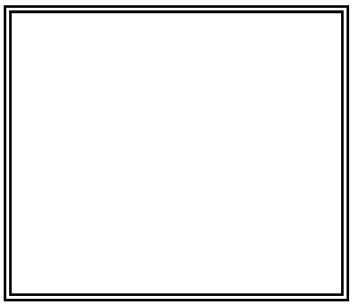
Student activities:

The student should be able to:

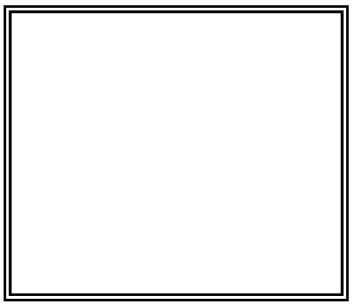
1. Examine Gram-stained film from samples possibly containing Neisseria.
2. Perform and read the related biochemical activities and reactions.



Neisseria gonorrhoeae in urethral discharge Gram-stain



Sugar fermentation by *Neisseria meningitidis*



Sugar fermentation by *Neisseria gonorrhoeae*

Assessment questions

Mention one method for rapid diagnosis of meningococcal meningitis other than the direct smear

……

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

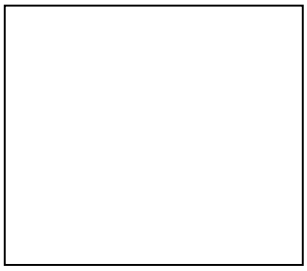
Title: Bacillus and Corynebacterium group

Objectives:

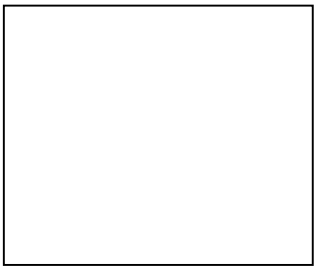
At the end of this session, the student should know and gain the following skills:

1. The ability to identify *Bacillus anthracis.*
2. The ability to differentiate between *Bacillus anthracis* and other bacillus species
3. The ability to make laboratory diagnosis of Diphtheria cases or carriers.

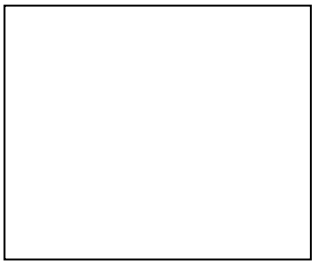
Student activities:



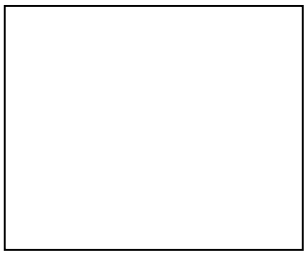
Beta haemolytic colonies of *Bacillus cereus*



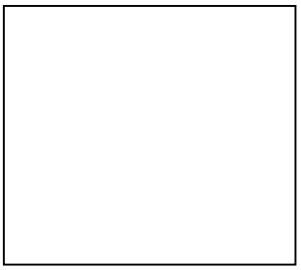
Colonies of Anthracoids on blood agar plate



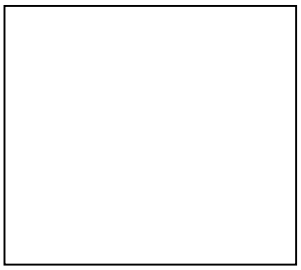
Gelatin liquefaction test



Gram stained film of *Bacillus anthracis*



Gram stained film of *C. diphtheriae* in culture



Elek immunoprecipitation test

Assessment questions

Mc Fadyean stain is used to demonstrate_……

Mark	Supervisor

Section no: …… **Tutor**……

Date: ……

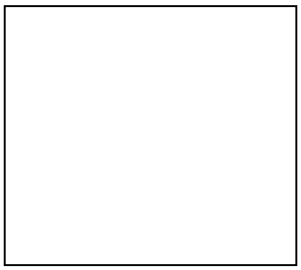
Title: Genus *Clostridium*

Objectives:

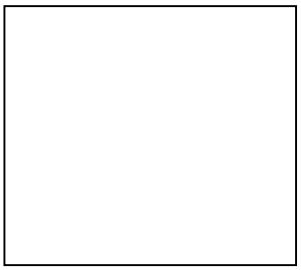
By the end of this session, the student should gain the following knowledge:

10- The important members of genus *Clostridium*.
11- The different diseases caused by *Clostridium*.
12- The appropriate samples to diagnose each of the Clostridium diseases
13- The morphological characters of *Clostridium*.
14- The cultural characters of *Clostridium*.
15- The principle of each of the biochemical tests used to identify *C. perfringens* as well as the methods and interpretation of these tests.
16- How to diagnose Tetanus.
17- How to diagnose Gas gangerene.
18- How to diagnose botulism.
10- Methods of detection of toxins produced by *Clostridium species*.

Student activities:



Gram stained film of *Clostridium tetani*



Acidic litmus milk

Assessment questions

Clostridial toxins can be detected by:

1- …… 2- ……

3- ……

Mark	Supervisor

Section no: …… **Tutor**……

Date: ……

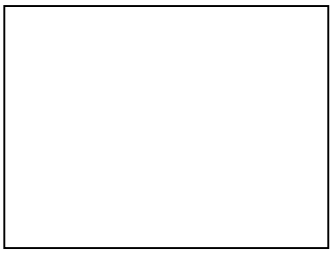
Title: Mycobacteria

Objectives:

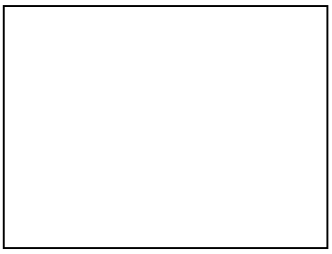
By the end of this session, the student should gain the following knowledge and skills:

1. The diseases caused by the genus Mycobacteria.
1. The diagnosis of infections caused by Mycobacteria.
2. The stains used for diagnosis of M. tuberculosis.
3. Identification of acid fast bacilli.
4. The media used for isolation of M. tuberculosis.
5. Skin testing for TB.

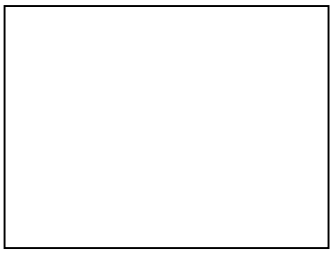
Student activities:



Sputum smear stained by ZN st showing Acid fast bacilli



Lowenstein Jensen media



Colonies of M. tuberculosis on LJ media

Assessment questions

Mention the principle of tuberculin test

……

Describe the CSF picture of TB meningitis

……

Mark	Supervisor

Section no: …… **Tutor**……

Date: ……

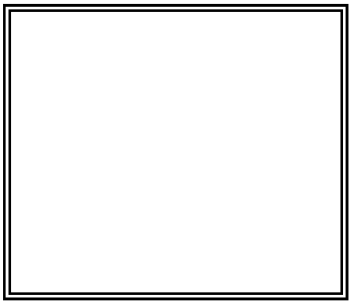
Title: ENTEROBACTERIACEAE

Objectives:

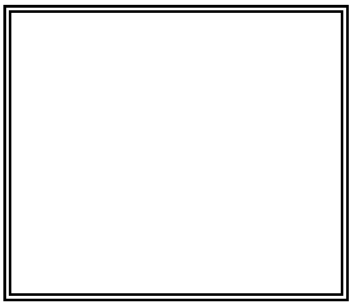
By the end of this section, students should acquire the following knowledge and skills:

1. Examination of Gram stained smear of Gram-negative bacilli from culture.
2. Basis of classification and special features of different members of Enterobacteriaceae family.
3. Laboratory diagnosis of diseases caused by different members of Enterobacteriaceae family.
4. Principle, procedure and interpretation of Widal test.

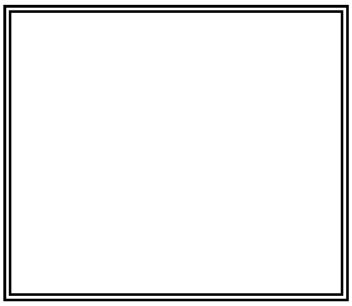
Student activities:



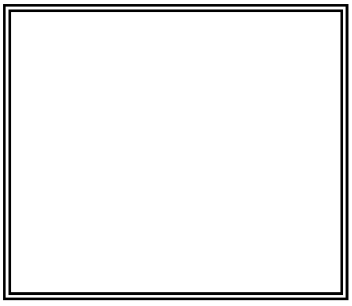
Gram stained film of E. coli



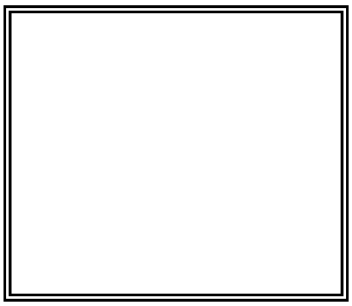
L.F. Colonies of E. coli



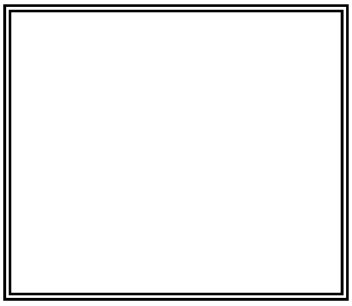
Mucoid colonies of Klebsiella



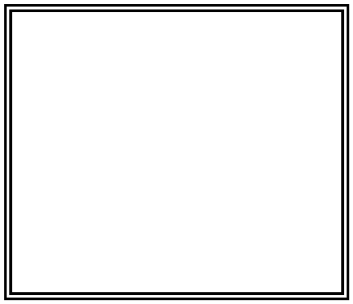
B.R. of E.coli



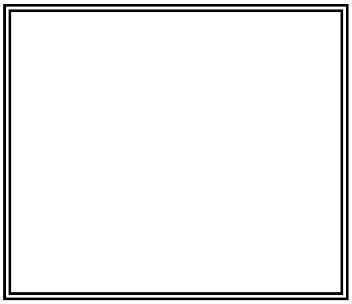
B.R. of Klebsiella



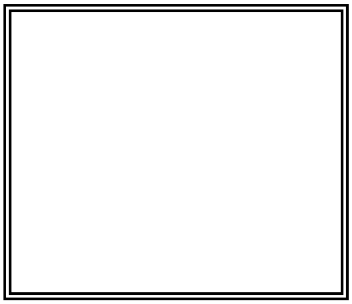
B.R. of Citrobacter



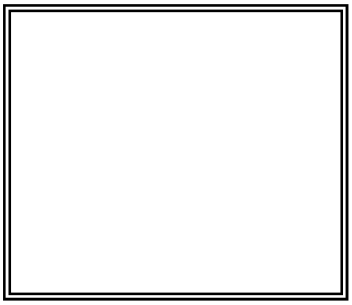
B.R. of Salmonella typhi



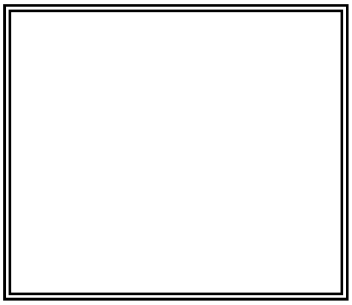
B.R. of Salmonella paratyphi



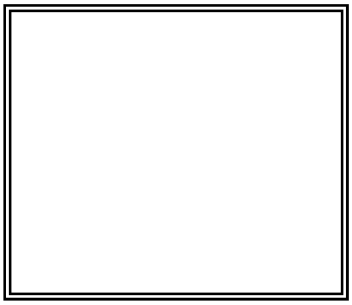
B.R. of Shigella dysinteriae



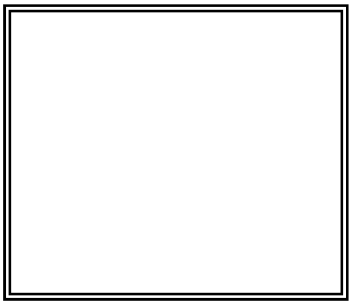
B.R. of Shigella flexneri



B.R. of Shigella sonii



Oxidase test



Urease test

Assessment questions

True (T) or False (F)

1. Some strains of E.coli are capsulated ( )
2. Citrobacter is indole positive. ( )

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

Title: Vibrio, Pseudomonas, Hemophilus, Bordettela, Yersinia, Mycoplasma, rickettsia & chlamydia

Objectives:

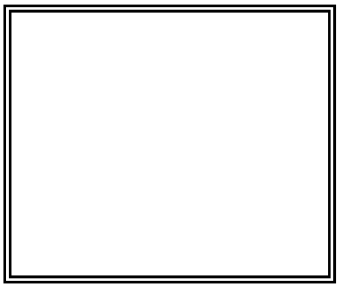
At the end of this session, students will able to learn and gain the following skills:

1- Learn the main diseases caused by these organisms

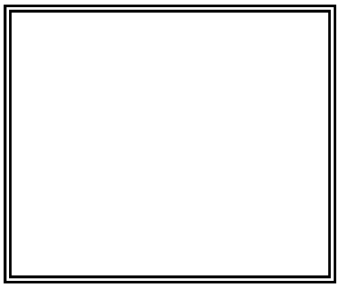
2- Mode of transmission of these organisms

3-The difference between these organisms in their growth conditions and biochemical reactions.

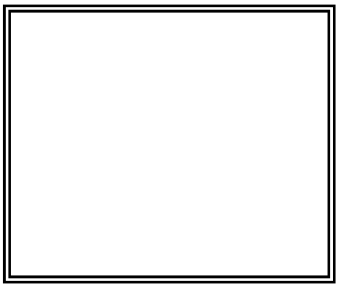
Student activities:



Colonies of *H. influenza* on Chocolate agar



Satellism



Exopigment of pseudomonas

Assessment questions

Choose the single best answer:

Urea breath test is diagnostic to:

a. V cholera
b. Campylobacter
c. Helicobacter
d. Spirochetes

- *Haemophilus influenza* type b can be detected in the cerebrospinal fluid by Quelling reaction or latex agglutination.

▢ True ▢ False

Mark	Supervisor

Section no: …… **Tutor**……

Date: ……

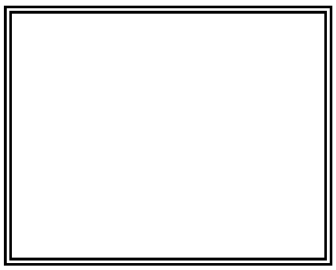
Title: Spirochetes

Objectives:

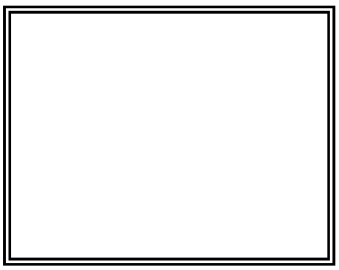
By the end of this session the student should be able to know and gain skills about the following:

10- The special characters of spirochetes family.
11- The pathogenic species in spirochetes.
12- The disease caused by Terponema pallidum.
13- Methods of diagnosis of syphilis.
14- Methods of diagnosis of relapsing fever.
15- The pathogenesis of leptospirosis.

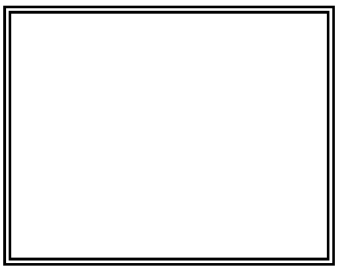
Student activities: Wasserman test



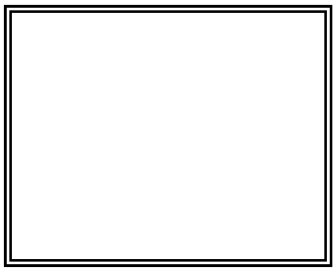
Strong positive



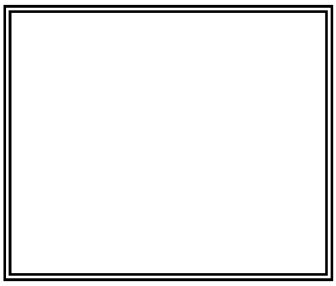
Moderate positive



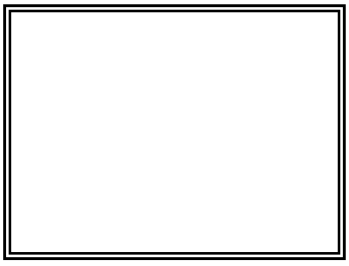
Weak positive



Negative test



Antigen anticomplementry



Antibody anticomplementry

Assessment questions

What are the samples for diagnosis of leptospirosis?

1. ……
2. ……

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

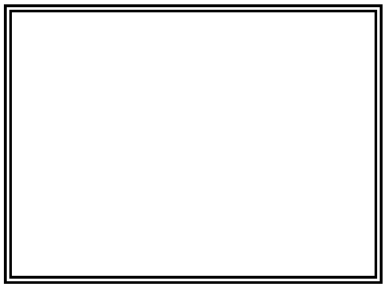
Title: Mycosis

Objectives

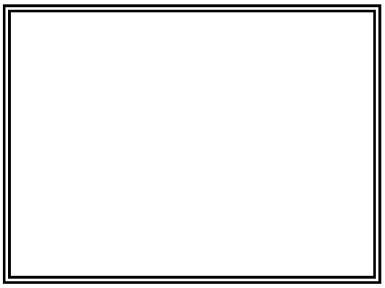
By the end of this session, the student should gain the following knowledge

1. Types of mycosis and proper sample taken in each type
2. Value and methods of direct examination of samples
3. Different media used for isolation of fungi
4. Identification of fungal growth on culture eg *C. albicans*

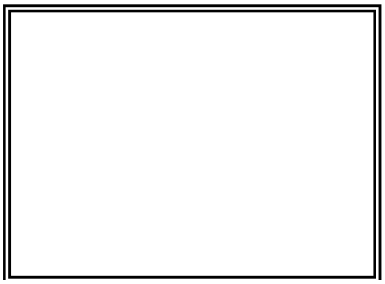
Student activities:



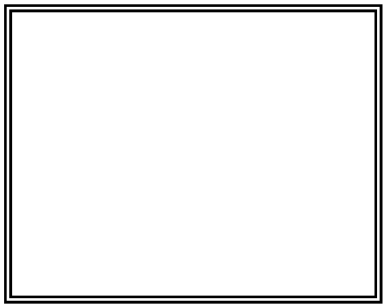
Candida by gram stain



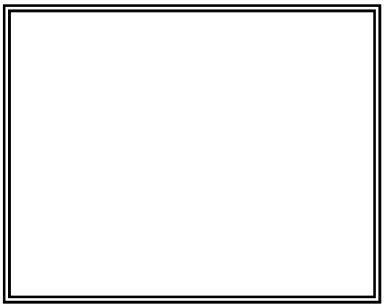
Candida by LPCB stain



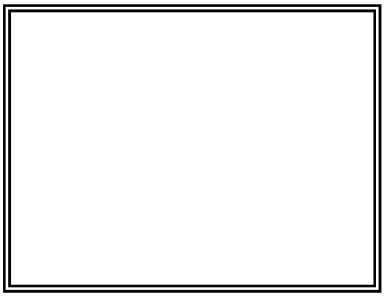
Septated hyphae by LPCB



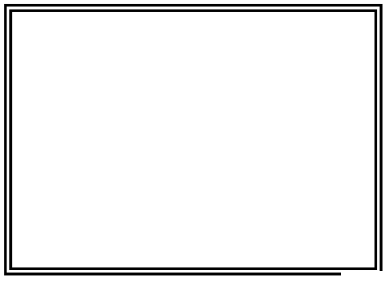
Non septated hyphae by LPCB



Aspergillus niger head by LPCB

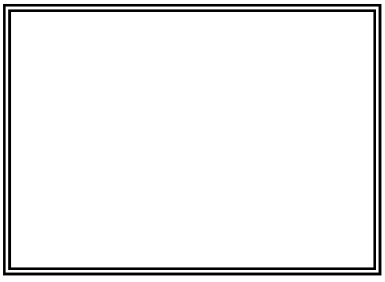


Aspergillus fumigatus head by LPCB

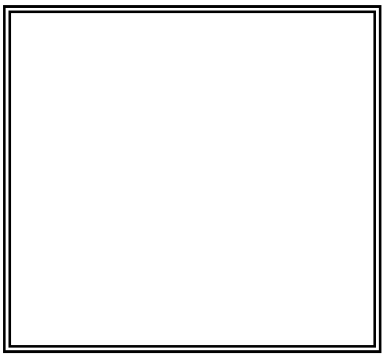


Aspergillus niger black hairy colonies on SDA

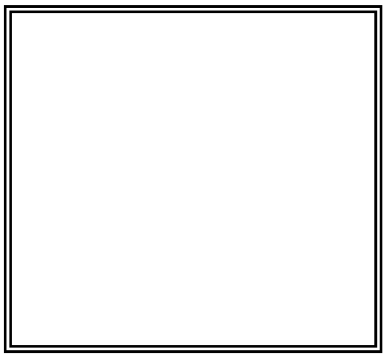
Candida white creamy colonies on SDA



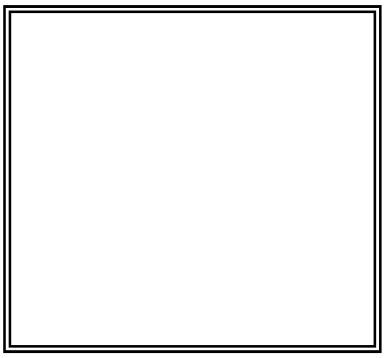
Candida white creamy colonies on SDA



Slide culture



Sporangiospores by LPCB



Germ tube test of C. albicans LPCB

Assessment questions

1. Value of KOH (10-30 %) in direct examination of fungi sample
    a. Inhibit saprophytic fungi
    b. Inhibit bacteria flora
    c. Keratolytic
    d. All of above
    e. Non of above

2. Complete undisrupted morphology of fungi is seen in
    a. SDA
    b. Wood light
    c. EM
    d. Slide culture or microculture
    e. All of above

3. Stains used for fungal diagnosis are

    a. Stained with lactophenol cotton blue
    b. Histopathology by PAS & silver stain
    c. Geimsa stain (histoplasma)
    d. India ink (-ve stain) for Cryptococcus capsule
    e. All of above

4. Media used for culture of fungi are
    a. Blood agar
    b. SDA
    c. Dermatophyte test media
    d. Potato carrot bile salt media
    e. All of above

Mark	**Supervisor**

Section no: …… **Tutor**……

Date: ……

Title: Laboratory Diagnosis of Viral Infections

Objectives:

At the end of this session, the student should know:

1- How can viruses be detected in clinical specimens.
2- Tests used for detection of antiviral antibodies.
3- Methods of cultivation and identification of viruses.
4- Methods of quantification of viruses.

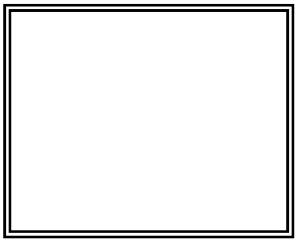
Student activities:

1- The student should know the instruments demonstrated.

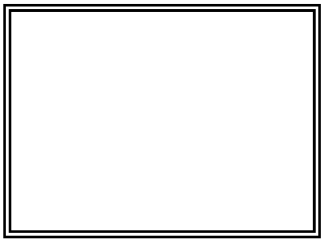
2- The student should try to search on the web and find the following

   a. Pictures of the cytopathic effects of some viruses.

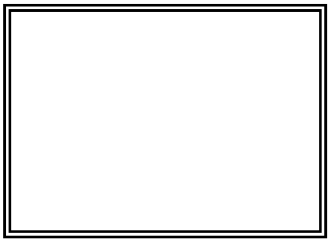
   b. The electron microscopic picture of some viruses.



Tissue culture plate



Tissue culture flask with medium



CPE of CMV

Assessment questions

Viral antigens can be detected by:

a. ELISA
b. Complement fixation test.
c. Immunofluorescence.
d. All of the above.
e. None of the above.

Mark

Supervisor

Section no: …… **Tutor**……

Date: ……

Title: Standard Infection Control measures for Hospital Acquired Infections

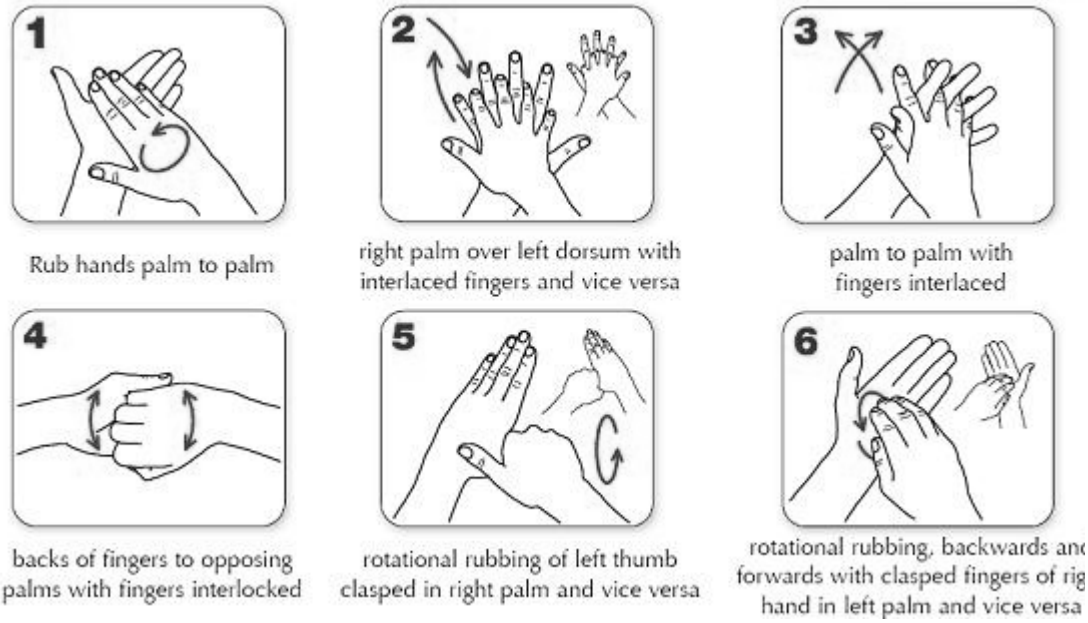
Objectives:

At the end of this section the students should know the following:

1. The importance of hand washing.
2. The proper hand washing technique and indications.
3. Safe Use and Disposal of Sharps.
4. Decontamination of Equipment.
5. Dealing with Blood and other Body Fluids.
6. Safe Disposal of Waste.
7. Proper use of Personal Protective Equipment: (Eye / Face Protection, Mask,Aprons,Gloves).

Student activities

Practice hand washing technique:



Practice:

Action in the event of a sharps injury or contamination with blood:

- Encourage bleeding, squeeze the injury, do not suck.
- Wash the skin thoroughly with soap and water, do not scrub.
- Libral use of antiseptic solution.
- Irrigate contaminated mucous membranes eg mouth and eyes with large quantities of tap water.
- Cover the injury with waterproof dressing and seek medical advice without delay.

Assessement questions

The most important for controlling nosocomial infections is:
a) Safe use of sharps
b) Hand hygiene
c) Sterilization of equipment
d) a+c
e) None of the above

The concentration of alcohol needed to be effective for hand hygiene is 40%

○ True ○ False

Burning or incinerating is one way to destroy needle disposable boxes.

○ True ○ False

Mark	Supervisor

Microbiology Cases

The students in each practical section will be divided into groups. Each group is comprised of 10 students and each group will be assigned to a staff member (supervisor). The students of each group will be asked to prepare an assay of 3-5 pages and present it as a power point presentation of 15-20 slides in their section and their supervisor will score their work accordingly.

1. Acute urethral discharge
2. Urinary tract infection
3. Acute enteritis with sepsis
4. Post Traumatic Wound Infection
5. Splenic abscess
6. Cellulitis
7. Neonatal meningitis
8. Acute Osteomyelitis
9. Lobar Pneumonia
10. Food Poisoning
11. Osteomyelitis Following Major Trauma
12. Blastomycosis: A Cutaneous Presentation
13. Otitis media
14. Genitourinary infections
15. Diabetic foot
16. Burn infections
17. Gastroenteritis
18. Puerperal sepsis
19. Congenital pneumonia
20. Conjunctivitis
21. Corneal ulcer
22. Genital herpes
23. Encephalitis
24. Meningitis
25. Botulism
26. Pseudomembranous colitis
27. Gas gangrene
28. Fever and rash
29. Fever and jaundice
30. Relapsing fever
31. PUO
32. Liver abscess
33. Lung abscess
34. Brain abscess
35. Diphtheria
36. Pulmonary TB
37. Tuberculous meningitis
38. Spontaneous bacterial meningitis
39. Avian flu
40. Swine flu
41. Endocarditis
42. Rheumatic fever
43. Ventilator associated pneumonia
44. Fever and rhinitis
45. Vaginal discharge
46. Fever and disturbed consciousness
47. Fever and sore throat
48. Viral hepatitis
49. Brucellosis
50. Infectious mononucleosis
51. Leptospirosis
52. Fever, abdominal pain and dark urine
53. Whooping cough
54. Measles
55. Mumps
56. Rubella
57. Chicken pox
58. Zoster
59. Syphilis
60. Yellow fever
61. Typhoid fever
62. AIDS
63. Plague
64. Typhus
65. Rabies
66. Bronchiolitis
67. Watery diarrhea
68. Trachoma
69. Allergic rhinitis
70. Allergic conjunctivitis
71. Bronchial asthma
72. SLE
73. Rhreumatoid arthritis
74. Erythroblastosis fetalis
75. Anaphylactic shock
76. Hyperacute graft rejection
77. Chronic graft rejection
78. GVHD
79. Legionellosis
80. Lymphogranuloma venereum
81. Atypical pneumonia
82. Tinea pedis
83. Tinea unguum
84. Tinea capitis
85. Mycetoma
86. Cryptococcus meningitis
87. Pulmonary histoplasmosis
88. Pityriasis versicolour
89. Atopic dermatitis
90. Contact dermatitis
91. Tinea corporis
92. Tinea cruris
93. Onychomycosis
94. Pulmonary aspergillosis
95. Catheter associated urinary tract infection
96. Poliomyelitis
97. Tetanus
98. Impetigo
99. Lyme disease
100. Wool sorter disease
101. Toxic shoch syndrome

102. Wool sorter disease
103. Toxic shock syndrome
104. Potstreptococcal glomerulonephritis
105. Scarlet fever

106. Neonatal pneumonia 107. Leprosy 108. Pyelonephritis 109. Empyaema 110. Prostatitis 111. Gastriris 112. Sinusitis 113. Q Fever 114. Spotted fever 115. Septic arthritis 116. Septic shock 117. Neonatal sepsis 118. Hospital acquired blood stream infection 119. Surgical site infection Erysipelas 120. Folliculitis 121. Malignant pustule	

Virtual lab

What common learning objectives do laboratory exercises hold for students?

1- Learn standard practices and procedures

2- Familiarity with equipment

3- Practice with concepts taught in lecture

4- Apply the Scientific Method

5- Develop online critical thinking skills

Virtual Laboratory Curriculum:

1- Virtual Laboratory vs. Animation.

2- DNA Extraction.

3- Gel Electrophoresis.

4-PCR.

5- Stem cells.

Duration of the Course:

Ten hours divided as follow:

6 hours in first term

4 hours in the second term.

Skill lab

Introduction:

Students should be introduced to the principles and practice of infection control in three settings-hospital, clinic, and the community, through a series of skills. The emphasis would be on the development of systematic approach to infection control practice.

Objectives:

Improve infection control practice and heighten awareness of risks associated with poor IC practice in health care setting, laboratory and community.

Structure:

The practical course is structured into a number of learning activities which are supported by graphics, video, animations, a number of challenges and a quiz.

Course layout and contents:

The practical course would be conducted during the academic year for the third year students once/ week for 25 student/session. Course contents are delivered in 3 hours/class.

SKILLS ALLOCATED:

1. Principles of hand hygiene.
2. Dressing and removal of PPE.
3. Needle stick injury protection.
4. Infectious waste disposal.