



University of Mosul
College of Sciences
Department of Biology



M.Sc. First semester

Subject	
Microbial taxonomy	Microbiology
Applied microbiology	
Microbial physiology	
Advance virology	
Microbial biochemistry	
Internet and computer	Zoology
Advanced histology	
Advanced Animal physiology	
Insect biology	
Animal biochemistry	
Internet and computer	Botany
Plant biochemistry	
Plant metabolism	
Ecology and pollution	
Quantitative genetics	
Plant anatomy	
Internet and computer	



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Lecturer Name	Prof.Dr.Muhsin Ayoub Essa and Dr. Ghada A. Mohammad
Subject Name	Applied Microbiology/ M. SC. Microbiology / 1 st semester
Academic Year	2022-2023
Credit Hours	2 hours / week

Students do study the following fields:

Course Outcomes:

1. Students are able to understand how microorganisms are live in their environment.
2. Help the student to use the microorganisms in different applications
3. Understand how microorganisms produce different metabolites to use it in medicine and industry.
4. Encouraged the students to improve their skills in the critical thinking about the physiology of the microorganisms.

Weekly Teaching Plan

Week 1, 2	Treatment of wastes and Bioremediation
Week 3,4	Microbes and bioenergy production and Extreme Environments
First Quiz	
Week 5,6	Brobiotics and Microorganism in treatment of cancer
Week 7,8	Microbial Interactions and Global Biogeochemical cycles.



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Second Quiz	
Week 9,10	Production of bacterial pigments
Week 11,12	Single Cell Protein (SCP) production
Third Quiz	
Week 13	Production of Antibiotics and Anti-Tumor Agents, Nanotechnology
Week 14,15	Production of microbial insecticides, Quorum Sensing and Environmental Sustainability
Course Final Term Exam	

Student Behavior in Class: were very good and polite.

Teaching Techniques: Variety methods: traditional and modern ways, by meet and classroom programs to explain and demonstration all lessons.

References:

- 1- Nduka Okafor , Modern industrial Microbiology and biotechnology,. © 2007, Nduka Okafor Science Publishers, Enfield (NH) Jersey Plymouth
- 2- Microbial Biotechnology *Role in Ecological Sustainability and Research Edited by* Pankaj Chowdhary Sujata Mani Preeti Chaturvedi. © 2023 John Wiley & Sons, Inc.

Lecturer Name	Dr.Waad Sabri Shaher
Subject Name	Advanced Histology ,First course
Academic Year	2022-2023
Credit Hours	Theoretical: 2 hours

Students do study the following fields:

1. Blood &Hematopoiesis



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2. Vascular & Lymphatic System, Bone & cartilage structure
3. Structure & function of Urinary & Respiratory System
4. Cellular reactions to injury, Male and female reproductive Sys.

Course Outcomes:

1. Knowing the organs tissue
2. Understand the functions of body Systems
3. Knowing the cellular reactions to injury and histopathological tissues

Weekly Teaching Plan

Week 1, 2	Blood cells & Hematopoiesis
Week 3, 4	Vascular system, Musculature of heart, arteries
First Quiz	
Week 5, 6	Lymphatic system, Urinary system
Week 7, 8	Respiratory system, Cellular reactions to injury
Second Quiz	
Week 9, 10	Cell death, Necrosis, Disturbances of cell growth
Week 11, 12	Integumentary System, Connective tissues
Third Quiz	
Week 13	Bone & cartilage Structure & function
Week 14, 15	Male reproductive System, Female reproductive System
Course Final Term Exam	

Reference: Junqueira's Basic Histology, Fifteenth Edition (2018) Anthony L. Mescher



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Lecturer Name	Prof. Dr. Muna Hussein Ali Jankeer
Subject Name	Advanced Biochemistry (MSC. Microbiology)
Academic Year	2022-2023
Credit Hours	2 hours / week for 15 weeks course

Students do study the following fields:

Advanced Biochemistry (MSC. Zoology):

1. Introduction of biochemistry
2. Carbohydrates
3. Proteins
4. Lipids
5. Nucleic Acids
6. Enzymes
7. Vitamins and coenzyme
8. Introduction of metabolism
9. Seminars

Course Outcomes:

1. By following through the teaching process of principles of biochemistry
2. To help students PhD the principles of biochemistry and advanced metabolism To encourage student develop their own skills in research.





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Weekly Teaching Plan

Advanced Biochemistry(Msc) :

Week 1, 2	Introduction of Biochemistry , Carbohydrates
Week 3,4	Amino acids, Proteins
First Quiz	
Week 5,6	Fatty acids, Lipids
Week 7,8	Nucleic acids
Second Quiz	
Week 9,10	Enzymes
Week 11,12	Vitamins and coenzyme
Third Quiz	
Week 13,14	Introduction of metabolism, Bioenergetics
Week 15	Seminars
Course Final Term Exam	

Student Behavior in Class: Good

Computer Usage : Good

Teaching Techniques: Variety

***Lehninger**

Principles of Biochemistry, 2017



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M. Sc. Second semester

Subject	
Serology	Microbiology
biostatistics	
Bacterial diagnosis	
Advanced Microbial genetics	
English	
Elective	
Advanced parasitology	Zoology
Advanced embryology	
biostatistics	
Molecular biology	
English	
Elective	
Fungi physiology and toxicology	Botany
biostatistics	
Advanced plant taxonomy	
Tissue culture and biotechnology	
English	
Elective	



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Lecturer Name	Dr. Rayan M. Faisal and Dr. Ghada A. Mohammad
Subject Name	Microbial Genetics/ M. SC. Microbiology / 2 nd semester
Academic Year	2022-2023
Credit Hours	2 hours / week

Students do study the following fields:

1. Structure and Organization of nucleic acid.
2. Replication of DNA and Gene expression
3. Plasmids types and their replication
4. Genetic recombination
5. DNA mutation and mutagenesis
6. Molecular biology of bacterial conjugation

Course Outcomes:

1. Students were able to understand the structure of DNA and the four levels of complexity , compression with RNA, description of structure features of DNA double strand and single strand of RNA.
 2. help the student to describe synthesis of new DNA strands with helping of variable enzymes, and three stages of transcription, the relationship between the genetic code and protein synthesis.
 3. Understand plasmids, their role in bacteria, types of their replication, the importance of the genes they carry, and their stability.
 4. Understand the types of mutations and how they occur and the types of mutagens and their mechanism of action.
 5. Differentiate between suppressor mutations and how to calculate mutation rates.
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6. Understand how DNA is mobilized between bacteria either naturally or by genetic engineering.
7. Encouraged the students to improve their skills in the critical thinking in genetic engineering techniques.

Weekly Teaching Plan

Week 1, 2	Structure of nucleic acids and their organization
Week 3,4	The Replication of DNA, transcription
First Quiz	
Week 5,6	Translation
Week 7,8	Regulation of gene expression
Second Quiz	
Week 9,10	plasmids
Week 11,12	Mutations and mutagenicity
Third Quiz	
Week 13	PCR
Week 14,15	DNA sequencing
Course Final Term Exam	

Student Behavior in Class: were very good and polite.

Teaching Techniques: Variety of methods: traditional and modern ways using Google meet and Google classroom for explaining and demonstrating all lessons.





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Lecturer Name	Dr. Raed Salim Ahmad Al-Saffar
Subject Name	Advanced Biostatistics (MS.C)
Academic Year	2023 - 2024
Credit Hours	Theoretical 2 hrs.

Students do study the following fields:

1. Advanced Biostatistics provides students with statistical foundation of the various problems of Biology.
2. Students will learn to recognize the main features of the processes under investigation that could be analyzed in terms of survival analysis, meta-analysis, or general analysis of the paired data.
3. Analyze the observed phenomena in advanced statistical level.

Course Outcomes:

After successful completion of this course students are expected to be able to:

1. Systematize their knowledge of general statistics, and repeat the basics.
2. Plan an experiment in the field of their interest.
3. Provide them with understanding of several experimental sets comparison.
4. Introduce the basic principles of statistical processing of experimental data.
5. Introduce basics of survival analysis and its application in biological experiments.

Weekly Teaching Plan



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Week 1, 2	<ul style="list-style-type: none">• Introduction.• Basic principal of Biostatics.
Week 3,4	<ul style="list-style-type: none">• Fundamental of Biostatics.• Development of Biostatics.
First Quiz	
Week 5,6	<ul style="list-style-type: none">• Epidemiology of Biostatics.• Laws of Biostatics.
Week 7,8	<ul style="list-style-type: none">• Experimental of Biostatics.• Application of Biostatics.
Second Quiz	
Week 9,10	<ul style="list-style-type: none">• The experimental design.• Replication.
Week 11,12	<ul style="list-style-type: none">• Power of experiment.• Power of biometrical
Third Quiz	
Week 13	<ul style="list-style-type: none">• Reliability of the additive genetic.
Week 14,15	<ul style="list-style-type: none">• Data analysis.• Two or more thresholds.
Course Final Term Exam	

Student Behavior in Class: Students were active in our classes and interactive between them and us also.

Teaching Techniques: Variety

References :

1. Westfall, P., & Henning, K. S. (2013). Understanding advanced statistical methods. CRC Press.
2. Whitlock, M. C., & Schluter, D. (2009). The analysis of biological data. Greenwood Village, CO: Roberts and Company Publishers..



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Ph.D. First Semester

المادة	
Microbial metabolism	Microbiology
Bacterial taxonomy & Pathogenicity	
Microbial Genetics	
Advance Immunology	
Internet and computer	
Advanced Protozoa and Worms	Zoology
Animal physiology	
Advanced metabolism	
Comparative anatomy	
Internet and computer	Botany
Advance Plant taxonomy	
Advance Plant biochemistry	
Applied fungi	
Advance Quantitative genetics	
Internet and computer	



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Lecturer Name	Dr.Hiyam Adel Altaee /Dr. Amera Mahmood Alrawi /
Subject Name	Microbial metabolism /Ph.D students /microbiology
Academic Year	2023-2024
Credit Hours	2hours/week

Students do study the following fields:

1. Prokaryotic cell structure
2. Microbial metabolism ,Principles of metabolism
3. Catabolism and energy release
4. Anabolism and anabolic pathways
5. Control and regulation of metabolism

Course Outcomes:

1. Students were able to understand the principles of microbial metabolism
- 2.Help students how to master the role of metabolic pathways in the cell life
3. Encouraging students to develop their scientific skills

Weekly Teaching Plan

Week 1, 2	Prokaryotic cell structures and functions
Week 3,4	Microbial growth and dynamics of growth ; Control of growth
First Quiz	
Week 5,6	Principles of metabolism ; Catabolism
Week 7,8	Catabolic pathways and production of energy
Second Quiz	
Week 9,10	Anabolism ; biosynthesis of : Nucleic acids ,Protein ,Polysaccharides , Peptidoglycan and Lipids
Week 11,12	Control of metabolism
Third Quiz	
Week 13	Regulation of metabolism



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Week 14,15	Photosynthesis
Course Final Term Exam	

وصف المقرر الدراسي

Lecturer Name	Dr. Rayan M. Faisal and Dr. Ghada A. Mohammad
Subject Name	Microbial Genetics/ Ph.D Microbiology / 1 st semester
Academic Year	2023-2024
Credit Hours	2 hours / week

Students do study the following fields:

6. Structure and Organization of nucleic acid.
7. Replication of DNA and Gene expression
8. Plasmids types and their replication
9. Genetic recombination
10. DNA mutation and mutagenesis
11. Molecular biology of bacterial conjugation

Course Outcomes:

1. Students were able to understand the structure of DNA and the four levels of complexity , compression with RNA, description of structure features of DNA double strand and single strand of RNA.
 2. help the student to describe synthesis of new DNA strands with helping of variable enzymes, and three stages of transcription, the relationship between the genetic code and protein synthesis.
 3. Understand plasmids, their role in bacteria, types of their replication, the importance of the genes they carry, and their stability.
 4. Understand the types of mutations and how they occur and the types of mutagens and their mechanism of action.
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- Differentiate between suppressor mutations and how to calculate mutation rates.
- Understand how DNA is mobilized between bacteria either naturally or by genetic engineering.
- Encouraged the students to improve their skills in the critical thinking in genetic engineering techniques.

Weekly Teaching Plan

Week 1, 2	The Replication of DNA,
Week 3,4	transcription
First Quiz	
Week 5,6	Translation
Week 7,8	Levels of gene regulation
Second Quiz	
Week 9,10	Recombinant DNA technology
Week 11,12	
Third Quiz	
Week 13	PCR technique
Week 14,15	DNA sequencing
Course Final Term Exam	

Student Behavior in Class: were very good and polite.

Teaching Techniques: Variety of methods: traditional and modern ways using Google meet and Google classroom for explaining and demonstrating all lessons.



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References:

- 1- Pierce, B. A. (2017). Genetics A conceptual Approach. 4th ed. W.h. freeman Macmillan Learning, New york.
- 2- Brooker, R. J. (2018). Genetics Analysis & Principles. 6th ed. Mc Graw Hi Education.
- 3- Snyder, L.; Peters, J.; Henkin, T. and Champness, W. (2013). Molecular genetics of bacteria. 4th ed. ASM press, USA.

Lecturer Name	Prpf.Dr. Muhammed Salah Aldeen Abdul Faraj
Subject Name	Protozoa and Worms
Academic Year	2023- 2024
Credit Hours	2 hours

Students do study the following fields:

1. Introduction , History and Distribution , Vectors
2. Types of Parasites , Life cycle, Mixed Infections ,
3. Pathogenesis , Clinical Features ,
4. Immunity , Laboratory Diagnosis .

Weekly Teaching Plan



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Week 1, 2	General Introduction , Protozoa
Week 3,4	Immunity to Parasites Infection
First Quiz	
Week 5,6	Amebae ,Intestinal,Oral and Genital Flagellates
Week 7,8	Hemoflagellates, Malaria and Coccidia
Second Quiz	
Week 9,10	Helminths,General Features and Cestodes
Week 11,12	Pseudophyllidean, Cyclophyllidean Tapeworms
Third Quiz	
Week 13	Trematodes: Flukes
Week 14,15	Nematodes
Course Final Term Exam	

Student Behavior in Class: Excellent interaction with the lectures

Teaching Techniques:

References: Medical Parasitology Paniker Textbook

Lecturer Name	Dr. Raed Salim Ahmad Al-Saffar
Subject Name	Advanced Quantitative Genetics (Ph.D)
Academic Year	2023 - 2024
Credit Hours	Theoretical 2 hrs.

Students do study the following fields:

1. The importance and applications of Quantitative genetics.
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2. Introduce them to concepts, theory and methods in quantitative genetics with emphasis in application to breeding programs and statistical analysis of genetic experiments/studies.

Course Outcomes:

After successful completion of this course students are expected to be able to:

1. Understand the genetic underpinnings of living organisms.
2. Improve traits of economic interest in domestic plants and animals.

Weekly Teaching Plan

Week 1, 2	<ul style="list-style-type: none"> • Introduction. • Basic of generation- means.
Week 3,4	<ul style="list-style-type: none"> • Basic of generation- variation. • Selfing and full – sib mating.
First Quiz	
Week 5,6	<ul style="list-style-type: none"> • Genetic marker. • Gene location.
Week 7,8	<ul style="list-style-type: none"> • Designer chromosome. • Population.
Second Quiz	
Week 9,10	<ul style="list-style-type: none"> • The consequence of linkage. • Epistasis.
Week 11,12	<ul style="list-style-type: none"> • Genotype by environment interaction. • Maternal effect.
Third Quiz	
Week 13	<ul style="list-style-type: none"> • Applications.
Week 14,15	<ul style="list-style-type: none"> • Experimental design. • Correlated and threshold character.
Course Final Term Exam	

Reference :

Falconer D. S. (2017) Introduction to Quantitative Genetics (Classic Reprint) . FB &C Limited.



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Lecturer Name	Prof. Dr. Muna Hussein Ali Jankeer
Subject Name	Advanced Metabolism (PhD. Zoology)
Academic Year	2022-2023
Credit Hours	2 hours / week for 15 weeks course

Students do study the following fields:

Advanced Metabolism (PhD) :

1. Introduction of metabolism
2. Carbohydrates Metabolism
3. Proteins Metabolism
4. Lipids Metabolism
5. Nucleic Acids Metabolism
6. Seminars

Course Outcomes:

1. By following through the teaching process of principles of biochemistry
2. To help students PhD the principles of biochemistry and advanced metabolism To encourage student develop their own skills in research.





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Weekly Teaching Plan

Advanced Metabolism (PhD) :

Week 1, 2	Introduction of metabolism,Bioenergetics
Week 3,4	Carbohydrates Metabolism
First Quiz	
Week 5,6	Proteins Metabolism
Week 7,8	Lipids Metabolism
Second Quiz	
Week 9,10	Ketogenesis , Nucleic Acids Metabolism
Week 11,12	Nucleic Acids Metabolism
Third Quiz	
Week 13,14	Seminars
Week 15	Seminars
Course Final Term Exam	

***Lehninger Principles of Biochemistry, 2017**





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Ph.D. Second Semester

Subject	
Molecular virology	Microbiology
Microbial ecology and toxins	
Design and experimental analysis	
Molecular biochemistry	
Animal ecology	Zoology
Endocrine physiology	
Design and experimental analysis	
Advanced entomology	
Advanced plant ecology	Botany
Advanced plant physiology	
Design and experimental analysis	
advanced plant pathology	



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Lecturer Name	Prof. Dr. Muna Hussein Ali Jankeer
Subject Name	Advanced Ecology (PhD. Zoology)
Academic Year	2024-2023
Credit Hours	2 hours / week for 15 weeks course

Students do study the following fields:

Advanced Ecology (PhD) :

1. Introduction of ecology
2. Ecosystem
3. Ecology succession
4. Ecological pyramids
5. Environmental pollution
6. Air pollution
7. Water pollution
8. Noise pollution
9. Seminars

Course Outcomes:

1. By following through the teaching process of principles of ecology and pollution.
2. To help students master the principles of advanced ecology and pollution
3. To encourage student develop their own skills in research.





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Weekly Teaching Plan

Advanced Ecology (PhD) :

Week 1, 2	Introduction of ecology
Week 3,4	Ecosystem
First Quiz	
Week 5,6	Ecology succession Ecological pyramids
Week 7,8	Environmental pollution
Second Quiz	
Week 9,10	Air pollution
Week 11,12	Water pollution, Heavy metal pollution
Third Quiz	
Week 13,14	Noise pollution
Week 15	Seminars
Course Final Term Exam	

Student Behavior in Class: Good

Computer Usage : Good

Teaching Techniques: Variety

***The ecology book 2019**

Ecology. Micheal Begon. 2005





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Lecturer Name	Mohammed Hussein Mikael
Subject Name	Advanced Endocrinology / PhD Zoology
Academic Year	2023 - 2024
Credit Hours	2

Students do study the following fields: PhD

1. Functions and chemical structures of hormones
2. Organs that secrete hormones
3. Conditions of hormone disorder levels

Weekly Teaching Plan

Week 1, 2	HORMONE STRUCTURE
Week 3,4	Hormone receptors
First Quiz	
Week 5,6	Pituitary gland
Week 7,8	Reproductive system
Second Quiz	
Week 9,10	Thyroid gland
Week 11,12	Pineal gland
Third Quiz	
Week 13	Parathyroid gland
Week 14,15	Pancreas gland
Course Final Term Exam	

Student Behavior in Class: Good



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Teaching Techniques:

- 1-The lectures are explained through audio files, videos and recording files of the lectures so that the student can refer to them whenever he wants that to avoid the problems of power outages and weak in internet.
- 2 - The lectures are also explained and communicating with students through the meeting by the Classroom for the purpose of agitation topics related to the scientific subject to be discussed in a scientific way.
- 3 - Students are given daily tests in order to keep the student in touch with the scientific material and to consolidate the information in the student's mind.
- 4 - Assigning students to answer intellectual questions about some topics and discussing them in the next lecture to develop the aims of scientific research and delve into the subtleties of the scientific material and study the various aspects of the subject in terms of its connection to other science and their applications.
- 5- Assigning students to write some reports related to the scientific subject and their interaction with the scientific material to set grades that fall within the student's scientific assessment .
- 6 - Taking into consideration the student's attendance in lectures and the extent of his ability to participate in the discussions presented during the lectures, and this is part of the student's assessment methods.

Reference:

Arthur C. Guyton and John E. Hall (2006).Textbook of Medical Physiology.11 ed. Elsevier Inc. ISBN 0-7216-0240-1.
