

السيد عميد كلية العلوم المحترم

م/ استحداث مختبر الكيمياء

تحية طيبة

يرجى تفضلكم بالموافقة على استحداث (مختبر الكيمياء) لإجراء تجارب مختبرية تغطي مفردات ومنهج مادة الكيمياء التحليلية (مرحلة أولى) والكيمياء الحياتية (مرحلة ثانية) وحسب المنهج المتبع في كليتنا.
مع التقدير..



مقدم الطلب

أ.د. عبدالله حمود عبدالله

رئيس قسم علوم التحليلات المرضية





استمارة استحداث المختبرات العلمية والورش الهندسية وفق المعايير العراقية لجودة مختبرات وزارة
التعليم العالي والبحث العلمي العراقية

رمز المختبر: LCH00002

الاسم المقترح للمختبر: الكيمياء

الجهة التي اقترحت الاستحداث: قسم علوم التحليلات المرضية

جهة ارتباط المختبر (القسم): كلية العلوم قسم / علوم التحليلات المرضية

الأسباب الموجبة لاستحداث المختبر: تدريب الطلبة على المهارات المختبرية ذات العلاقة بمادة الكيمياء التحليلية والكيمياء العضوية وحسب متطلبات المنهج التكاملي المعتمد في كليتنا.

مجال عمل المختبر: مختبر تعليمي للدراسات الأولية

وظيفة المختبر: التدريب المهاري المختبري لمادة الكيمياء التحليلية/الكيمياء العضوية (مرحلة أولى) والكيمياء الحياتية (مرحلة ثانية)

الطاقة الاستيعابية للمختبر: 25 طالبا

الأجهزة والأدوات المختبرية المتوفرة: مرفق مع الاستمارة

تصميم المختبر: مرفق مع الاستمارة

الملاك العلمي والفني الدائم للمختبر: مرفق مع الاستمارة

مصادقة مجلس القسم

توقيع رئيس القسم

مساحة المختبر: 82 متر مربع

نسبة الطلبة الى مساحة المختبر: 2.3 متر مربع

عدد العاملين في المختبر: 3

الملاك العلمي والفني للمختبر

ت	الاسم	اللقب العلمي	الاختصاص العام	الاختصاص الدقيق
1	م.م. مرتضى فراس	مدرس مساعد	علوم كيمياء	الكيمياء السريرية
2	م.م. زهراء صبري جواد	مدرس مساعد	علوم كيمياء	كيمياء سريرية
3	م.ب. امال سالم احمد	مساعد باحث	علوم كيمياء	علوم كيمياء

مصادقة مجلس القسم

توقيع رئيس القسم

توصية لجنة الاستحداث:

قرار مجلس الكلية:

قرار مجلس الجامعة:

المرفقات:

- 1- دراسة الجدوى
- 2- وصف المقرر الدراسي للمادة
- 3- قائمة بالأجهزة والمواد المختبرية
- 4- خارطة تصميم المختبر وموقعه في البناية



دور مختبر الكيمياء

يتضمن مختبر الكيمياء للدراسات الأولية تعليم وتدريب الطلبة على الاساسات النظرية والمهارات العملية في اجراء التجارب الكيميائية والمختبرية مثل التسحيح لحامض مع قاعدة لمادة مجهولة التركيز او الحجم بتحضير محلول قياسي يساهم هذا المختبر في إنجاز بحوث طلبة الدراسات الأولية بما يلبي متطلبات مسار بولونيا الدراسي، كما يساهم في رفد الحركة البحثية العلمية للأساتذة.

يأتي استحداث مختبر الكيمياء لغرض توفير البيئة التعليمية والبحثية الخاصة بهذا العلم لطلبة كلية العلوم (القسم التحليلات المرضية) بغية استكمال الرصانة التعليمية من خلال تحقيق متطلبات المنهج التكاملي الذي تعتمده كلية الهندسة.

مجال عمل المختبر: تعليمي

الغرض منه تمكين الطلبة من تنمية الجانب المهاري على وفق أهداف المنهج الدراسي.

جهة ارتباط المختبر: كلية العلوم / قسم علوم التحليلات المرضية

رؤية المختبر ورسالته وأهدافه العامة والخاصة

أولاً: رؤية المختبر

اعداد خريجين على درجة عالية من الكفاءة متمكنين من استخدام أجهزة المستخدمة في أنواع التحليل الكيميائي وطريقة التعامل مع المواد الكيميائية والسلامة والأمان في المختبر. توفير بيئة تعليمية وبحثية تضمن تقديم تدريب عملي متقدم في مختلف العلوم الكيميائية وفق معايير الجودة والسلامة المعملية

ثانياً: رسالة المختبر

تمكين الطلبة والباحثين من اكتساب المهارات التجريبية والتحليلية الأساسية والمتقدمة للربط بين المفاهيم النظرية والتطبيق العملي

ثالثاً: الأهداف العامة

- 1- دعم التعليم التطبيقي وربط النظرية بالتجربة
- 2- تحسين مخرجات التعليم ومواكبة التطور العلمي
- 3- ترسيخ مبادئ واخلاقيات السلامة والأمان الكيميائي في التعامل مع المواد والأجهزة

رابعاً: الأهداف الخاصة

- 1- رفع كفاءة الطلبة في المهارات العلمية والتقنية لاستخدام التقنيات الكيميائية
- 2- تدريب الطلبة على اجراء التحاليل الكيميائية النوعية والكمية بدقة عالية
- 3- تطوير مهارات الطلبة من خلال الاسئلة الذهنية والاختبارات العملية الخاصة بالمختبر.
- 4- تمكين الطلبة والباحثين من اجراء التطبيقات العملية للبحوث العلمية.

وصف المشروع

اسم المشروع: مختبر الكيمياء

الموقع المقترح: ضمن حرم المؤسسة التعليمية (كلية العلوم)

طبيعة المختبر: تعليمي

الفئة المستهدفة: طلبة المرحلة الأولى والثانية (قسم علوم التحليلات المرضية).

اسم المقرر: الكيمياء التحليلية (مرحلة أولى) / الكيمياء الحياتية (مرحلة ثانية)

سنة افتتاح المختبر: 2023

الضمانات التي يقدمها المختبر:

1. بناء المختبر للمهارات العملية لدى الطلبة ضمن مجال التحليلات الكيميائية
2. توفير المختبر رصانة الإجراءات المختبرية لكل تجربة عملية.
3. يقدم طرائق العمل المختبرية وفق الاشتراطات لمجال تخصص الكيمياء.
4. يضمن حماية البيئة الداخلية والخارجية من مخلفات العمل المختبري.



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title			Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☒ Seminar
Module Code	PATH-113		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGx11 UGI	Semester of Delivery	
Administering Department	PGPE (يجب رمز القسم)	College	COGE (يجب وضع رمز الكلية)
Module Leader	Hussein Nasser Khlaf Al-Salman	e-mail	Hussein.Nasser.khlaf@sa-uc.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Zainab Kadhim Zbalah Mohammed	e-mail	zainab.Kadhim.alkhazragie@sa-uc.edu.iq
Peer Reviewer Name	Zainab Kadhim Zbalah Mohammed	e-mail	zainab.Kadhim.alkhazragie@sa-uc.edu.iq
Scientific Committee Approval Date	06/12/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None		Semester

Co-requisites module	None	Semester	
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Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1- Understanding the Fundamentals and Techniques of Analytical Chemistry: Enabling students to recognize the basic principles of analytical chemistry methods such as quantitative and qualitative analysis, as well as learning techniques like spectroscopic, microscopic, and electrochemical analysis. 2- Application of Laboratory Tools and Equipment: Equipping students with the necessary skills to use modern laboratory tools and equipment such as absorption spectrometers, electrochemical analyzers, and chemical testing instruments, among other essential tools in analytical chemistry. 3- Developing Skills in Conducting Experiments and Analyzing Data: Training students on how to design and perform experiments accurately, and how to collect and analyze data to draw correct and precise scientific conclusions. 4- Understanding Experimental Errors and Statistical Data Analysis: Teaching students how to handle experimental errors that may occur during chemical analysis, and how to use statistical methods to analyze and interpret data. 5- Practical Applications of Analytical Chemistry: Teaching students how to apply the knowledge gained in practical fields such as the chemical industry, pharmaceuticals, environmental science, and food industries, with the aim of improving quality or ensuring safety. 6- Enhancing Critical Thinking and Problem-Solving: Encouraging students to develop critical thinking skills by analyzing complex scientific problems in analytical chemistry and making decisions based on evidence and scientific experiments.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the Principles of Volumetric, Gravimetric, and Instrumental Analysis: Students will gain a solid understanding of the theoretical foundations of volumetric (titrimetric), gravimetric, and instrumental (using advanced analytical tools) analysis methods. 2. Mastery of Volumetric Analysis Techniques: Students will learn to perform volumetric analysis using titration methods, including acid-base, redox, and complexometric titrations, with a focus on calculating concentrations and interpreting results. 3. Mastery of Gravimetric Analysis Techniques: Students will develop the ability to conduct gravimetric analysis, which includes precipitating, filtering, and weighing

	compounds to determine their quantity, as well as ensuring high precision in weighing and calculation. 4. Proficiency in Instrumental Analysis: Students will acquire skills in using various instrumental methods, such as spectrophotometry, chromatography, and electrochemical analysis, to identify and quantify chemical substances in complex mixtures. 5. Application of Statistical Methods for Data Analysis: Students will be trained in applying statistical techniques to analyze experimental data from volumetric, gravimetric, and instrumental methods, ensuring accuracy and reliability of results through error analysis and data validation. 6. Conducting Practical Laboratory Experiments with Precision: Students will gain hands-on experience in conducting experiments in volumetric, gravimetric, and instrumental analysis, ensuring that they can accurately perform techniques, measure samples, and handle equipment. 7. Identifying and Correcting Experimental Errors: Students will learn to recognize common sources of error in volumetric, gravimetric, and instrumental analyses, and develop strategies for error correction to improve the precision of their results. 8. Application of Analytical Techniques in Real-World Scenarios: Students will apply their knowledge of analytical chemistry to solve practical problems in various fields, including environmental testing, pharmaceutical analysis, and industrial applications, using volumetric, gravimetric, and instrumental techniques. 9. Enhancing Critical Thinking and Problem-Solving Skills: Students will develop the ability to critically evaluate experimental outcomes, analyze data, and make informed decisions based on their findings from volumetric, gravimetric, and instrumental analyses. 10. Effective Scientific Communication: Students will improve their ability to communicate scientific findings effectively, including writing clear and accurate laboratory reports, interpreting analytical data, and presenting results both orally and in writing to different audiences.
Indicative Contents المحتويات الإرشادية	1. Introduction to Analytical Chemistry: Overview of the field of analytical chemistry, including its scope, Chemical concentrations , applications, and the importance of accurate chemical analysis in scientific research and industry. Explanation of the difference between qualitative and quantitative analysis. [8 hrs] 2. Principles of Volumetric Analysis (Titration Methods): Detailed study of titration techniques, including acid-base, redox, complexometric, and precipitation titrations. Concepts of equivalence point, indicator selection, and calculation of concentrations in volumetric analysis. [15 hrs] 3. Gravimetric Analysis: Introduction to gravimetric methods, including precipitation, filtration, and drying techniques. Study of factors affecting the accuracy and precision of gravimetric measurements, and the steps involved in preparing and weighing precipitates. [12 hrs]

4. **Instrumental Analysis Techniques:** Overview of instrumental methods used in modern analytical chemistry, such as spectroscopy (UV-Vis, IR, NMR), chromatography (GC, HPLC), and electrochemical techniques (potentiometry, voltammetry). Explanation of the principles and applications of each technique. [9 hrs]
 5. **Error Analysis and Accuracy in Analytical Chemistry:** Study of different types of errors (systematic and random errors) and their impact on the accuracy and precision of analytical results. Methods for error detection and minimizing errors in volumetric, gravimetric, and instrumental analyses. [8 hrs]
 6. **Quantification in Volumetric Analysis:** In-depth study of methods for quantifying substances using titration techniques. Focus on sample preparation, indicator selection, titrant standardization, and calculations of concentration and purity. [6 hrs]
 7. **Advanced Instrumental Methods:** Detailed exploration of advanced instrumental techniques such as atomic absorption spectroscopy (AAS), inductively coupled plasma mass spectrometry (ICP-MS), and gas chromatography-mass spectrometry (GC-MS). Application of these methods in environmental, pharmaceutical, and industrial analysis. [8 hrs]
 8. **Applications of Analytical Techniques in Real-World Scenarios:** Practical applications of volumetric, gravimetric, and instrumental analysis in fields such as environmental monitoring, food safety testing, forensic science, and pharmaceutical analysis. Case studies and examples of analytical problem-solving. [6 hrs]
 9. **Sample Preparation and Handling:** Techniques for preparing and handling samples for analysis, including extraction, digestion, and dilution procedures. Importance of minimizing contamination and ensuring representative samples for accurate analysis. [6 hrs]
 10. **Data Interpretation and Reporting in Analytical Chemistry:** Training in interpreting the results of volumetric, gravimetric, and instrumental analyses. Emphasis on writing clear and accurate laboratory reports, presenting data in tabular and graphical formats, and interpreting results in light of experimental conditions. [8 hrs]
- These indicative contents cover the core aspects of analytical chemistry, focusing on the essential techniques and principles that students need to master for conducting high-quality chemical analyses.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

	Effective learning and teaching strategies for Analytical Chemistry focus on a hands-on, student-centered approach. Active learning is emphasized, encouraging students to apply theoretical knowledge to real-world problems through practical exercises and case studies. Laboratory-based learning is central, with students conducting volumetric, gravimetric, and instrumental analyses to hone their technical skills. The flipped classroom model supports independent learning, where students engage with content before class, allowing for deeper discussions and problem-solving during in-person sessions. Collaborative learning fosters teamwork, allowing students to exchange ideas and learn collectively. To enhance understanding, multimedia tools and digital resources are integrated, offering visualizations of complex concepts. Regular assessments guide student progress, ensuring both theoretical and practical competencies are achieved. Real-world applications in fields such as pharmaceuticals and environmental analysis demonstrate the relevance of analytical chemistry in everyday life. Ultimately, these strategies prepare students for the challenges of the analytical chemistry profession.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب له ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Overview of the field of analytical chemistry, including its scope, applications, and the importance of accurate chemical analysis in scientific research and industry. Explanation of the difference between qualitative and quantitative analysis. Factors that affect the selection of an analytical method and steps of chemical analysis.
Week 2	Review of elementary concept important to analytical chemistry: Strong and weak electrolytes; important weight and concentration units.
Week 3	The evaluation of analytical data: Definition of terms.
Week 4	Chemical concentrations: Mole and molar mass, Calculations in grams and moles
Week 5	Solutions: Definition, Preparation, Molarity, Normality, Formality, PH, POH, Solubility.
Week 6	An introduction to gravimetric analysis: Statistical analysis of data; rejection of data; precipitation methods; gravimetric factor.
Week 7	Mid-term Exam
Week 8	The scope of applications of gravimetric analysis: Inorganic precipitating agents; organic precipitating agents.
Week 9	An introduction to volumetric methods of analysis: Volumetric calculations; acid-base equilibria and pH calculations.
Week 10	Buffer solutions: Theory of neutralization titrations of simple system.
Week 11	Theory of neutralization titrations of complex system; Precipitation titrations.

Week 12	Calculation of pH in complex system; Volumetric methods based on complex system.
Week 13	Equilibria in oxidation-reduction system; theory of oxidation-reduction titrations.
Week 14	Instrumental Methods: Photometric, Colorimetric, pH measurements, Chromatography.
Week 15	Atomic Absorption: Spectrophotometry and Atomic Spectroscopy.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Lab 1: Demonstration of some laboratory equipment's.
Week 2	Lab 2: Separation and identification of group 1 cations (individual test).
Week 3	Lab 3: Analysis of group 1 cations mixture.
Week 4	Lab 4: Preparation and standardization of an acid.
Week 5	Lab 5: Determination of the percentage of acetic acid.
Week 6	Lab 6: Analysis of sodium carbonate and sodium hydroxide mixture.
Week 7	Lab 7: Determination of chloride by the Mohr method.
Week 8	Lab 8: Determination of chloride by the Volhard method.
Week 9	Lab 9: Preparation and standardization of 0.1N KMnO ₄ .
Week 10	Lab 10: Determination of ferrous form of iron in Mohr's salt.
Week 11	Lab 11: Determination of total hardness in tap water.
Week 12	Lab 12: Gravimetric determination of Nickel.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
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Required Texts	1) F. James Holler and Stanley R. CROUCH, "Fundamentals of Analytical Chemistry", 9th Ed., USA, (2013). 2) Abdulhussien Aljebory and Tamadhur Jabbar Als Salman, practical analytical chemistry, 2016 . https://www.researchgate.net/publication/301647876 3) David Harvey, Modern Analytical Chemistry, DePauw University, McGraw-Hill Companies, United States of America, (2000)	No
Recommended Texts	H. A. Flaschka, A.J. Barnard, Jr. and P. E. Sturrock, "Quantitative analytical chemistry", Vol. II, Barnes and Noble, Inc., New York, 1969.	No

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION

وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	biochemistry		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Path-226		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	pathological analyses	College	College of science
Module Leader	Muneer Kadhum Khudhair	e-mail	Muneerk.khudhair@uokufa.edu.iq
Module Leader's Acad. Title	A.Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims

أهداف المادة الدراسية

1. Understand how the chemical properties of molecules determine the ways in which they interact and react with each other.
2. Understand different types of chemical reactions and how they are used by living organisms.
3. Use a variety of models to understand and explain chemical and biochemical phenomena, being aware of their strengths and weaknesses.
4. Apply thermodynamic and kinetic principles to explain the molecular driving forces in chemical and biochemical reactions.
5. Develop effective and safe chemical and biochemical laboratory skills that require use of the methods and instrumentation of modern biochemistry.
6. To integrate content, skills, critical thinking and the published works of others to design feasible experiments and independent research projects employing the scientific method.
7. To demonstrate the ability to analyze and interpret data, including critically analyzing experimental design and data interpretation in the primary literature.
8. To develop scientific writing skills through the writing of papers using scientific conventions of format, succinctness, objectivity and accuracy.
9. To develop oral communication skills within the context of scientific conventions of format, succinctness, objectivity and accuracy through the oral and poster presentations

Module Learning Outcomes

مخرجات التعلم للمادة الدراسية

Students will be able to explain/describe the synthesis of proteins, lipids, nucleic acids, and carbohydrates and their role in metabolic pathways along with their regulation at the epigenetic, transcriptional, translational, and post-translational levels including RNA and protein folding, modification, and degradation. Regulation by non-coding RNAs will be tied to the developmental and physiological functioning of the organism.

Indicative Contents

المحتويات الإرشادية

Indicative content includes the following.

Theory Parts

Carbohydrates

Carbohydrates include sugars and starches. These compounds contain only the elements carbon, hydrogen, and oxygen. Functions of carbohydrates in living things include providing energy to cells, storing energy, and forming certain structures, such as the cell walls of plants. The monomer that makes up large carbohydrate compounds is called a monosaccharide. The sugar glucose, represented by the chemical model below, is a monosaccharide. It contains six carbon atoms (C) and several atoms of

hydrogen (H) and oxygen (O). Thousands of glucose molecules can join together to form a polysaccharide such as starch. (15 hrs)

Lipids

Lipids include fats and oils. They contain primarily the elements carbon, hydrogen, and oxygen, although some lipids contain additional elements such as phosphorus. Functions of lipids in living things include storing energy, forming cell membranes, and carrying messages. Lipids consist of repeating units that join together to form chains called fatty acids. Most naturally occurring fatty acids have an unbranched chain of an even number (generally from 4 to 28) of carbon atoms. (15 hrs)

Proteins

Proteins include enzymes, antibodies, and many other important compounds in living things. They contain the elements carbon, hydrogen, oxygen, nitrogen, and sulfur. The functions of proteins are very numerous. They include helping cells keep their shape, making up muscles, speeding up chemical reactions, and carrying messages and materials. The monomers that make up large protein compounds are called amino acids. There are 23 different amino acids that combine into long chains (called polypeptides) to form the building blocks of a vast array of proteins in living things. (10 hrs)

Nucleic Acids

Nucleic acids include the molecules DNA (deoxyribonucleic acid) and RNA (ribonucleic acid). They contain the elements carbon, hydrogen, oxygen, nitrogen, and phosphorus. Their functions in living things are to encode instructions for making proteins, to help make proteins, and to pass the instructions from parents to offspring. The monomer that makes up nucleic acids is the nucleotide. All nucleotides are the same except for a component called a nitrogen base. There are four different nitrogen bases, and each nucleotide contains one of these four bases. The sequence of nitrogen bases in the chains of nucleotides in DNA and RNA makes up the code for protein synthesis, called the genetic code. The animation below represents the very complex structure of DNA, which consists of two chains of nucleotides. (10 hrs)

Practical Parts

	Include special tests to detect 1- Monosaccharides and their types. Detection of ketone and aldehyde 2- Fats and their types, saturated and unsaturated fats 3- Amino acids and their types, aromatic and aliphatic acids_(10 hrs)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Biochemistry is a very difficult subject, as it covers so many areas. Therefore, it is necessary to start teaching biochemistry from the basic concepts. It is far more important to teach students about conducting experiments in a laboratory in a clear and easy way. And then, the students should learn the key topics. It requires many things to be learned. So, when you are teaching biochemistry, you should start with the basics first. Students should understand the basic concepts of chemistry, and they should be able to follow along. After that, you should move on to the more complicated topics

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	2,5, 11	LO 3, 4, 9 and 10
	Assignments	2	10% (10)	7, 13	LO 6, 11, and 12
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Biochemistry
Week 2	Carbohydrates
Week 3	Basic of CHO
Week 4	Classification of CHO
Week 5	Classification of CHO
Week 6	Lipids
Week 7	Midterm exam
Week 8	Nature of Lipids in cells
Week 9	Amino Acids

Week 10	Classification of Amino acids according to its structure
Week 11	Classification of Amino acids according to its essential and non-essential
Week 12	Proteins
Week 13	Function of Proteins
Week 14	Classification of Protein according to its structure
Week 15	Nucleic Acids
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to biochemistry Lab
Week 2	Lab 2: Carbohydrates tests
Week 3	Lab 3: Ketones and Aldehyde tests
Week 4	Lab 4: Mono-carbohydrates tests
Week 5	Lab 5: di and poly saccharides tests
Week 6	Lab 6: Amino acids test
Week 7	Lab 7: Types of Amino acids Tests
Week 8	Lab 8: proteins tests
Week 9	Lab 9: Lipids tests
Week 10	Lab 9: types of lipids Tests

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Biochemistry, Lippincott Illustrated Reviews 2018	Yes
Recommended Texts	clinical chemistry for medical students DM Vasodivan, 2016	Yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

المرفق 3: قائمة بالأجهزة والمواد المختبرية

ت	الوصف (الأدوات والأجهزة والمعدات)	العدد	الملاحظات
1	جهاز المطياف الضوئي	1	
2	فرن كهربائي	1	
3	حمام مائي كبير	1	
4	خزانة سحب الغازات	1	
5	جهاز الطرد المركزي	2	
6	ايزو منتل	1	
7	هزاز حراري مغناطيسي	5	
8	ميزان حساس	2	
9	جهاز قياس اللهب	1	
10	حمام مائي صغير	1	
11	جهاز فحص المياه	1	
12	جهاز قياس الحموضة	1	
13	جهاز تقطير الماء الكهربائي	1	

المرفق 4: خارطة تصميم المختبر

