



Course specification (2018)

1-Basic information

Course Code:	S3-MICR
Course title :	Bacteriology, Mycology and Immunology
Academic year:	3rd Year
Program title:	B. Sc. Veterinary Medical sciences
Contact hours/ week	5 hours/week, (2 Lect./week, 3 Practical/week)
Approval Date	

2-Professional information

Overall aims of course:

The course will introduce the student to the microbial world and the relationship of that world with the environment, animal, bird, and human health. Students should develop an appreciation for the ubiquity, longevity and importance of bacterial and fungal species. Students should elicit solutions for different veterinary bacterial and fungal problems. Students should identify immune system and immunity.

The student will be able to:

1. Outline the fundamental characteristics of microbes (nature, cell structure, types and classification).
2. Develop an understanding of microbial growth, metabolism, reproduction, nutrition, cultivation, and identification.
3. Identify different bacterial and fungal pathogens detecting their virulence factors and antimicrobial resistance.
4. Identify the host-parasite relationships and types of bacterial infections.
5. Study bacterial and fungal genetics.
6. Diagnose different veterinary bacterial and fungal infections by different methods.
7. Outline the immune system (physiology, structure and development, types and mechanisms of immunity).

3- Intended learning outcomes of course (ILOs)

a- Knowledge and understanding:

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

- a1- Be aware of the biosafety and quality control measures in veterinary laboratories.
- a2- Describe the nature, classification, morphology and structure of bacterial and fungal cells.
- a3- Recognize growth requirements, physiology, reproduction and products of bacteria and fungi.
- a4- Recognize the factors associated with the virulence of the microorganisms, its exaltation and attenuation.
- a5- Describe how genetic characters of bacteria could be expressed, transferred and changed.
- a6- Define the terms: sterilization, susceptibility, resistance, antibiotics and chemotherapeutic agents.
- a7- Outline the structure, development of immune system and different types and mechanisms of immunity.
- a8- Discuss the immunological terms: cytokines, antigens, antibodies, adjuvant, immunomodulation and hypersensitivity and their types.



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a9- List the different methods for diagnosis of bacterial and fungal diseases.

b- Intellectual skills

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

- b1- Appraise the different important laboratory safety guidelines.
- b2- Gain an appreciation for the coherence of biological, physical, chemical and genetic description of living microorganism.
- b3- Identify and differentiate between different bacterial and fungal pathogens.
- b4- Assess the infective potential of environmental materials to prevent the spread of the infection in the community.
- b5- Solve the problems concerning with different veterinary bacterial and fungal affections.
- b6- Distinguish between different types of immunity.

c- Professional and practical skills

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

- c1- Collect, preserve and transport samples from animals, poultry and fish for microbiological examination.
- c2- Demonstrate microscopy-types, their principles and their use for identification of bacterial identification.
- c3- Apply different methods of sterilization and disinfection.
- c4- Describe the modes of action of chemotherapeutic agents and the test necessary to determine drug susceptibility.
- c5- Culture of bacteria and fungi on different media.
- c6- Perform standard practice microbiological laboratory techniques, interpret laboratory results and integrate the results with clinical information.
- c7- Use different microbiological techniques to identify different bacterial and fungal pathogens.

d- General and transferable skills

By the end of studying the course, the student should be able to:

- d1- Work in groups.
- d2- Demonstrate competence in information technology including the use of computers and internet tools.
- d3- Use library facilities and Internet search strategies to study bacteria and fungi.
- d4- Function in lab with live microorganisms obey and understand all safety rules to ensure the safety of all participants.
- d5- Improve public speaking and scientific writing skills through presentations, discussions and writing in the exam.

4-Topics and contents

First Semester

Week	Topic	No. of hrs	Lectures	Practical
1	-Introduction of Microbiology	1	1	-
	-Morphology and Classification of bacteria	1	1	-
	*Safety in the laboratory	3	-	3



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2	-Bacterial growth cycle, arrangement and Structure.	1	1	-
	-Bacterial Reproduction and Metabolism.	1	1	-
	*Microscopy	2	-	2
	*Bacterial Motility	1	-	1
3	-Relationships of the bacteria to the host and environment.	1	1	-
	-Bacterial products (pigments, toxins)	1	1	-
	*Sterilization and disinfection	3	-	3
4	-Bacterial infection and virulence	1	1	-
	-Koch's postulates and their exceptions.	1	1	-
	*Sterilization and disinfection	1	-	1
	* <i>In-vitro</i> antimicrobial sensitivity	2	-	2
5	-Gene expression (Transcription and Translation).	1	1	-
	-Bacterial chromosome and plasmids.	1	1	-
	*Staining of bacteria	3	-	3
6	-Mutations and mutagenic agents.	1	1	-
	-Genetic engineering techniques and nucleic acid hybridization	1	1	-
	*Staining of bacteria	1	-	1
	*Bacteriological culture media	2	-	2
7	-Tissues and organs and cells of the immune system.	1	1	-
	-Types and mechanisms of immunity.	1	1	-
	*Cultivation and isolation of pure culture of bacteria	3	-	3
8	-Types and mechanisms of immunity.	1	1	-
	-Antigen and Immunogenicity.	1	1	-
	*Tests for the identification of bacteria	3	-	3
9	-Immunoglobulins	1	1	-
	-Cells cooperation for humeral and cellular immunity	1	1	-
	*Biochemical tests for the identification of bacteria	3	-	3
10	-Adjuvant			
	-Hypersensitivity.	2	2	-
	-Immunostimulants and immunosuppression.			
	*Serological tests.	3	-	3
11	-Structure of fungal cell and fungal colony.	2	2	-
	-Fungal reproduction, growth and products.			
	*Serological tests.	1	-	1
	*Cell mediated Immunity	2	-	2
12	-Classification of fungi.	1	1	-
	-Identification of fungi	1	1	-
	*Practical Mycology	3	-	3
Total		60	24	36



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Second Semester

Week	Topic	No. of hrs	Lectures	Practical
1	-Staphylococci	1	1	-
	- Streptococci	1	1	-
	* <i>Staphylococcus aureus</i> on culture (Gram`s stain).	3	-	3
2	- Listeria	1	1	-
	- F. Bacillaceae (G. Bacillus)	1	1	-
	* <i>Streptococcus</i> species on culture (Gram`s stain).	3	-	3
3	- G. Clostridium	2	2	-
	* <i>S. agalactiae</i> in milk (Loeffler`s MB stain).	3	-	3
4	-Corynebacteria	1	1	-
	-Mycobacterium	1	1	-
	* <i>Bacillus anthracoides</i> on culture (Gram`s stain).	3	-	3
5	-Enterobacteriaceae (<i>E. coli</i> , <i>Salmonella</i> , <i>Klebsiella</i>)	2	2	-
	* Corynebacteria on culture (Gram`s stain).	3	-	3
6	- <i>Brucella</i> species.	1	1	-
	- <i>Campylobacter</i> species.	1	1	-
	* Gram-negative bacteria on culture (Gram`s stain).	3	-	3
7	- <i>Pseudomonas</i> species.	1	1	-
	-Spirochaetes (<i>Leptospira</i> , <i>Borreliae</i> and <i>Treponema</i>)	1	1	-
	* <i>Pseudomonas aeruginosa</i> on culture (Gram`s stain).	3	-	3
8	- <i>Pasteurella</i> species.	1	1	-
	- Mycoplasma, Chlamydia & Rickettsia.	1	1	-
	* <i>Mycobacterium</i> species in sputum (Ziehl-Neelsen stain)	3	-	3
9	- Yeasts (<i>Candida</i> species, <i>Cryptococcus</i> species)	2	2	-
	* <i>P. multocida</i> in blood/tissue film (Leishman's stain)	3	-	3
10	- Moulds.	2	2	-
	* Yeasts on culture (Gram`s stain).	3	-	3
11	-Dermatophytes.	1	1	-
	-Diphasic fungi	1	1	-
	* Yeasts on culture (Gram`s stain).	3	-	3
12	- Mycotoxins.	1	1	-
	- Fish pathogenic bacteria (<i>Aeromonas</i> , <i>Vibrio</i> , <i>Edwardsiella</i>).	1	1	-
	* Dermatophytes.	3	-	3
Total		60	24	36

5-Teaching and learning methods

5.1- Lectures (brain storming, discussion) using board and data shows.

5.2- Self learning by preparing essays and presentations (computer researches and faculty library)

5.3- Practical sections.



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5.4- Field visits

6-Teaching and learning methods for the students with disabilities

Office hours and special meetings for explanation of difficult topics.

7-Student assessment

7.1. Assessments methods:

Method	Matrix alignment of the measured ILOs/ Assessments methods			
	K&U	I.S	P&P.S	G.S
Written Exam	a2, a3, a4, a5, a7, a8, a9	b2, b3, b4, b5, b6	c7	d5
Practical Exam	a1, a2, a3, a6, a9	b1, b2, b3, b4, b5	c1 to c7 (all)	d4, d5
Oral Exam	a1 to a9 (all)	b1 to b6 (all)	c1 to c6 (all)	d5

7.2. Assessment schedules/semester:

Method	Week(s)
Practical exams	13 th week
Final exams	managed by administration
Oral Exams	Accompanying the final exams

7.3. Weight of assessments:

Assessment	Weight of assessment
Practical exams	30%
Written exams	50%
Oral exams	20%
Student activities	-
Total	100%

8- List of references

8.1. Notes and books

Departmental notes on:

- Notes on Bacteriology, Mycology and Immunology.
- Notes on Practical Bacteriology, Mycology and Immunology.
- Notes on Veterinary Microbiology.

8.2. Essential books:

- Bergey's Manual of Systematic Bacteriology, 4th Edition Noel R. Krieg, John G. Holt, and Murray R. G. E. 1984.
- Prescott, Harley and Klein's Microbiology. J. M. Willey, L. M. Sherwood, and C. J. Woolverton – 17th Edition, International Edition , 2008, Mc Graw Hill
- Bergey's Manual of Determinative Bacteriology, 9th Edition John G. Holt, 1993
- Diagnostic Microbiology, 2nd Edition 2000 Connie R. Mahon and George Manuselis.

8.3. Recommended texts

- 1- Clinical Veterinary Microbiology, P.J. Quinn, M.E. Carter, B. Markey and G.R. Carter, 6th



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Editio2004

- 2- **Veterinary Microbiology, Dwight C. Hirsh and Yuan Ghung Zee, 1999**
- 3- **Medical Microbiology, R. Cruickshank 1986.**
- 4- **Mackie and McCartney Medical Microbiology, 14th Edition 1992 (J. P. Duguid, B.P. Marmion and R. H. A. Swain). (The book present in the faculty library)**
- 5- **Medical Mycology, 1992 K. J. Kwon-Chung and John E. Bennett.**
- 6- **Introductory Mycology, 3rd Edition 1979, C.J. Alexopoulos and C.W. Mims.**
- 7- **Immunology, 1986 D. M. Weir.**
- 8- **Medical Immunology, 1977, Malcolm S. Thaler, M. D. and Richard D.**
- 9- **Topley & Wilson microbiology and microbial infections, 9th edition**

8.4. Journals, Websitesetc

Journals

[Journal of Bacteriology](#)

[Microbiology](#)

[Microbiology and Immunology](#)

[Journal of Microbiology, Immunology and Infection](#)

[BMC Microbiology](#)

[Brazilian Journal of Microbiology](#)

[Microbiology and Molecular Biology Reviews](#)

[Internet Journal of Microbiology](#)

[Polish Journal of Microbiology](#)

[Journal of Microbiology and Biotechnology](#)

[African Journal of Microbiology Research](#)

[International Journal of Microbiology](#)

[Iranian Journal of Microbiology](#)

Websites

<http://www.sciencedirect.com>.

<http://www.Pubmed>.

<http://www.Altavista>.

<http://www.cellsalive.com>.

<http://www.textbookofbacteriology.net>.

http://www.ourfood.com/General_bacteriology.html

http://www.Veterinary_Microbiology

http://www.Immunology_and_Immunopathology

Course Coordinator

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Time/ Week	Topic	Total No. of hours	Lectures	Practical	Intended learning outcomes (ILOs)			
					K&U (a)	IS .(b)	P.P.S (c)	G.T.S (d)
1	-Introduction of Microbiology	1	1	-	a2	b2, b3		d1, d2, d3, d5
	-Morphology and Classification of bacteria	1	1	-				
	*Safety in the laboratory	3	-	3	a1	b1	c1	d4
2	-Bacterial growth cycle, arrangement and Structure.	1	1	-	a2 a3	b2		d1, d2, d3, d5
	-Bacterial Reproduction and Metabolism.	1	1	-				
	*Microscopy *Bacterial Motility	2 1	- -	2 1	a2	b2, b3	c2, c6	d4
3	-Relationships of the bacteria to the host and environment.	1	1	-	a3	b2, b3		d1, d2, d3, d5
	-Bacterial products (pigments, toxins)	1	1	-				
	*Sterilization and disinfection	3	-	3	a1, a6	b1, b4, b5	c3	d4
4	-Bacterial infection and virulence	1	1	-	a4	b2		d1, d2, d3, d5
	-Koch's postulates and their exceptions.	1	1	-				
	*Sterilization and disinfection *In-vitro antimicrobial sensitivity	1 2	- -	1 2	a1, a6	b1, b4, b5	c3 c4	d4
5	-Gene expression (Transcription and Translation).	1	1	-	a5	b2		d1, d2, d3, d5
	-Bacterial chromosome and plasmids.	1	1	-				
	*Staining of bacteria	3	-	3	a2	b2, b3	c2, c6, c7	d4
6	-Mutations and mutagenic agents.	1	1	-	a5	b2		d1, d2, d3, d5
	-Genetic engineering techniques and nucleic acid hybridization	1	1	-				
	*Staining of bacteria	1	-	1	a2	b2, b3	c2, c6, c7	d4
	*Bacteriological culture media	2	-	2	a3		c5, c6, c7	

7	-Tissues and organs and cells of the immune system. -Types and mechanisms of immunity.	1 1	1 1	- -	a7	b6		d1, d2, d3, d5
	*Cultivation and isolation of pure culture of bacteria	3	-	3	a3	b2, b3	c5, c6, c7	d4
8	-Types and mechanisms of immunity. -Antigen and Immunogenicity.	1 1	1 1	- -	a7, a8	b6		d1, d2, d3, d5
	*Tests for the identification of bacteria	3	-	3	a9	b2, b3	c6, c7	d4
9	-Immunoglobulins -Cells cooperation for humeral and cellular immunity	1 1	1 1	- -	a8			d1, d2, d3, d5
	*Biochemical tests for the identification of bacteria	3	-	3	a9	b2, b3	c6, c7	d4
10	-Adjuvant -Hypersensitivity. -Immunostimulants and immunosuppression.	2	2	-	a8	b5, b6		d1, d2, d3, d5
	*Serological tests.	3	-	3	a9	b2, b3	c6, c7	d4
11	-Structure of fungal cell and fungal colony. -Fungal reproduction, growth and products.	2	2	-	a2, a3	b2		d1, d2, d3, d5
	*Serological tests.	1	-	1	a9	b2, b3	c6, c7	d4
	*Cell mediated Immunity	2	-	2				
12	-Classification of fungi. -Identification of fungi	1 1	1 1	- -	a2	b2, b3		d1, d2, d3, d5
	*Practical Mycology	3	-	3	a2, a3, a9	b2, b3	c2, c5, c6, c7	d4

Time/ Week	Topic	Total No. of hours	Lectures	Practical	Intended learning outcomes (ILOs)			
					K&U (a)	K&U (a)	K&U (a)	K&U (a)
1	-Staphylococci	1	1	-	a2, a3,	b2, b3,	c2, c7	d1, d2, d3, d5
	- Streptococci	1	1	-	a4, a9	b4, b5,		
	* <i>Staphylococcus aureus</i> on culture (Gram`s stain).	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4
2	- Listeria	1	1	-	a2, a3,	b2, b3,	c2, c7	d1, d2, d3, d5
	- F. Bacillaceae (G. Bacillus)	1	1	-	a4, a9	b4, b5,		
	* <i>Streptococcus</i> species on culture (Gram`s stain).	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4
3	- G. Clostridium	2	2	-	a2, a3,	b2, b3,	c2, c7	d1, d2, d3, d5
					a4, a9	b4, b5,		
	* <i>S. agalactiae</i> in milk (Loeffler`s MB stain).	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4
4	-Corynebacteria	1	1	-	a2, a3,	b2, b3,	c2, c7	d1, d2, d3, d5
	-Mycobacterium	1	1	-	a4, a9	b4, b5,		
	* <i>Bacillus anthracoides</i> on culture (Gram`s stain).	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4
5	-Enterobacteriaceae (<i>E. coli</i> , <i>Salmonella</i> , <i>Klebsiella</i>)	2	2	-	a2, a3,	b2, b3,	c2, c7	d1, d2, d3, d5
					a4, a9	b4, b5,		
	* Corynebacteria on culture (Gram`s stain).	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4
6	- <i>Brucella</i> species.	1	1	-	a2, a3,	b2, b3,	c2, c7	d1, d2, d3, d5
	- <i>Campylobacter</i> species.	1	1	-	a4, a9	b4, b5,		
	* Gram-negative bacteria on culture (Gram`s stain).	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4
7	- <i>Pseudomonas</i> species.	1	1	-	a2, a3,	b2, b3,	c2, c7	d1, d2, d3, d5
	-Spirochaetes (<i>Leptospira</i> , <i>Borreliae</i> and <i>Treponema</i>)	1	1	-	a4, a9	b4, b5,		
	* <i>Pseudomonas aeruginosa</i> on culture (Gram`s stain).	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4

8	- <i>Pasteurella</i> species.	1	1	-	a2, a3,	b2, b3,		d1, d2,
	- Mycoplasma, Chlamydia & Rickettsia.	1	1	-	a4, a9	b4, b5,	c2, c7	d3, d5
	* <i>Mycobacterium</i> species in sputum (Ziehl-Neelsen stain)	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4
9	- Yeasts (<i>Candida</i> species, <i>Cryptococcus</i> species)	2	2	-	a2, a3,	b2, b3,	c2, c7	d1, d2,
	* <i>P. multocida</i> in blood/tissue film (Leishman's stain)	3	-	3	a4, a9	b4, b5,	c1, c2, c5, c6, c7	d3, d5
10	- Moulds.	2	2	-	a2, a3,	b2, b3,	c2, c7	d1, d2,
	* Yeasts on culture (Gram's stain).	3	-	3	a4, a9	b4, b5,	c1, c2, c5, c6, c7	d3, d5
11	- Dermatophytes.	1	1	-	a2, a3,	b2, b3,	c2, c7	d1, d2,
	- Diphasic fungi	1	1	-	a4, a9	b4, b5,	c1, c2, c5, c6, c7	d3, d5
	* Moulds on culture (Lactphenol cotton blue stain).	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4
12	- Mycotoxins.	1	1	-	a2, a3,	b2, b3,	c2, c7	d1, d2,
	- Fish pathogenic bacteria (<i>Aeromonas</i> , <i>Vibrio</i> , <i>Edwardsiella</i>).	1	1	-	a4, a9	b4, b5,	c1, c2, c5, c6, c7	d3, d5
	* Dermatophytes.	3	-	3	a2, a3	b2, b3	c1, c2, c5, c6, c7	d4