



University of Mosul
College of Sciences
Department of Biology



Stage 1 Lab.

Biology laboratory

Module Objectives	اهداف دراسة مادة الحيوان:
1. Introduction of information about laboratory safety	1. إدخال معلومات حول السلامة المخبرية
2. Tools and machines example microscope	2. الأدوات والآلات مثال المجهر
3. Cell measurement	3. قياس الخلية
4. Animal taxonomy	4. تصنيف الحيوانات
5. Introduction of cell, types of cell ,structure of cell	5. مقدمة عن الخلية، أنواع الخلايا، تركيب الخلية
6. Animal tissues	6. الأنسجة الحيوانية
7. Animal anatomy	7. تشريح الحيوان
8. Types of cell division	8. أنواع انقسام الخلايا

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: General safety instructions in the laboratory.
Week 2	Lab 2: Tools and machines example microscope.
Week 3	Lab 3: Cell measurement
Week 4	Lab 4: Introduction of cell, types of cell ,structure of cell
Week 5	Lab 5: Introduction of cell, types of cell ,structure of cell
Week 6	Lab 6: Animal taxonomy
Week 7	Lab 7: Animal taxonomy
Week 8	Lab 8: Animal taxonomy
Week 9	Lab9: Animal tissues
Week10	Lab 10: Animal tissues



University of Mosul
College of Sciences
Department of Biology
Stage 1 Lab.



Week 11	Lab 11: Animal tissues
Week 12	Lab 12: Animal tissues
Week 13	Lab 13: Animal tissues
Week 14	Lab 14: Types of cell division
Week 15	Lab 15: Types of cell division

المشرف على المختبر: د. فاطمة قاسم محمد Dr. Fatima Qasim Muhammad

مسؤول المختبر: عامر رجب محمود Amer Rajab Mahmoud

Plant Physiology Laboratory:

Module Objectives	اهداف دراسة مادة النبات:
1. Clarification of basic information about the basic vocabulary of the curriculum and how to use it in the anatomy of plants in practice.	1. توضيح المعلومات الأساسية عن المفردات الأساسية للمنهج وكيفية استخدامها في تشريح النباتات عمليا.
2. Teaching students how to prepare different plant tissue sections.	2. تعليم الطلاب كيفية تحضير أقسام الأنسجة النباتية المختلفة.
3. histological comparisons between different aggregates.	3. إجراء المقارنات النسيجية بين المجموع المختلفة.



University of Mosul
College of Sciences
Department of Biology



Stage 1 Lab.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab1:Plant form
Week 2	Lab2:Plant function
Week 3	Lab3: plant cell
Week 4	Lab 4;The cell wall
Week 5	Lab5 :Living components of plant cell
Week 6	Lab6:Types and functions of plastids
Week 7	Lab 7: Non-living components
Week 8	Lab8:types of starch grains
Week 9	Lab 9: Non-living components
Week10	Lab10: types of crystals
Week 11	Lab11 : Plant Tissues, Meristimatic tissues.
Week 12	Lab12: Apical M.T., Lateral M.T. Intercalary M.T.
Week 13	Lab13 :Permanent tissues
Week 14	Lab14 Dermal tissue, Parenchyma tissues, Collenchyma ,T.
Week 15	Lab15:Sclerenchyma T. , Fibers, Sclerides.

مسؤول المختبر: فلة قيدار محمد

Fulla Qedar



University of Mosul
College of Sciences
Department of Biology



Stage 1 Lab.

Computer lab:

Module Objectives	اهداف دراسة مادة النبات:
<p>1. Improved Communication: Fast communication can help increase productivity, allow for better business decisions and facilitate company expansion into new regions or countries. The movement of information within organizations or companies has become instantaneous. Employees can easily transfer data across departments without any interruption. Tools such as email, electronic fax, mobile phones, and text messages enhance the movement of information data between employees, customers, and business partners or suppliers, allowing for greater connectivity across internal and external structures.</p>	<p>1. تحسين الاتصال: يمكن أن يساعد الاتصال السريع في زيادة الإنتاجية، ويسمح باتخاذ قرارات عمل أفضل وتسهيل توسع الشركة في مناطق أو بلدان جديدة. أصبحت حركة المعلومات داخل المنظمات أو الشركات لحظية. يمكن للموظفين نقل البيانات بسهولة عبر الأقسام دون أي انقطاع. تعمل أدوات مثل البريد الإلكتروني والفاكس الإلكتروني والهواتف المحمولة والرسائل النصية على تحسين حركة بيانات المعلومات بين الموظفين والعملاء وشركاء الأعمال أو الموردين، مما يسمح باتصال أكبر عبر الهياكل الداخلية والخارجية.</p>
<p>2. Work: Streamlined workflow systems, shared storage, and collaborative workspaces can increase business efficiency and allow employees to process a greater level of work in a shorter period of time. Information technology systems can be used to automate routine tasks, to facilitate data analysis and to store data in a way that can be easily retrieved for future use. Technology can also be used to answer customer questions through email, in a real-time chat session, or through a phone routing system that connects the customer to an available customer service agent.</p>	<p>2. العمل: يمكن لأنظمة سير العمل المبسطة والتخزين المشترك ومساحات العمل التعاونية أن تزيد من كفاءة العمل وتسمح للموظفين بمعالجة مستوى أكبر من العمل في فترة زمنية أقصر. يمكن استخدام أنظمة تكنولوجيا المعلومات لأتمتة المهام الروتينية، لتسهيل تحليل البيانات وتخزين البيانات بطريقة يمكن استرجاعها بسهولة لاستخدامها في المستقبل. يمكن أيضًا استخدام التكنولوجيا للإجابة على أسئلة العملاء عبر البريد الإلكتروني، أو في جلسة محادثة في الوقت الفعلي، أو من خلال نظام توجيه الهاتف الذي يربط العميل بوكيل خدمة العملاء المتاح.</p>



University of Mosul
College of Sciences
Department of Biology



Stage 1 Lab.

<p>3. Cost Reduction and Economic Efficiency: Communication technology and social technology have made business promotion and product launch affordable. Many small businesses have found ways to use social technology to increase their brand awareness and get more customers for less. In business, factors such as operating cost play an important role in business development and growth. So when companies use information technology to reduce operating costs, the return on investment will increase, which will lead to business growth.</p>	<p>3. خفض التكاليف والكفاءة الاقتصادية: جعلت تكنولوجيا الاتصالات والتكنولوجيا الاجتماعية ترويج الأعمال وإطلاق المنتجات في متناول الجميع. لقد وجدت العديد من الشركات الصغيرة طرقاً لاستخدام التكنولوجيا الاجتماعية لزيادة الوعي بعلامتها التجارية والحصول على المزيد من العملاء مقابل تكلفة أقل. في الأعمال التجارية، تلعب عوامل مثل تكلفة التشغيل دوراً مهماً في تطوير الأعمال ونموها. لذلك عندما تستخدم الشركات تكنولوجيا المعلومات لتقليل تكاليف التشغيل، فإن العائد على الاستثمار سيزداد، مما سيؤدي إلى نمو الأعمال.</p>
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Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
Lab 1	Word applications (1)
Lab 2	Word applications (2)
Lab 3	Applications on Excel (1)
Lab4	Applications on Excel (2)
Lab 5	Power Point applications (1)
Lab 6	Power Point applications (2)
Lab 7	E-mail applications

المشرف على المختبر: د. محمود صبحي

DR. Mahmood Subhi



University of Mosul

College of Sciences

Department of Biology

Second stage laboratories



Insect laboratory

Module Objectives	اهداف دراسة مادة الحشرات:
Enable the student to identify arthropods.	تمكين الطالب من التعرف على المفصليات.
The most important types that it includes.	أهم الأنواع الذين يضمهم.
Expand with the insect class and identify the external and internal morphological characteristics of insects.	التوسع مع فئة الحشرات والتعرف على الخصائص المورفولوجية الخارجية والداخلية للحشرات.
Know the taxonomic position of insects.	معرفة الوضع التصنيفي للحشرات.
Classification methods using taxonomic records.	طرق التصنيف باستخدام السجلات التصنيفية.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction of insect
Week 2	Lab 2: distinguish an insect from other arthropoda
Week 3	Lab 3: The type of orientation on head
Week 4	Lab 4: types of sutures + types of antenna (1)
Week 5	Lab 5: antenna 2
Week 6	Lab 6: Mouth parts of grasshopper and cockroach
Week 7	Lab 7: Mouth parts of housefly
Week 8	Lab 8: Mouth parts of horsefly and istable fly
Week 9	Lab9: Mouth parts of honey bee



University of Mosul
College of Sciences
Department of Biology



Second stage laboratories

Week10	Lab 10: Mouth parts of mosquito
Week 11	Lab 11: Mouth parts of plant bug
Week 12	Lab 12: Mouth parts of bed bug
Week 13	Lab 13: Mouth parts of butterfly
Week 14	Lab 14: Types of legs
Week 15	Lab 15: Types of wings

Dr. Muneef Abd المشراف على المختبر: د. منيف عبد مصطفى

Dawood Fathi مسؤول المختبر: داؤد فتحي امين

Plant anatomy and classification laboratory

Objectives	اهداف دراسة مادة تشريح النبات:
Clarification of basic information about the basic vocabulary of the curriculum and how to use it in the anatomy of plants in practice.	توضيح المعلومات الأساسية عن المفردات الأساسية للمنهج وكيفية استخدامها في تشريح النباتات عمليا.
Teaching students how to prepare different plant tissue sections.	تعليم الطلاب كيفية تحضير أقسام الأنسجة النباتية المختلفة.
Conducting histological comparisons between different aggregates.	إجراء المقارنات النسيجية بين المجاميع المختلفة.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: The plant cell, The cell wall, pits.
Week 2	Lab 2: Intercellular spaces, living & nonliving components.



University of Mosul
College of Sciences
Department of Biology



Second stage laboratories

Week 3	Lab 3: Plant Tissues , Meristimatic Tissues.
Week 4	Lab 4: Apical M.T., Lateral M.T. Intercalary M.T.
Week 5	Lab 5: Perminant Tissues, Parenchyma tissues.
Week 6	Lab 6: Collenchyma Tissues .
Week 7	Lab 7: Sclerenchyma T.
Week 8	Lab 8: Fibers, Sclerides.
Week 9	Lab9: Dermal T. ,Epidermis, Stomata.
Week10	Lab 10: Types & components , subsidiary cells.
Week 11	Lab 11: The Xylem .
Week 12	Lab 12: The phloem.
Week 13	Lab 13: Cross section in monocotyledon & dicotyledon root.
Week 14	Lab 14: Cross section in monocotyledon.
Week 15	Lab 15: Cross section in dicotyledon stem.

Objectives	اهداف دراسة مادة تصنيف النباتات:
Introduce the student to the principles of modern plant taxonomy (Phylogentic classification) which based on a set of taxonomical evidence (comparative Morphology, comparative Anatomy, Cytological taxonomy, etc.)	تعريف الطالب بمبادئ التصنيف النباتي الحديث (التصنيف التطوري) الذي يعتمد على مجموعة من الأدلة التصنيفية (علم الشكل المقارن، التشريح المقارن، التصنيف الخلوي، الخ.)
Demonstrate how to use the taxonomic evidence in designing taxonomical keys to distinguish between different plant taxa.	توضيح كيفية استخدام الأدلة التصنيفية في تصميم المفاتيح التصنيفية للتمييز بين الأصناف النباتية المختلفة.



University of Mosul
College of Sciences
Department of Biology
Second stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: General Terms used in plant Taxonomy.
Week 2	Lab 2: classification of plants depending on habit.
Week 3	Lab 3: classification of plants depending on environments .
Week 4	Lab 4: The Root in Plants , types of root , modification of roots .
Week 5	Lab 5: The stem in Plants , types of stem in plants ,
Week 6	Lab 6: modifications of stem in plants.
Week 7	Lab 7: The leaves in plants , simple & compound leaves ,types of leaves in plants,
Week 8	Lab 8:. modifications of leaves in plants.
Week 9	Lab9: Flowers in plants
Week10	Lab 10: The Seeds (component & types); Pollen grain & pollination.
Week 11	Lab 11: Taxonomy of Plant kingdom; Characters of Seed plants.
Week 12	Lab 12: Gymnospermae (general characters, taxonomy, example family pinaceae).
Week 13	Lab 13: Angyospermae (general characters, taxonomy, example).
Week 14	Lab 14: Examples on monocotyledons families.
Week 15	Lab 15: Examples on dicotyledons families



University of Mosul

College of Sciences



Department of Biology

Second stage laboratories

Objectives	اهداف دراسة مادة مجامع نباتية:
Knowledge Development: Developing the student's ability to recall what he has learned About microorganisms that live in soil and water.	تنمية المعرفة: تنمية قدرة الطالب على تذكر ما تعلمه عن الكائنات الحية الدقيقة التي تعيش في التربة والمياه.
To improve the comprehension level and to develop the ability On interpretation, prediction and conclusion.	تحسين مستوى الاستيعاب وتنمية القدرة على التفسير والتنبؤ والاستنتاج.
Developing applied capabilities.	تطوير القدرات التطبيقية.
Giving the student the ability to analyze.	اكتساب الطالب القدرة على التحليل.
Developing the student's ability to integrate ideas and information (level Kebaltre Synthesis (which is the opposite of parse.	تنمية قدرة الطالب على تكامل الأفكار والمعلومات وهو عكس (مستوى Kebaltre Synthesis الإعراب).
Evaluation: Developing the student's ability to judge the value of the learned material	التقييم: تنمية قدرة الطالب على الحكم على قيمة المادة المتعلمة.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Algae definition.
Week 2	Lab 2: Division: Cyanophyta
Week 3	Lab 3: Division: Chlorophyta(Volvocales).
Week 4	Lab 4: Division: chlorococcales & other orders.
Week 5	Lab 5: Division: Xanthophyta(Vaucheriales).
Week 6	Lab 6: Division: Division: Phaeophyta(Lamunariales & other orders).
Week 7	Lab 7: Division: Rhodophyta(Siphoniales).
Week 8	Lab 8: - Archaeogoniate definition.
Week 9	Lab9: Non-Vascular plants.



University of Mosul

College of Sciences

Department of Biology

Second stage laboratories



Week10	Lab 10: - Division: Marchantiophyta.
Week 11	Lab 11: Division: Anthocerotophyta.
Week 12	Lab 12: Division: Pteridophyta
Week 13	Lab 13: Gymnosperms
Week 14	Lab 14: Angiosperms
Week 15	Lab 15: Applications

المشرف على المختبر: د. مي طه حامد Dr. May Taha

مسؤول المختبر: داود فتحي امين Dawood Fathi

Parasitology laboratory

Objectives	اهداف دراسة مادة اللافقرات:
Convey information about invertebrates to students about their types.	إيصال معلومات عن اللافقرات للطلاب وأنواعه
Knowing the methods of its diagnosis and its activities.	التعرف على طرق تشخيصه وأنشطته
Keep up with the development that is happening in the world.	مواكبة التطور الذي يحدث في العالم

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction of Invertebrates.
Week 2	Lab 2: Protozoa.



University of Mosul
College of Sciences
Department of Biology



Second stage laboratories

Week 3	Lab 3: Didinium, stentor.
Week 4	Lab 4: Noctiluca.
Week 5	Lab 5: Foraminifira, leucosolenia.
Week 6	Lab 6: Spicules.
Week 7	Lab 7: Spongin fibers.
Week 8	Lab 8: Gemmules.
Week 9	Lab9: Coelenterata.
Week10	Lab 10: Hydra.
Week 11	Lab 11: Obelia, Medusa.
Week 12	Lab 12: Physalia.
Week 13	Lab 13: Aurelia, Metridium, Tubipora.
Week 14	Lab 14: Nereis, Hirud.
Week 15	Lab 15: Arthropoda.

Objectives	اهداف دراسة مادة الطفيليات:
Communicate information about parasitology to students.	توصيل المعلومات حول علم الطفيليات للطلاب
Focusing on important parasites, especially those that infect humans and economic animals.	التركيز على الطفيليات المهمة وخاصة تلك التي تصيب الإنسان والحيوانات الاقتصادية
How to diagnose parasites.	كيفية تشخيص الطفيليات
Methods of transmission to humans and prevention.	طرق انتقاله للإنسان والوقاية منه



University of Mosul
College of Sciences
Department of Biology
Second stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction of practical parasitology.
Week 2	Lab 2: Protozoa.
Week 3	Lab 3: <i>Endolimax nana</i> , <i>Iodamoeba butchlii</i> .
Week 4	Lab 4: <i>Entamoeba coli</i> , <i>Ciliophora</i> .
Week 5	Lab 5: Intestinal flagellates , <i>Gardia lamblia</i>
Week 6	Lab 6: Atrial flagellat, <i>Trickomonas vaginalis</i>
Week 7	Lab 7: Blood and tissue flagellates
Week 8	Lab 8: <i>Leishmania</i> , <i>Trypanosoma</i>
Week 9	Lab9: Sporozoa, <i>Plasmodium</i> , <i>Platyhlminthes</i> .
Week10	Lab 10: <i>Diphyllobothrium latum</i>
Week 11	Lab 11: <i>Taenia saginata</i> , <i>Taenia solium</i> .
Week 12	Lab 12: <i>Echinococcus granulosus</i> .
Week 13	Lab 13: Trematoda, <i>Fasciola hepatica</i> , <i>Fasciolopsis buski</i>
Week 14	Lab 14: Schistosomatidae.
Week 15	Lab 15: Nematelminthes.

المشرف على المختبر: د. محمد صلاح الدين Dr Mohammad Salah

مسؤول المختبر: رهان نشوان Rihan Nashwan



University of Mosul
College of Sciences
Department of Biology
Second stage laboratories



Animal Physiology Laboratory

Objectives	اهداف دراسة مادة الكيمياء الحياتية 1:
Communicate biological information to students about the basic biological and molecular components of a cell .	توصيل المعلومات البيولوجية للطلاب حول المكونات البيولوجية والجزيئية الأساسية للخلية.
Methods of measuring and conducting laboratory chemical tests .	طرق القياس وإجراء الاختبارات الكيميائية المخبرية.
Keeping up with the development that is happening in the world of laboratory materials and equipment.	مواكبة التطور الذي يحدث في عالم المواد والتجهيزات المخبرية.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Quantitative test for carbohydrates, Molish's test.
Week 2	Lab 2: Bendict's test, Barfoed's.
Week 3	Lab 3: Selivanoff 's test, Bial's test.
Week 4	Lab 4: Hydrolysis of carbohydrates.
Week 5	Lab 5: Hydrolysis of disaccharides reactions.
Week 6	Lab 6: Hydrolysis of polysaccharides.
Week 7	Lab 7: Proteins have many functions and shapes.



University of Mosul
College of Sciences
Department of Biology



Second stage laboratories

Week 8	Lab 8:. Types of proteins.
Week 9	Lab9: Ninhydrin test, Hopkincole reaction or glyoxylic acid reaction.
Week10	Lab 10: Millon test, Xanthoprotic test.
Week 11	Lab 11: Sakaguchi test, Lead acetate test.
Week 12	Lab 12: Biuret test, Proteins extraction.
Week 13	Lab 13: Spectrophotometric method, Biuret method, lowry (Folin) method,
Week 14	Lab 14: Lipids, Fatty acids, Lipids classification, Acrolein test, Unsaturated test, Acid val,
Week 15	Lab 15: Iodine number, Estimation of reducing sugar by nelson.

Objectives	اهداف دراسة مادة الكيمياء الحياتية 2:
Communicate biological information to students about the basic biological and molecular components of a cell .	توصيل المعلومات البيولوجية للطلاب حول المكونات البيولوجية والجزيئية الأساسية للخلية.
Methods of measuring and conducting laboratory chemical tests .	طرق القياس وإجراء الاختبارات الكيميائية المخبرية.
Keeping up with the development that is happening in the world of laboratory materials and equipment.	مواكبة التطور الذي يحدث في عالم المواد والتجهيزات المخبرية.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Blood composition, Functions of blood.
Week 2	Lab 2: Centrifugation, Anticoagulant, Blood collection and handling, Calorimetric analysis,



University of Mosul
College of Sciences
Department of Biology



Second stage laboratories

	Spectrophotometer, Light intensity and Beer's law, The normal value.
Week 3	Lab 3: Determination of serum glucose, Insulin, Glucagon .
Week 4	Lab 4: Determination of Growth hormones (GH) and Adrenocortic trophic(ACTH), Hydrocortisone Hormone.
Week 5	Lab 5: Determination of total serum protein concentration, Blood proteins functions, The normal value of serum protein, Hyperproteinemia, Hypoproteinemia.
Week 6	Lab 6: Methods for determination of serum protein concentration.
Week 7	Lab 7: Determination of serum cholesterol concentration. - The source and metabolism of cholesterol as the following.
Week 8	Lab 8: How cholesterol is transported in the blood.
Week 9	Lab9: The normal value of blood cholesterol.
Week10	Lab 10: Determination of serum urea concentration.
Week 11	Lab 11: The normal value of blood urea. - The removing of urea.
Week 12	Lab 12: - Clinical significance of urea.
Week 13	Lab 13: Determination of serum creatinine concentration.
Week 14	Lab 14: The normal value of blood creatinine. Clinical Significance of Creatinine.
Week 15	Lab 15: Natural concentration of creatine. - Determination of creatinine concentration in serum.

Dr. Muntaha Mahmood المشرف على المختبر: د. منتهى محمود

Fulla Qedar مسؤول المختبر: فلة قيذار محمد



University of Mosul
College of Sciences
Department of Biology
Second stage laboratories



Microbiology Laboratory

Objectives	اهداف دراسة مادة الاحياء المجهرية 1:
1. Giving information to the student regarding the origins of microbiology.	1. إعطاء الطالب معلومات عن نشأة علم الأحياء الدقيقة.
2. Defining the types of microorganisms.	2. التعريف بأنواع الكائنات الحية الدقيقة.
3. Studying the composition of internal and external microorganisms.	3. دراسة تركيب الكائنات الحية الدقيقة الداخلية والخارجية.
4. Branches of microbiology.	4. فروع علم الأحياء الدقيقة.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Disadvantages of bacteria.
Week 2	Lab 2: Advantages of bacteria.
Week 3	Lab 3: Types of Microscopes.
Week 4	Lab 4: Introduction on Bacteria . Bacterial smear preparation.
Week 5	Lab 5: Bacterial smear preparation.
Week 6	Lab 6: Bacterial staining
Week 7	Lab 7: Simple stain
Week 8	Lab 8: Gram stain .
Week 9	Lab 9: Capsule stain
Week 10	Lab 10: Spore stain.



University of Mosul
College of Sciences
Department of Biology



Second stage laboratories

Week 11	Lab 11: Acid-Fast stain
Week 12	Lab 12: Motility tests.
Week 13	Lab 13: Sterilization Methods. Part 1
Week 14	Lab 14: Disinfection Methods. Part 1
Week 15	Lab 15: Culture media. part 1

Objectives	اهداف دراسة مادة الاحياء المجهرية 2:
1. Giving primary information to the student regarding methods of feeding microorganisms.	1. إعطاء الطالب المعلومات الأولية عن طرق تغذية الكائنات الحية الدقيقة.
2. The factors affecting its growth.	2. العوامل المؤثرة على نموه.
3. Methods of controlling it, whether biological, chemical, physical or mechanical.	3. طرق مكافحتها سواء كانت بيولوجية أو كيميائية أو فيزيائية أو ميكانيكية.
4. In addition to giving the student preliminary information on the pathogenicity of bacteria.	4. بالإضافة إلى إعطاء الطالب معلومات أولية عن أمراض البكتيريا.
5. Giving the student preliminary information in immunity.	5. إعطاء الطالب معلومات أولية في المناعة.
6. Giving the student preliminary information in Biotechnology.	6. إكساب الطالب المعلومات الأولية في مجال التكنولوجيا الحيوية.

Dr. Rayan Mazin المشرف على المختبر: د. ريان مازن فيصل

Laith Luay مسؤول المختبر: ليث لوي توفيق



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Cell and Genetics Laboratory:

Module Objectives	اهداف دراسة مادة بايولوجية الخلية:
Understand the basic concepts of cellular function.	1. فهم المفاهيم الأساسية للوظيفة الخلوية.
The ability to carefully analyze the scientific evidence contained in what is understood about cellular processes.	2. القدرة على التحليل الدقيق للأدلة العلمية الواردة في ما هو مفهوم عن العمليات الخلوية.
Developing skills by understanding the mechanisms and hypotheses that regulate cell work.	3. تنمية المهارات من خلال فهم الآليات والفرضيات التي تنظم عمل الخلية.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: study the prokaryotic and eukaryotic cells.
Week 2	Lab 2: Measure the length of the cell
Week 3	Lab 3: Study the cell wall.
Week 4	Lab 4: modification and functions of plasma membrane.
Week 5	Lab 5: Study the cytoplasmic organelles part 1
Week 6	Lab 6: Study the cytoplasmic organelles part 2
Week 7	Lab 7: Study the cell division (mitosis)
Week 8	Lab 8: Study the cell division (meiosis)
Week 9	Lab9: Structures of chromosomes.
Week10	Lab 10: number and types of chromosomes.
Week 11	Lab 11: karyotyping part 1



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Week 12	Lab 12: karyotyping part 2
Week 13	Lab 13: DNA replication
Week 14	Lab 14: Gene expression part 1
Week 15	Lab 15: Gene expression part 2

Module Objectives	اهداف دراسة الوراثة:
1. Introduce the student to the science of genetics, its branches, and its importance.	1. تعريف الطالب بعلم الوراثة وفروعه وأهميته.
2. Introducing the student to the science of genetics, its branches, and its importance.	2. تعريف الطالب بعلم الوراثة وفروعه وأهميته.
3. Introduce the student to the cytological structure of the plant cell, with a focus on the cell nucleus, its genetic components and functions.	3. تعريف الطالب بالتركيب الخلوي للخلية النباتية مع التركيز على نواة الخلية ومكوناتها الجينية ووظائفها.
4. Knowledge of Mendel laws and their applications.	4. معرفة قوانين مندل وتطبيقاتها.
5. The student is familiar with the identification of genetic factors and the extent of their influence genetically.	5. أن يتعرف الطالب على العوامل الوراثية ومدى تأثيرها وراثيا.
6. Giving the student the necessary experience and skills in the field of basics of genetics in general.	6. إكساب الطالب الخبرات والمهارات اللازمة في مجال أساسيات علم الوراثة بشكل عام.



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: The characters of the best organism for the genetic studies .
Week 2	Lab 2: The traits of pea plant.
Week 3	Lab 3: Mendels first law and solution of genetic problems.
Week 4	Lab 4: Mendels second law and solution of genetic problems.
Week 5	Lab 5: Punnet squares and solution of genetic problems. Part 1
Week 6	Lab 6: Punnet squares and solution of genetic problems. part 2
Week 7	Lab 7: Mendel's characters in human, solution of genetic problems.
Week 8	Lab 8: the characters link with sex, solution of genetic problems.
Week 9	Lab9: Pedigree analysis, solution of genetic problems.
Week10	Lab 10: Forked line method.
Week 11	Lab 11: solution of genetic problems.
Week 12	Lab 12: Diagnosis of genetic disease.
Week 13	Lab 13: solution of genetic problems.
Week 14	Lab 14: The corn plant
Week 15	Lab 15: Drosophila

المشرف على المختبر: د. غادة عبدالرزاق Dr Ghada Abdulrazzaq

مسؤول المختبر: نبراس ناصح Nibras Nasih



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Environmental laboratory:

Module Objectives	اهداف دراسة البيئة:
1. Provide the student with aspects of knowledge of the concepts, types and characteristics of environmental systems.	1. تزويد الطالب بالجوانب المعرفية لمفاهيم وأنواع وخصائص النظم البيئية.
2. Providing the student with knowledge that enables him to identify the importance of environmental systems and the problems they face.	2. تزويد الطالب بالمعرفة التي تمكنه من التعرف على أهمية النظم البيئية والمشكلات التي تواجهها.
3. Enable the student to choose environmental models and use them in the study of environmental systems .	3. تمكين الطالب من اختيار النماذج البيئية واستخدامها في دراسة النظم البيئية.
4. Providing students with positive attitudes towards preserving and protecting environmental systems .	4. إكساب الطلبة اتجاهات إيجابية نحو الحفاظ على النظم البيئية وحمايتها.
5. Provide students with positive attitudes towards preserving and protecting environmental systems .	5. إكساب الطلبة اتجاهات إيجابية نحو الحفاظ على النظم البيئية وحمايتها.
6. Enable the student to choose environmental models and use them in the study of environmental systems.	6. تمكين الطالب من اختيار النماذج البيئية واستخدامها في دراسة النظم البيئية.
7. Providing students with aspects of knowledge of the concepts, types and characteristics of environmental systems.	7. تزويد الطلاب بالجوانب المعرفية لمفاهيم وأنواع وخصائص النظم البيئية.
8. The student acquires practical and applied skills based on theoretical lessons.	8. يكتسب الطالب مهارات عملية وتطبيقية تعتمد على الدروس النظرية.



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Identifying the laboratory ecology.
Week 2	Lab 2: The Science of meteorological -1.
Week 3	Lab 3: The Science of meteorological -2
Week 4	Lab 4: Treatment of physical properties in the water.
Week 5	Lab 5: Treatment the concentration of oxygen in the water.
Week 6	Lab 6: Treatment of alkaline water.
Week 7	Lab 7: Treatment of acidic water.
Week 8	Lab 8: Determination of productivity in a manner dissolved oxygen.
Week 9	Lab9: Treatment the salinity of the water.
Week10	Lab 10:Treatment of calcium and magnesium hardness in water.
Week 11	Lab 11: Treatment of total brackish water.
Week 12	Lab 12: Relations between organisms.
Week 13	Lab 13: Structure of society1.
Week 14	Lab 14: Structure of society1.
Week 15	Lab 15: Structure of the community.



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Module Objectives	اهداف دراسة مادة التلوث:
1. The student's knowledge of the concept of pollution, its causes, types, risks, and how to reduce pollution.	1. معرفة الطالب بمفهوم التلوث وأسبابه وأنواعه ومخاطره وكيفية الحد من التلوث.
2. Knowing the negative effects of pollutants on the environment and human health.	2. التعرف على الآثار السلبية للملوثات على البيئة وصحة الإنسان.
3. Identify the harmful effects of pesticides, fertilizers, oil and others. 4. Identify solid waste, its types, damages, and disposal methods.	3. التعرف على الآثار الضارة للمبيدات والأسمدة والزيوت وغيرها. 4. التعرف على النفايات الصلبة وأنواعها وأضرارها وطرق التخلص منها.
4. Identify the types of radiation and radioactive pollution, its sources and its biological damage.	4. التعرف على أنواع الإشعاع والتلوث الإشعاعي ومصادره وأضراره البيولوجية.
5. Learn about the concept of the ecosystem and its components.	5. التعرف على مفهوم النظام البيئي ومكوناته.
6. Introducing the concept of environmental pollution and the factors contributing to it.	6. التعريف بمفهوم التلوث البيئي والعوامل المساهمة فيه.
7. Clarify the dangers and consequences of environmental pollution.	7. توضيح مخاطر وعواقب التلوث البيئي.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Identifying the laboratory pollution.
Week 2	Lab 2: The Science of meteorological.
Week 3	Lab 3: Determination residual chlorine in the water.
Week 4	Lab 4: Determination chloride in the water.
Week 5	Lab 5: Determination BOD ₅ in the water.



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Week 6	Lab 6: Determination COD. In the water.
Week 7	Lab 7: Determination nitrate in the water.
Week 8	Lab 8: Determination phosphate in the water.
Week 9	Lab9: Determination Sulphate in the water.
Week10	Lab 10: Determination silica in the water.
Week 11	Lab 11: Relations between organisms.
Week 12	Lab 12: Field capacity of soil.
Week 13	Lab 13: Soil color. Soil Texture.
Week 14	Lab 14: Determination heavy metal in the water,1.
Week 15	Lab 15: Determination heavy metal in the water,2.

المشرف على المختبر: د. عبدالمنعم محمد علي Dr. Abdulmounem Mohammed Ali

مسؤول المختبر: مها ازاد حامد Maha Azad Hamid





University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Mycology laboratory:

Module Objectives	اهداف دراسة مادة الفطريات:
1. Communicate information about fungi.	1. توصيل المعلومات حول الفطريات.
2. Sexual and non-sexual growth and reproduction.	2. النمو والتكاثر الجنسي وغير الجنسي.
3. How fungi are classified.	3. كيف يتم تصنيف الفطريات.
4. The role of fungi in nature.	4. دور الفطريات في الطبيعة.
5. Its beneficial effects.	5. آثاره المفيدة.
6. Production of vitamins and antibiotics and their role in the food industry.	6. إنتاج الفيتامينات والمضادات الحيوية ودورها في الصناعات الغذائية.
7. The harmful effects of fungi and their types that cause diseases.	7. أضرار الفطريات وأنواعها المسببة للأمراض.
8. Mycotoxins are dangerous to health.	8. السموم الفطرية تشكل خطرا على الصحة.
9. Keeping up with the development that is happening in the world of laboratory materials and equipment.	9. مواكبة التطور الذي يحدث في عالم المواد والتجهيزات المخبرية.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Sterilization .
Week 2	Lab 2: The culture media .
Week 3	Lab 3: Isolation of microorganism from different sources: from air
Week 4	Lab 4: Isolation of microorganism from different sources: from water .
Week 5	Lab 5: Isolation of microorganism from soil.
Week 6	Lab 6: Growth of Fungi.
Week 7	Lab 7: Single Spore Isolation for Fungi .



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Week 8	Lab 8: Slide culture technique.
Week 9	Lab9: Collection of medical specimens: laboratory diagnosis of medical fungi.
Week10	Lab 10: How to maintain or preserve isolated colonies.
Week 11	Lab 11: Methods used to sterilize antibiotics and heat-sensitive compounds .
Week 12	Lab 12: Identification of common fungi.
Week 13	Lab 13: Identification of Candida by Analytic Profile Index (API 20C Aux):
Week 14	Lab 14: Identification of pathogenic fungus by Analytic Profile Index (API 20C Aux):
Week 15	Lab 15: Identification of Candida species by Polymerase Chain Reaction (PCR).

Dr. Fatin Noori Abu المشرف على المختبر: د. فاتن نوري عبد

Nibras Nasih مسؤول المختبر: نبراس ناصح

Histology laboratory

Module Objectives	اهداف دراسة مادة الانسجة:
1 . Clarify the terms related to tissues for students.	1. توضيح المصطلحات المتعلقة بالانسجة للطلاب.
2 . Explain the main types of tissues.	2. اشرح الأنواع الرئيسية للانسجة.
3 . Study its composition.	3. دراسة تركيبته.
4 . Study their functions.	4. دراسة وظائفهم.
5 . distinguish them from each other.	5. تمييزهم عن بعضهم البعض.
6 . Identify the location of each tissue in the different organs of the body.	6. تحديد موقع كل نسيج في أعضاء الجسم المختلفة.



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: The simple epithelial tissue part 1.
Week 2	Lab 2: The simple epithelial tissue part 2.
Week 3	Lab 3: Stratified epithelial tissue part 1.
Week 4	Lab 4: Stratified epithelial tissue part 2.
Week 5	Lab 5: Connective tissue(Cells, Fibers).
Week 6	Lab 6: Connective tissue (Loose C. T.).
Week 7	Lab 7: Dense connective tissue .
Week 8	Lab 8: Blood.
Week 9	Lab9: Cartilage .
Week10	Lab 10: Bone.
Week 11	Lab 11: Muscular tissue .
Week 12	Lab 12: Nerve system: the type of nerve cells.
Week 13	Lab 13: Peripheral nerve, motor end plate .
Week 14	Lab 14: nerve fiber ,spinal.
Week 15	Lab 15: Sympathetic ganglia.Cerebellum.

المشرف على المختبر: د. وعد صبري شاهر Waad Sabry

مسؤول المختبر: مها ازاد Maha Azad



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Microbiology Laboratory:

Module Objectives	اهداف دراسة مجهرية تربة:
1. Know the concepts of soil microbiology.	1. التعرف على مفاهيم ميكروبيولوجيا التربة.
2. Studying the economic and environmental importance of soil microbes.	2. دراسة الأهمية الاقتصادية والبيئية لميكروبات التربة.
3. Knowing the effect of microorganisms on the environment and the interactive effect with higher organisms.	3. معرفة تأثير الكائنات الحية الدقيقة على البيئة والتأثير التفاعلي مع الكائنات العليا.
4. Studying the role of soil organisms in the formation and erosion of soil and the cycle of carbon and nitrogen.	4. دراسة دور الكائنات الحية في التربة في تكوين التربة وتآكلها ودورة الكربون والنيتروجين.
5. Discuss the vital relationships of water and soil microbes.	5. مناقشة العلاقات الحيوية بين الماء وميكروبات التربة.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction in practical water & Soil Microbiology.
Week 2	Lab 2: Contact slide assay.
Week 3	Lab 3: microbial population count in water & soil.
Week 4	Lab 4: Bacteria and Actinomycetes
Week 5	Lab 5: Fungi.
Week 6	Lab 6: Isolation of antibiotic producer from soil .
Week 7	Lab 7: measuring CO ₂ production.
Week 8	Lab 8: Algae enumeration.
Week 9	Lab 9: filament Fungi.



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Week10	Lab 10: Bacteriological examination of water, Coliform bacteria + E.coli.
Week 11	Lab 11: Fecal Enterococcus.
Week 12	Lab 12: isolation the Shigella.
Week 13	Lab 13: isolation the Salmonella.
Week 14	Lab 14: isolation Vibrio cholera .
Week 15	Lab 15: isolation Pseudomonas .

Module Objectives	اهداف دراسة مجهرية الماء:
1. Know the concepts of water microbiology.	1. التعرف على مفاهيم ميكروبيولوجيا المياه.
2. Studying the economic and environmental importance of water microbes.	2. دراسة الأهمية الاقتصادية والبيئية لميكروبات الماء.
3. Knowing the effect of microorganisms on the environment and the interactive effect with higher organisms.	3. معرفة تأثير الكائنات الحية الدقيقة على البيئة والتأثير التفاعلي مع الكائنات العليا.
4. Studying the role of water organisms in the formation and erosion of soil and the cycle of carbon and nitrogen.	4. دراسة دور الكائنات المائية في تكوين وتعرية التربة ودورة الكربون والنيتروجين.
5. Discuss the vital relationships of water microbes.	5. مناقشة العلاقات الحيوية لميكروبات الماء.
1. Know the concepts of water microbiology.	1. التعرف على مفاهيم ميكروبيولوجيا المياه.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction in practical water & Soil Microbiology.
Week 2	Lab 2: Contact slide assay.
Week 3	Lab 3: microbial population count in water & soil.



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Week 4	Lab 4: Bacteria and Actinomycetes
Week 5	Lab 5: Fungi.
Week 6	Lab 6: Isolation of antibiotic producer from soil .
Week 7	Lab 7: measuring CO2 production.
Week 8	Lab 8: Algae enumeration.
Week 9	Lab9: filament Fungi.
Week10	Lab 10: Bacteriological examination of water, Coliform bacteria + E.coli.
Week 11	Lab 11: Fecal Enterococcus.
Week 12	Lab 12: isolation the Shigella.
Week 13	Lab 13: isolation the Salmonella.
Week 14	Lab 14: isolation Vibrio cholera .
Week 15	Lab 15: isolation Pseudomonas .





University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Module Objectives	اهداف دراسة فسلجة بكتريا:
1. Convey information to the student about the latest information on bacterial physiology.	1. نقل المعلومات للطالب عن أحدث المعلومات في علم وظائف الأعضاء البكتيرية.
2. The importance of the factors affecting its growth.	2. أهمية العوامل المؤثرة على نموها.
3. Microstructure of a microbial	3. البنية المجهرية للميكروبات

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introductin, Microbial growth curve and Mathmatics .
Week 2	Lab 2: Microbial growth factors
Week 3	Lab 3: Detection of bacterial enzyme1
Week 4	Lab 4: Detection of bacterial enzyme2
Week 5	Lab 5: Detection of bacterial enzyme3
Week 6	Lab 6: Detection of bacterial enzyme4
Week 7	Lab 7: Bacterial toxins1
Week 8	Lab 8: Bacterial toxins2
Week 9	Lab9: Oxidation Reduction Reactions
Week10	Lab 10: Detection of fermentation metabolisims1
Week 11	Lab 11: Detection of fermentation metabolisims2
Week 12	Lab 12: Antimicrobial sensitivity tests 1
Week 13	Lab 13: Antimicrobial sensitivity tests 2
Week 14	Lab 14: API
Week 15	Lab 15: VITEK



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



المشرف على المختبر: د. ريان مازن فيصل Dr. Rayan Mazin

مسؤول المختبر: ليث لوي توفيق Laith Luay

Animal physiology laboratory

Module Objectives	اهداف دراسة فسلجة حيوان :
1. The student's comprehension of the concept of the course and his ability to distinguish between it and other sciences.	1. استيعاب الطالب لمفهوم المقرر وقدرته على التمييز بينه وبين العلوم الأخرى.
2. Addressing a comprehensive description of the various body systems, with a focus on ruminant field animals and poultry.	2. تناول وصف شامل لأجهزة الجسم المختلفة، مع التركيز على حيوانات الحقل المجتررة والدواجن.
3. Studying the vital processes that occur in the animal's body that transform the nutrients that the animal eats and turn them into animal products or other secondary waste.	3. دراسة العمليات الحيوية التي تحدث في جسم الحيوان والتي تقوم بتحويل العناصر الغذائية التي يتناولها الحيوان وتحويلها إلى منتجات حيوانية أو مخلفات ثانوية أخرى.
4. Basic and physiology of growth and reproduction.	4. أساسيات و فسيولوجيا النمو والتكاثر.
5. Keep up with the development that is happening in the world	5. مواكبة التطور الذي يحدث في العالم



University of Mosul
College of Sciences
Department of Biology
Third stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: General safety instructions in the laboratory.
Week 2	Lab 2: Introduction Circulatory system.
Week 3	Lab 3: Fragility test 1.
Week 4	Lab 4: Fragility test 2.
Week 5	Lab 5: Total Red Blood Cell count.
Week 6	Lab 6: differential count.
Week 7	Lab 7: Estimation Hemoglobin.
Week 8	Lab 8: PCV test.
Week 9	Lab9: Platelets count.
Week10	Lab 10: ESR test.
Week 11	Lab 11: Bleeding time Test.
Week 12	Lab 12: Blood pressure.
Week 13	Lab 13: Physiological and pathological variation of Blood pressure.
Week 14	Lab 14: Blood groups.
Week 15	Lab 15: Respiratory test.

Dr. Muntaha Mohmood المشرف على المختبر: د. منتهى محمود

Fulla Qedar مسؤول المختبر: فلة قيدار محمد



University of Mosul

College of Sciences

Department of Biology

Fourth stage laboratories



Animal physiology laboratory

Module Objectives	اهداف دراسة فسلجة حيوان 1 :
1. The student's comprehension of the concept of the course and his ability to distinguish between it and other sciences.	1. استيعاب الطالب لمفهوم المقرر وقدرته على التمييز بينه وبين العلوم الأخرى.
2. Addressing a comprehensive description of the various body systems, with a focus on ruminant field animals and poultry.	2. تناول وصف شامل لأجهزة الجسم المختلفة، مع التركيز على حيوانات الحقل المجتررة والدواجن.
3. Studying the vital processes that occur in the animal's body that transform the nutrients that the animal eats and turn them into animal products or other secondary waste.	3. دراسة العمليات الحيوية التي تحدث في جسم الحيوان والتي تقوم بتحويل العناصر الغذائية التي يتناولها الحيوان وتحويلها إلى منتجات حيوانية أو مخلفات ثانوية أخرى.
4. Basic and physiology of growth and reproduction.	4. أساسيات و فسيولوجيا النمو والتكاثر.
5. Keep up with the development that is happening in the world	5. مواكبة التطور الذي يحدث في العالم

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: General safety instructions in the laboratory.
Week 2	Lab 2: Introduction Circulatory system.
Week 3	Lab 3: Fragility test 1.
Week 4	Lab 4: Fragility test 2.
Week 5	Lab 5: Total Red Blood Cell count.
Week 6	Lab 6: differential count.
Week 7	Lab 7: Estimation Hemoglobin.



University of Mosul
College of Sciences
Department of Biology



Fourth stage laboratories

Week 8	Lab 8: PCV test.
Week 9	Lab9: Platelets count.
Week10	Lab 10: ESR test.
Week 11	Lab 11: Bleeding time Test.
Week 12	Lab 12: Blood pressure.
Week 13	Lab 13: Physiological and pathological variation of Blood pressure.
Week 14	Lab 14: Blood groups.
Week 15	Lab 15: Respiratory test.

Module Objectives	اهداف دراسة مادة الانزيمات:
1. Classification of enzymes	1. تصنيف الانزيمات
2. Characteristic of enzymes	2. خاصية الانزيمات
3. Structure of enzymes	3. هيكل الانزيمات

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introductin to Enzymes.
Week 2	Lab 2: Preparing chemical solutions.
Week 3	Lab 3: Cell disruption methods1.
Week 4	Lab 4: Cell disruption methods2.
Week 5	Lab 5: Preparation of bacterial extract.
Week 6	Lab 6: Protease enzyme.



University of Mosul
College of Sciences
Department of Biology



Fourth stage laboratories

Week 7	Lab 7: Lipase enzyme.
Week 8	Lab 8: Aspartate aminotransferase, Alanine aminotransferase.
Week 9	Lab9: Decarboxylase enzyme .
Week10	Lab 10: denitrification.
Week 11	Lab 11: Alkaline phosphatase.
Week 12	Lab 12: Cytochrome oxidase.
Week 13	Lab 13: . catalase.
Week 14	Lab 14: Lecithinase .
Week 15	Lab 15: coagulase.

Dr. Muntaha Mohmood المشرف على المختبر: د. منتهى محمود

Fulla Qedar مسؤول المختبر: فلة قيدار محمد



University of Mosul
College of Sciences
Department of Biology
Fourth stage laboratories



Plant Physiology Laboratory:

Module Objectives	اهداف دراسة فسلجة نبات 1 :
1. Definition of physiology.	1.تعريف علم وظائف الأعضاء.
2. Studying plant cell structure and function of different cellular organelles.	2.دراسة تركيب الخلايا النباتية ووظيفة العضيات الخلوية المختلفة.
3. Study of water relations.	3.دراسة العلاقات المائية.
4. Study the importance of mineral elements for plants.	4.دراسة أهمية العناصر المعدنية للنباتات.
5. Brief study of structural and catabolic metabolism.	5.دراسة موجزة عن عملية التمثيل الغذائي الهيكلي والتقويضي.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Study of Osmosis part 1.
Week 2	Lab 2: Study of Osmosis part 2.
Week 3	Lab 3: Permeability part 1.
Week 4	Lab 4: Permeability part 2.
Week 5	Lab 5: Transpiration part 1.
Week 6	Lab 6: Transpiration part 2.
Week 7	Lab 7: Respiration part 1.
Week 8	Lab 8: Respiration part 2.
Week 9	Lab9: Dormancy part 1.
Week10	Lab 10: Dormancy part 2.



University of Mosul

College of Sciences



Department of Biology

Fourth stage laboratories

Week 11	Lab 11: Phytohormones part 1.
Week 12	Lab 12: Phytohormones part 2.
Week 13	Lab 13: Photosynthesis part 1.
Week 14	Lab 14: Photosynthesis part 2.
Week 15	Lab 15: Photosynthesis part 3.

Fulla Qedar مسؤول المختبر: فلة قيدير محمد

Cell and Genetics Laboratory

Module Objectives	اهداف دراسة بايولوجي جزئي :
1. Understand the principles of biology at the molecular level.	1. فهم مبادئ علم الأحياء على المستوى الجزيئي.
2. Identifying the molecular structure of nucleic acids, their replication and their role in building protein	2. التعرف على التركيب الجزيئي للأحماض النووية وتضاعفها ودورها في بناء البروتين
3. Understanding methods of controlling the level of gene expression in living cells.	3. التعرف على طرق التحكم في مستوى التعبير الجيني في الخلايا الحية.
4. Developing the student's perceptions by giving him an idea of recent trends in molecular biology.	4. تنمية مدارك الطالب من خلال إعطائه فكرة عن الاتجاهات الحديثة في علم الأحياء الجزيئي.
5. Learn about modern applications of molecular genetics in various fields of life	5. التعرف على التطبيقات الحديثة لعلم الوراثة الجزيئية في مختلف مجالات الحياة
6. Realizing the great progress in molecular genetics and its impact on human life.	6. التعرف على التقدم الكبير في علم الوراثة الجزيئية وأثره على حياة الإنسان.



University of Mosul
College of Sciences
Department of Biology
Fourth stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction of information about laboratory safety.
Week 2	Lab 2: Introduction of cell disruption.
Week 3	Lab 3: DNA extraction.
Week 4	Lab 4: RNA extraction.
Week 5	Lab 5: Detection RNA and DNA.1.
Week 6	Lab 6: Detection RNA and DNA2..
Week 7	Lab 7: Estimation of DNA concentration and purity1.
Week 8	Lab 8:. Estimation of DNA concentration and purity2.
Week 9	Lab9: PCR technique1.
Week10	Lab 10: PCR technique2.
Week 11	Lab 11: Gel electrophoresis1.
Week 12	Lab 12: Gel electrophoresis2.
Week 13	Lab 13: Molecular techniques.1.
Week 14	Lab 14: Molecular techniques2.
Week 15	Lab 15: Molecular techniques3.

المشرف على المختبر: د. غادة عبدالرزاق Dr Ghada Abdulrazzaq

مسؤول المختبر: نبراس ناصح Nibras Nasih



University of Mosul
College of Sciences
Department of Biology
Fourth stage laboratories



Histology Laboratory

Module Objectives	اهداف دراسة تشريح مقارن :
1. Communicating anatomical information to students in the different types of vertebrates.	1. إيصال المعلومات التشريحية للطلاب في أنواع الفقاريات المختلفة.
2. compare its members .	2. مقارنة أعضائها.
3. keep pace with the development that is happening in the world	3. مواكبة التطور الذي يحدث في العالم

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: The characteristics of chordate.
Week 2	Lab 2: subphylums of chordate,urochordata,.
Week 3	Lab 3: subphylums,hemichordate.
Week 4	Lab 4: r subphylums cephalochordate.
Week 5	Lab 5: The classes of fishes agnatha .
Week 6	Lab 6: .chondrichthyes.
Week 7	Lab 7: Osteochthyes .
Week 8	Lab 8: the beginning of tetrapoda.
Week 9	Lab9: The characteristics of class amphibian, and the orders of it1.
Week10	Lab 10: The characteristics of class amphibian, and the orders of it2.
Week 11	Lab 11: The characteristics of class Reptilia1.



University of Mosul
College of Sciences
Department of Biology



Fourth stage laboratories

Week 12	Lab 12: The characteristics of class Reptilia2.
Week 13	Lab 13: The characteristics of class Aves.
Week 14	Lab 14: The characteristics of class Mammalia1.
Week 15	Lab 15: The characteristics of class Mammalia2.

المشرف على المختبر: د. وعد صبري شاهر Waad Sabry

مسؤول المختبر: مها ازاد Maha Azad

Immunology Laboratory

Module Objectives	اهداف دراسة المناعة :
1. The student understood the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions.	1. فهم الطالب المفاهيم الأساسية في علم المناعة ومكونات الجهاز المناعي وأعضائه وخلاياه وجزئياته ووظائفه.
2. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases	2. التعرف على آليات ردود الفعل المناعية وكيفية تنظيمها وتصنيف الأمراض المناعية
3. Learn about the importance of antibodies, their structure, types of antibodies, and the mechanism of interaction between antigens and antibodies.	3. التعرف على أهمية الأجسام المضادة وبنيتها وأنواع الأجسام المضادة وآلية التفاعل بين المستضدات والأجسام المضادة.
4. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease	4. مساعدة الطالب على فهم كيفية عمل الجهاز المناعي في الحالة الفسيولوجية الطبيعية وفي حالة المرض
5. Knowledge and understanding of clinical disorders associated with autoimmune	5. معرفة وفهم الاضطرابات السريرية المرتبطة بأمراض المناعة الذاتية



University of Mosul
College of Sciences
Department of Biology



Fourth stage laboratories

diseases	
6. The student understands the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions	6. يفهم الطالب المفاهيم الأساسية لعلم المناعة ومكونات الجهاز المناعي وأعضائه وخلاياه وجزئياته ووظائفه
7. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases	7. التعرف على آليات ردود الفعل المناعية وكيفية تنظيمها وتصنيف الأمراض المناعية
8. Learn about the importance of antibodies, their structure, the diversity of antibodies, and the mechanism of interaction between antigens and antibodies	8. التعرف على أهمية الأجسام المضادة وبنيتها وتنوع الأجسام المضادة وآلية التفاعل بين المستضدات والأجسام المضادة
9. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease	9. مساعدة الطالب على فهم كيفية عمل الجهاز المناعي في الحالة الفسيولوجية الطبيعية وفي حالة المرض
10. Understanding the immunological basis for rejection of transplanted organs and the medical examinations required before organ transplantation	10. فهم الأساس المناعي لرفض الأعضاء المزروعة والفحوصات الطبية اللازمة قبل زراعة الأعضاء
11. Knowledge and understanding of clinical disorders associated with autoimmune diseases	11. معرفة وفهم الاضطرابات السريرية المرتبطة بأمراض المناعة الذاتية
12. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases	12. التعرف على آليات ردود الفعل المناعية وكيفية تنظيمها وتصنيف الأمراض المناعية

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: CBC test
Week 2	Lab 2: Differential WBC
Week 3	Lab 3: Phagocytosis.
Week 4	Lab 4: Complement.



University of Mosul
College of Sciences
Department of Biology



Fourth stage laboratories

Week 5	Lab 5: Injection of Lab animals.
Week 6	Lab 6: Agglutination and perception reaction
Week 7	Lab 7: ELISA-1.
Week 8	Lab 8: ELISA -2.
Week 9	Lab 9: Immunofluorescence-1- .
Week 10	Lab 10: Immunofluorescence-2-
Week 11	Lab 11: E-rosette-1.
Week 12	Lab 12: E-rosette-2.
Week 13	Lab 13: Hypersensitivity.
Week 14	Lab 14: Lymphoblast transformation test .
Week 15	Lab 15: Flow cytometry.

Module Objectives	اهداف دراسة بكتريا مرضية :
1. Communicate pathogenic bacteria information to students	1. توصيل معلومات عن البكتيريا المسببة للأمراض للطلاب
2. Know their types and the diseases they cause	2. التعرف على أنواعها والأمراض التي تسببها
3. and methods of diagnosis	3. وطرق التشخيص
4. and treat it	4. وعلاجه
5. And keep pace with the development that is happening in the world	5. ومواكبة التطور الذي يحدث في العالم



University of Mosul
College of Sciences
Department of Biology
Fourth stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction of biological lab. Safety.
Week 2	Lab 2: Methods for collection samples from patients1.
Week 3	Lab 3:. Methods for collection samples from patients2.
Week 4	Lab 4: Staphylococcus spp..
Week 5	Lab 5: Streptococcus spp.
Week 6	Lab 6: Enterobacteriaceae 1.
Week 7	Lab 7: Enterobacteriaceae 2.
Week 8	Lab 8:. Enterobacteriaceae 3.
Week 9	Lab9:. Enterobacteriaceae 4.
Week10	Lab 10: <i>Pseudomonas</i> spp.
Week 11	Lab 11: <i>Haemophilus</i> spp.
Week 12	Lab 12: <i>Bordetella</i> spp.
Week 13	Lab 13: <i>Lactobacillus</i> spp.
Week 14	Lab 14: <i>Vibrio</i> spp.
Week 15	Lab 15: Clostridium.





University of Mosul
College of Sciences
Department of Biology
Fourth stage laboratories



Module Objectives	اهداف دراسة علم الاحياء المجهرية الغذائي :
1. Conveying information to students about microorganisms that grow in food, causing spoilage and spoilage.	1. إيصال المعلومات للطلاب عن الكائنات الحية الدقيقة التي تنمو في الغذاء وتسبب فساده وفساده.
2. growth conditions.	2. ظروف النمو.
3. control the health problems caused by such as diseases and food poisoning.	3. السيطرة على المشاكل الصحية الناجمة عن الأمراض والتسمم الغذائي.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: History of m.o. in food.
Week 2	Lab 2: Laboratory safety.
Week 3	Lab 3: Enumeration of microorganisms.
Week 4	Lab 4: Microbiological examination of milk.
Week 5	Lab 5: Microbial examination of dairy product.
Week 6	Lab 6: Microbial examination of cheese.
Week 7	Lab 7: Detection of coliform.
Week 8	Lab 8: Microbial examination of milk cattle have mastitis.
Week 9	Lab 9: Microbial examination of flour and sugar.
Week 10	Lab 10: Microbial examination of fruit juice.



University of Mosul
College of Sciences
Department of Biology



Fourth stage laboratories

Week 11	Lab 11: Microbial examination of meat.
Week 12	Lab 12: Microbial examination of frozen foods .
Week 13	Lab 13: Microbial examination of poultry meat and fish.
Week 14	Lab 14: Microbial examination of eggs .
Week 15	Lab 15: Microbial examination of eggs and Microbial examination of canned foods.

Module Objectives	اهداف دراسة علم الاحياء المجهرية الصناعية :
1. Convey information to the student about the microorganisms used in the industry.	1. إيصال معلومات للطالب عن الكائنات الحية الدقيقة المستخدمة في الصناعة.
2. To produce organic acids.	2. لإنتاج الأحماض العضوية.
3. Vaccines.	3. اللقاحات.
4. fermented food	4. الأغذية المخمرة
5. Antibiotics.	5. المضادات الحيوية.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Requirement for industrial fermentation
Week 2	Lab 2: Production of ethanol and vinegar .
Week 3	Lab 3: Production of ethanol and vinegar .
Week 4	Lab 4: Production of lactic acid and glutamic acid by fermentation.
Week 5	Lab 5: Production of lactic acid and glutamic acid by fermentation.
Week 6	Lab 6: Industrial production of citric acid.



University of Mosul

College of Sciences



Department of Biology

Fourth stage laboratories

Week 7	Lab 7: Industrial production of citric acid.
Week 8	Lab 8: Single cell protein.
Week 9	Lab9: Single cell protein.
Week10	Lab 10: Production of antibiotic:penicillin.
Week 11	Lab 11: Production of antibiotic:2.
Week 12	Lab 12: Production of antibiotic:3.
Week 13	Lab 13: Production of biogas(methan.
Week 14	Lab 14: Solution preparation1.
Week 15	Lab 15: Solution preparation2.

Module Objectives	اهداف دراسة وراثة مايكروبيات:
1- The course aims to show that microorganisms, especially bacteria, possess a genetic apparatus, contrary to what was rumored that the phenotypic differences in bacteria are based on adaptation.	1- يهدف المقرر إلى بيان أن الكائنات الحية الدقيقة، وخاصة البكتيريا، تمتلك جهازا وراثيا، على عكس ما يشاع أن الاختلافات المظهرية في البكتيريا تعتمد على التكيف.
2- This genetic system, in its molecular basis and in performing its various functions, does not differ from the genetic system of the rest of living organisms.	2- هذا النظام الوراثي في أساسه الجزيئي وفي أداء وظائفه المختلفة لا يختلف عن النظام الجيني لبقية الكائنات الحية.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

Material Covered



University of Mosul
College of Sciences
Department of Biology



Fourth stage laboratories

Week 1	Lab 1: Introduction in genetic lab principles.
Week 2	Lab 2:. Detection of spontaneous mutation.1.
Week 3	Lab 3: Detection of spontaneous mutation2.
Week 4	Lab 4: Detection of spontaneous mutation3.
Week 5	Lab 5: Detection of antibiotic resistance1.
Week 6	Lab 6: Detection of antibiotic resistance2.
Week 7	Lab 7: Horizontal gene transfer: transformation1.
Week 8	Lab 8: Horizontal gene transfer: transformation2.
Week 9	Lab9: Conjugation.
Week10	Lab 10: PCR.
Week 11	Lab 11: PCR.
Week 12	Lab 12: electrophoresis.
Week 13	Lab 13: Plasmid isolation.
Week 14	Lab 14: Plasmid curing.
Week 15	Lab 15: Ames Test





University of Mosul

College of Sciences



Department of Biology

Fourth stage laboratories

Module Objectives	اهداف دراسة الفايروسات:
1. Provide information about viruses.	1. تقديم معلومات حول الفيروسات.
2. Its types.	2. أنواعه.
3. classified.	3. مصنفة.
4. structure.	4. الهيكل.
5. diseases.	5. الأمراض.
6. treat it.	6. علاجه.
7. prevention.	7. الوقاية.
8. For students, a Encourage the student to keep abreast of the development taking place in virology in the world	8. بالنسبة للطلاب أ تشجيع الطالب على مواكبة التطور الذي يحدث في علم الفيروسات في العالم

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Biological hazards and Sample preparation
Week 2	Lab 2: Detection of viruses direct Examination using Light microscopy (Histological study).
Week 3	Lab 3: Morphology study using Electron Microscopy (videos)
Week 4	Lab 4: Culture, Growth of virus on embryonated eggs .
Week 5	Lab 5: Cell line and tissue culture techniques
Week 6	Lab 6: Virus cultivation in tissue culture.
Week 7	Lab 7: Virus inoculation in lab. animals.
Week 8	Lab 8: Bacteriophage plaque assay for phage titer.



University of Mosul

College of Sciences



Department of Biology

Fourth stage laboratories

Week 9	Lab9: Serology detection of virus using ELISA
Week10	Lab 10: Serology detection of virus using Immunofluorescence techniques.
Week 11	Lab 11: Agglutination and precipitation test.
Week 12	Lab 12: Haemagglutination inhibition and Neutralization tests.
Week 13	Lab 13: Detection of viruses using molecular methods (nucleic acid extraction)
Week 14	Lab 14: Viral Genome Detection: PCR technique.
Week 15	Lab 15: Real-Time PCR & DNA sequencing (videos)

Dr. Rojan Ghanim Dr. المشرف على المختبر: د. روجان غانم العلاف

Rihan nashwan مسؤول المختبر: رهان نشوان

Mycology laboratory

Module Objectives	اهداف دراسة مادة الفطريات:
1. Communicate information about fungi.	1. توصيل المعلومات حول الفطريات.
2. Sexual and non-sexual growth and reproduction.	2. النمو والتكاثر الجنسي وغير الجنسي.
3. How fungi are classified.	3. كيف يتم تصنيف الفطريات.
4. The role of fungi in nature.	4. دور الفطريات في الطبيعة.
5. Its beneficial effects.	5. آثاره المفيدة.
6. Production of vitamins and antibiotics and their role in the food industry.	6. إنتاج الفيتامينات والمضادات الحيوية ودورها في الصناعات الغذائية.
7. The harmful effects of fungi and their types that cause diseases.	7. أضرار الفطريات وأنواعها المسببة للأمراض.
8. Mycotoxins are dangerous to health.	8. السموم الفطرية تشكل خطرا على الصحة.
9. Keeping up with the development that is happening in the world of laboratory materials and equipment.	9. مواكبة التطور الذي يحدث في عالم المواد والتجهيزات المخبرية.



University of Mosul
College of Sciences
Department of Biology
Fourth stage laboratories



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1:. Sterilization .
Week 2	Lab 2: The culture media .
Week 3	Lab 3: Isolation of microorgrnism from different sources: from air
Week 4	Lab 4: Isolation of microorgrnism from different sources: from water .
Week 5	Lab 5: Isolation of microorgrnism from soil.
Week 6	Lab 6: Growth of Fungi.
Week 7	Lab 7: Single Spore Isolation for Fungi .
Week 8	Lab 8: Slide culture technique.
Week 9	Lab9: Collection of medical specimens: laboratory diagnosis of medical fungi.
Week10	Lab 10: How to maintain or preserve isolated colonies.
Week 11	Lab 11: Methods used to sterilize antibiotics and heat-sensitive compounds .
Week 12	Lab 12: Identification of common fungi.
Week 13	Lab 13: Identification of Candida by Analytic Profile Index (API 20C Aux):
Week 14	Lab 14: Identification of pathogenic fungus by Analytic Profile Index (API 20C Aux):
Week 15	Lab 15: Identification of Candida species by Polymerase Chain Reaction (PCR).

Dr. Fatin Noori Abu المشرف على المختبر: د. فاتن نوري عبد

Nibras Nasih مسؤول المختبر: نبراس ناصح