

**KING SAUD UNIVERSITY**  
**COLLEGE OF DENTISTRY**  
Dept. of Maxillofacial Surgery & Diagnostic Sciences  
Division of Oral & Maxillofacial Pathology, Biology,  
Microbiology and Immunology

**وصف المقرر دراسي**  
**Course File**

Course Title	:	General Microbiology and Immunology
Course No. & Code	:	222 MAC
Credit Hours	:	3 Hours
Level	:	First Half of Second Year

Course code: 222 MAC	رقم المقرر ورمزة: 222 ماك
Course name: General Microbiology and Immunology	اسم المقرر: علم الأحياء الدقيقة وعلم المناعة
Credits: 3 hrs (2 hour Lecture, 1 Practical in the 1 <sup>st</sup> semester of the 2 <sup>nd</sup> year)	عدد الساعات: 3 ( ساعة محاضرة و عملي واحد في الفصل الأول من السنة الثانية)
Prerequisite: None	المتطلب السابق: لا يوجد

**وصف المقرر:**

تم وضع محتويات هذا المقرر لغرض إلمام طالب وطالبة كلية طب الأسنان بالأحياء الدقيقة (كالفيروسات والبكتيريا والفطريات) التي تسبب الأمراض للإنسان بصفة عامة وماله علاقة بأمراض الفم والأسنان بصفة خاصة.

والمواضيع الرئيسية التي تدرس في هذا المقرر هي على النحو التالي:

- 1- أساسيات المناعة والعلاقة بين الإنسان والطفيليات المسببة للأمراض.
- 2- البكتيريا والأمراض التي تسببها الإنسان.
- 3- الفيروسات والأمراض التي تسببها في الإنسان.
- 4- الفطريات وأمراض الإنسان التي تسببها.
- 5- مقدمة لعلم الأحياء الدقيقة الفمي.

**A. Course Description:**

The course Microbiology for dental student is designed to provide and facilitate the learning in which the student can make acquaintance, both in which the student can make acquaintance, both in a theoretical and practical context, with microorganisms as agents of human disease with relevance to dentistry. The major topics covered in this course will be:

1. Fundamentals of Immunology and Host-parasite relationship
2. Bacteria and Human Diseases caused by them
3. Viruses and Human Diseases caused by them
4. Fungi and their human oral diseases.
5. An introduction to Oral Microbiology

**B- Course Objectives**

By the end of the course the dental students should:

1. Have a basic understanding of the major pathogenic organisms, related disease-syndromes ad their modes of spread with particular reference to dentistry.
2. Have a basic understanding of the host-parasite relationship and the immune system
3. Have a basic understanding of the oral microbial ecology and pathogenesis of dental caries and periodontal disease
4. be aware of the major clinical and biological factors to be taken into consideration for the appropriate use of anti-microbial therapy
5. be familiarized with some of the laboratory procedures including specimen collection and handling, requesting appropriate tests and interpretation of laboratory reports.

**C- Course Outline:**

**i. lecture topics**

- Introduction
- Bacterial structures and functions
- Bacterial physiology and genetics
- Host-parasite relationship
- Sterilization and disinfection
- Antibiotics and chemotherapy
- Immunology
- Staphylococci
- Corynebacteria
- Clostridia

- Actinoyces and nocardia
- Mycobacteria
- Neisseria and haemophilus
- Treponema, Borrelia
- Enterics and other gram-negatives
- Mycoplasma, rickettsia, Chlamydia
- Fungi
- Viruses –I - V
- Oral microflora, dental plaque

**ii- Practical Sessions**

- Microscopy
- Gram staining, negative staining
- Demonstration of bacterial cultural characteristics
- Sterilization and disinfection
- Antibiotic sensitivity detection
- Characteristics of Staphylococci
- Characteristics of Streptococci
- Characteristics of clostridia
- Pathogens of the gastrointestinal tract
- Characteristics of Yeast and molds
- Serological tests
- Virological methods

**Lecture Topics in Details [Contents]:**

1-	Introduction	Chap –I	pp5-6
	Definition of microbiology, contribution of different scientists to microbiology field and differences between prokaryotic and eukaryotic cell.		
2-	Bacterial Structures and Functions	Chap –I	pp6-10
	Shape and arrangement of bacteria, cell wall, cytoplasmic membrane, nuclear material, ribosome, inclusions, flagella, pilli, capsule and spores.		
3-	Bacterial Physiology and Genetics	Chap –I	pp13-19
	Nutrition, chemical components, required elements, environmental conditions affecting growth, growth cycle, bacterial genetics, physiological variation, genetic variation, mutation, genotype, phenotype, plasmids, transposons, transcription and translation.		
4-	Host-parasite Relationship	Chap –I	pp29-33



- 11- Clostridia Chap –2 pp91-94  
 General characteristics, main pathogenic clostridia, culture, toxins production, pathogenicity, identification, diagnosis, prevention and treatment, and anaerobic culture techniques.
- 12- Actinomyces and Nocardia Chap –2 pp89-90  
 General characteristics, culture, main different species, epidemiology, diagnosis, and treatment.
- 13- Mycobacteria Chap –2 pp127-129  
 General characteristics, main human pathogens, **M. tuberculosis**, *M.leprae* epidemiology, pathogenesis, tuberculin test, laboratory diagnosis, prevention and treatment.
- 14- Neisseria and Haemophilus Chap –2 pp95-97  
 General characteristics, main human pathogens, culture, pathogenesis, diagnosis and treatment.
- 15- Treponema, Borrelia Chap –2 pp121-124  
 General characteristics, main pathogenic Geneva, pathogenesis, syphilis (congenital and acquired), ANUG, diagnosis and treatment.
- 16- Enterics and other Gram-negatives Chap –2 pp99-104  
 General characteristics, main pathogenic Genera and species identification, habitat, pathogenicity and treatment.
- 17- Mycoplasma, Rickettsia, Chlamydia Chap –2 pp131-133  
 General characteristics, main species pathogenesis, diagnosis, prevention and treatment.
- 18- Yeast and related fungi Chap –2 pp147-151  
 General characteristics, Structure and morphology main species, culture, pathogenicity, predisposing factors, oral mycoses, identification and diagnosis and treatment.

- 19- Viruses Chap –2 pp135-145  
 Viral structure, classification and diagnosis of viral diseases, Herpes viruses, hepatitis viruses, HIV and respiratory infection viruses.
- 20- Oral microflora, dental plaque Chap –5 pp263-266
- A. Oral Microflora  
 Main microorganisms, distribution, development of oral flora, factors influencing the nature of oral flora, and defense mechanisms in the oral cavity.
- B. Dental plaque Chap -5 pp 270-273  
 Definition, composition, type, development, pathogenicity of dental plaque and prevention.

**Practical:**

- 1- Microscopy  
 Proper use and focusing of light microscope bacterial smear preparation and the use of simple stain.
- 2- Gram staining, negative staining  
 Students do gram-stain and negative stain techniques
- 3- Demonstration of bacterial cultural characteristics, pure culture technique; use of liquid and solid media.
- 4- Sterilization and disinfection  
 Different methods of sterilization and disinfection (e.g. autoclave, flaming loops) are using 70% alcohol, iodine compounds and sodium hypochlorite)
- 5- Antibiotic sensitivity detection  
 Antibiotic paper disc technique and serial concentration method
- 6- Characteristics of Staphylococci  
 Gram stain, catalase test, coagulase test

7- Characteristics of Streptococci

Gram-stain, catalase test, blood type of haemolysis (B, , ), bicitracin sensitivity test, optichin sensitivity test and bile salt solubility test.

8- Characteristics of clostridia

Gram-stain, catalase test, blood agar and cooked meat medium, litmus milk test, Nagler plate test, spore stain and anaerobic cultural methods

9- Pathogens of gastrointestinal tract

Lactose fermentation test, growth on MacConkey's, agar, biochemical tests (glucose fermentation with or without acid production, citrate utilization, reduction of nitrate to nitrite and oxidase test), and antibiotic sensitivity.

10- Characteristics of yeast and Molds

Growth on sabouraud agar, KOH test, fungal stain, gram-stain, germ-tube test, Chlamydiospores production. Type of hyphae and spores, fungi in patients specimens.

11- Serological tests

Single agglutination, microprecipitation and agar gel precipitation.

12- Virological methods:

Electron micrographs of medically important viruses, egg inoculation route, types of CPE in cell cultures.

D. Methodology:

Didactic + practical

E. Evaluation and grading:

The criteria of passing the course will be a cumulative grade of 60% or above on continuous assessment examination (one written and one practical) and final exam. The following percentage of total grade will be assigned to each:

<u>Tests No.</u>	<u>Type of Evaluation</u>	<u>Grades</u>
1- CAT (Mid term)		40%
	a- Written	25%
	b- Practical	15%
2- Final Examination		60%

The continuous assessment and final exam will measure the student's achievement of terminal objectives

Make-Up-Exam

F- Required Text:

Essential Microbiology for Dentistry – L.P. Samaranayake  
Latest Edition, Livingstone New York, London

G- Reference Text:

- McCracken and Cawson, Clinical and Oral Microbiology, McGraw Hill
- Sleigh and Timbury, Notes on Medical bacteriology, Churchill Livingstone
- Timbury, Notes on medical Virology, Churchill Livingstone
- Kimball Introduction to Immunology, Macmillan