

Dr. Khalid Qasim Kheder
Dr. Rafid Ahmed Abdullah

Subject name: Advanced and smart materials

Academic Year : 2020-2021

Credit Hour : 2hr. *15 weeks

Catalog Description:

- Introduction to materials science
- Background of advanced materials
- Types of advanced materials
- Structures of advanced materials
- Opportunities and constraints
- Advanced materials processes
- Physical and chemical properties
- Properties of ZnO and GaN-based materials
- Thermal performance
- Mechanical properties
- Electric and magnetic properties
- Advanced materials testing
- Mathematical modelling
- Bio-composites
- Toxicity studies
- Applications of advanced materials in medicine and biophysics
- Nano-biosensor based on advanced materials
- Introduction to smart materials
- Types of smart materials
- Piezoelectric material
- Shape-memory alloys and polymers
- Photovoltaic materials
- Electro-strictive polymers





- Magneto-strictive
- Smart inorganic materials
- pH- sensitive polymers
- Self-healing
- Photo-mechanical materials
- Thermoelectric materials
- Medical and biophysical applications of smart materials

Reference Book:

- 1- Self-Healing Materials Principles & Technology, by George Wypych, ChemTec Publishing, Toronto, Canada , 2017.
- 2- Functional and Smart Materials Structural Evolution and Structure Analysis, by: Z. L. Wang and Z. C. Kang, Plenum Press, New York, 1998.
- 3- New and advanced materials, by: Patrick Grant, University of Oxford, 2013.

Course Outcomes: To understand the properties of advanced and smart materials and their applications in medicine and biophysics.

Weekly Teaching Plan:

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|---------------------------------|---|
| Week 1&2&3 | <ol style="list-style-type: none"> 1. Introduction to materials science 2. Background of advanced materials 3. Types of advanced materials 4. Structures of advanced materials 5. Opportunities and constraints 6. Advanced materials processes |
| First Quiz | |
| Week 4&5&6&7 | <ol style="list-style-type: none"> 1. Physical and chemical properties 2. Properties of ZnO and GaN-based materials 3. Thermal performance 4. Mechanical properties 5. Electric and magnetic properties |



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| | <ol style="list-style-type: none"> 6. Advanced materials testing 7. Mathematical modelling 8. Bio-composites 9. Toxicity studies |
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Second Quiz

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| Week 8&9&10&11 | <ol style="list-style-type: none"> 1. Applications of advanced materials in medicine and biophysics 2. Nano-biosensor based on advanced materials 3. Introduction to smart materials 4. Types of smart materials 5. Piezoelectric material 6. Shape-memory alloys and polymers 7. Photovoltaic materials 8. Electro-strictive polymers |
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Third Quiz

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|------------------------------|--|
| Week 12&13&14 | <ol style="list-style-type: none"> 1. Magneto-strictive 2. Smart inorganic materials 3. pH- sensitive polymers 4. Self-healing 5. Photo-mechanical materials 6. Thermoelectric materials |
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2nd course Mid Term Examination

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| Week 15 | Medical and biophysical applications of smart materials |
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2nd course Final Term Examination

Mosul
University



College of science

Biophysics Department

Students Behaviour in Class : Very good

Computer Usage: Yes

Teaching Techniques: Variety



Dr. Khalid Qasim Kheder

Dr. Rafid Ahmed Abdullah

Lecturer: Sheima'a Talal Adabag

Subject name: Advanced and smart materials (practical)

Academic Year : 2021-2020

Credit Hour : 1.5hr. *15 weeks

Catalog Description:

1. Band gap energy of advanced material of GaN
2. Band gap energy of advanced material of InGaN
3. Band gap energy of advanced material of AlGaN
4. Studying the properties of laser safety eyeglasses
5. Calculating the optical density and maximum permissible exposure to laser
6. Studying the properties of ZnO nanoparticles
7. Studying the properties of bismuth oxide nanoparticles

Reference Book:

- 1- New and advanced materials, by: Patrick Grant, University of Oxford, 2013.
- 2- LASER SAFETY MANUAL, Environmental Health and Safety, Case western reserve university, 2017.
- 3- Ratio of surface area to volume in nanotechnology and nanoscience, by: Peter I. Kattan, Petra Books, 2011.

Course Outcomes: Computational and modeling of advanced and smart materials experimental.

Weekly Teaching Plan:

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| Week 1&2&3 | <ol style="list-style-type: none">1. Introduction to computational and modeling.2. Band gap energy of advanced material of GaN3. Band gap energy of advanced material of InGaN |
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First Quiz



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| Week 4&5&6&7 | <ol style="list-style-type: none"> 1. Band gap energy of advanced material of AlGa_N 2. Studying the properties of laser safety eyeglasses 3. Computer modelling 4. Group discussions |
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Second Quiz

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| Week 8&9&10&11 | <ol style="list-style-type: none"> 1. Calculating the optical density and maximum permissible exposure to laser 2. Studying the properties of ZnO nanoparticles 3. Solving examples with MATLAB 4. Group discussions |
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Third Quiz

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| Week 12&13&14 | <ol style="list-style-type: none"> 1. Studying the properties of bismuth oxide nanoparticles 2. Solving examples with MATLAB 3. Review and discussion |
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2nd course Mid Term Examination

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| Week 15 | Final review |
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2nd course Final Term Examination

Students Behaviour in Class : Excellent

Computer Usage: Yes

Teaching Techniques: Classical and MATLAB



Dr. TALAL SABHAN SALIH

Subject name: Bioinformatics I

Academic Year : 21-20

Credit Hour : 45

Catalog Description:

This course is given to the second year class in the first semester. It comprises of theoretical and practical parts. Students in the theoretical part will learn the principle and fundamental concepts of bioinformatics and its applications. In the practical part, student will have the opportunity to make use of the tools and softwares available to practice the theoretical part.

Reference Book:

- 1- Bioinformatics: Principles and Applications by Bibekanand Mallick and Zhumur Ghosh (2008).
- 2- Essential bioinformatics by Jin Xiong (2006)

Course Outcomes:

At the end of this course students should learn the following concepts:

- 1- Students will have close view to the principle and fundamental bioinformatics.
- 2- Students should learn how interdisciplinary fields of studies connect to each other in Bioinformatics.
- 3- Student should learn how to collect statistics through biological information and data analysis
- 4- Students will learn how to build a computational model and to solve a computational modelling problem
- 5- Student will learn how to test and evaluate a computational algorithm.

Weekly Teaching Plan:

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| Week 1 | Introduction to the bioinformatics, principle of bioinformatics, fundamental and |
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| Oct 2019 | concepts, applications of bioinformatics. |
| Week 2&3 | The computational point of view of bioinformatics, steps to provide bioinformatics solution, Collection statistics through biological information and data, Building a computational model and to Solve a computational modelling problem, Test and evaluate a computational algorithm. |
| | First Quiz |
| Week 4 | Information flow, central dogma, the fundamental of all living things, archive (DNA) to function (protein function). |
| | Second Quiz |
| Week 5,6 &7 | DNA Structure, RNA structure, three letter code, the function of DNA, the function of RNA, Basic components of nucleic acids, amino acids and proteins, the DNA background, the base pair and DNA double helux |
| | Third Quiz |
| Week 9&10 | Differences between DNA and RNA structure and function, why DNA is more stable that RNA. What is a gene, what is a genome, the difference between genes and genomes, the relation between genome size and number of genes |
| | Midterm Exam |
| Week 11 | How to find complementary sequence, example of finding complementary sequences. Difference between Exons and Introns |
| Week 12 | Gene Definition, Structure and organisation , gene structure in prokaryotes, gene organization in eukaryotes. Difference in |
| Week 13 | Gene mutation and how do mutations occur? Classification of gene mutation, Kinds of possible gene mutations, nonsense and missense mutations |
| | Forth Quiz |



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| Week 14 | Genetic Testing, What is genetic testing?, Types of genetic tests, Newborn screening, Diagnostic testing, Carrier testing, Preimplantation testing |
| Week 15 | Indicate the location of a gene, Cytogenetic location, Molecular location, the q and p arms, Circulating tumour DNA and how it is used to diagnose and manage cancer? |

Students Behaviour in Class

Students were very well behaved in the class and the materials were very well delivered.

Computer Usage:

The practical part of this course was done using computers with appropriate softwares and tools.

Teaching Techniques: Different techniques were used including, lecturer, homework, case studies, reports and seminars delivered by students

Raghad Riyadh Shafeek

Subject name: Bioinformatics I

Academic Year : 20-21

Credit Hour : 2hr. *15 weeks

Catalog Description: Bioinformatics is the science of storing, extracting, organizing, analyzing, interpreting and using information. The approaches to the discipline of bioinformatics incorporate expertise from the biological sciences, computer science and mathematics. The major in bioinformatics is designed for students interested in molecular biology and genetics, information technologies and computer science. Bioinformatics are involved in the analysis of the human genome, identification of targets for drug discovery, development of new algorithms and analysis methods, the study of structural and functional relationships, and molecular evolution.

Reference Book: MATLAB Bioinformatics Toolbox

Course Outcomes: Graduates with bioinformatics degrees work as software test engineers and with database design. They go on to study biochemistry and molecular biology, genome sciences and genetics.

knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics existing software effectively to extract information from large databases and to use this information in computer modeling problem-solving skills, including the ability to develop new algorithms and analysis methods an understanding of the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries

Weekly Teaching Plan:

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| <p>Week 1&2&3</p> | <p>Introduction to Matlab Bioinformatics toolbox Sequence utilities and statistics. Create random sequence for test cases DNA,RNA,Aminoacid</p> |
| <p>First Quiz</p> | |
| <p>Week 4&5&6&7</p> | <p>Sequence conversion and manipulation Converting DNA or RNA sequence to amino acid sequence (dna2rna, rna2dna,aa2dna, dna2aa,nt2int,int2nt, aa2int,int2aa,seqcomplement)</p> |



Second Quiz

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| <p>Week 8&9&10&11</p> | <p>Sequence statistics . (aacount , base count, codon count, dimer count ,nmercount, ntdensity, codonbias, oligoprob) Search for a specific patternwith in a sequence (Seqshowwords , Seq showcount, seqshowworfs). Cleave a protein with an enzyme (cleave, rabasecuts)</p> |
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Third Quiz

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| <p>Week 12&13&14</p> | <p>Amino acid sequence utilities Calculate amino acid statistics for a sequence(aacount) Determine amino acid composition of protein sequence. Protein property analysis Amino acid compound ,isoelectric point</p> |
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2ndcourse Mid Term Examination

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| <p>Week 15</p> | <p>Ploting 3 -D protein and other molecular structure with information from molecules model files(molviwer) Protein features analysis calculate property of a peptide</p> |
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2ndcourse Final Term Examination

Students Behaviour in Class : The student is excited to learn more about the basics of bioinformatics, the use of scientific and mathematical methods of bioinformatics, the basic rules of international bioinformatics, methods and analysis of DNA sequences as well as comparative methods or local and international groups using international database databases.

Computer Usage: Use of computer in genetic mapping and analysis of specialized samples in genome and genetic expression. Through the use and employment of specialized software languages.

Teaching Techniques: Use of computer and Projector (Data show) Websites in the analysis and study of molecular sequences of genetic DNA such as NCBI using DNA sequence analysis sequences

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Biophysics Department



. Raghad Riyadh Shafeek

Subject name: Bioinformatics II (pactical)

Academic Year : 20-21

Credit Hour : 2hr. *15 weeks

Catalog Description: Bioinformatics is the science of storing, extracting, organizing, analyzing, interpreting and using information. The approaches to the discipline of bioinformatics incorporate expertise from the biological sciences, computer science and mathematics. The major in bioinformatics is designed for students interested in molecular biology and genetics, information technologies and computer science. Bioinformatics are involved in the analysis of the human genome, identification of targets for drug discovery, development of new algorithms and analysis methods, the study of structural and functional relationships, and molecular evolution.

Reference Book:

Matlab bioinformatics tool box.

Course Outcomes:

Graduates with bioinformatics degrees work as software test engineers and with database design. They go on to study biochemistry and molecular biology, genome sciences and genetics.

knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics existing software effectively to extract information from large databases and to use this information in computer modeling problem-solving skills, including the ability to develop new algorithms and analysis methods an understanding of the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries

Weekly Teaching Plan:

Prepare the planned weekly curriculum and prepare an alternative plan in case of power failure.

Preparing the ready slide show in the event of an internet outage.

Preparation and updating of bioinformatics programs.



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| Week 1&2&3 | The genetic code plotting 3d proteins structure (molviewer) sequence statistics search |
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First Quiz

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| Week 4&5&6&7 | open sequence tools windows apply restriction enzymes graphical user for protein analysis sequence alignment |
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Second Quiz

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| Week 8&9&10&11 | seqlogo pairwise sequence alignment locally align (swalign) globally align (nwalgn) |
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Third Quiz

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| Week 12&13&14 | standard scoring matrices multiple sequence alignment create phylogenic trees |
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2nd course Mid Term Examination

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| Week 15 | return scoring matrix |
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2nd course Final Term Examination

Students Behaviour in Class :

The student is excited to learn more about the basics of bioinformatics, the use of scientific and mathematical methods of bioinformatics, the basic rules of international bioinformatics, methods and analysis of DNA sequences as well as comparative methods or local and international groups using international database databases.

Computer Usage:

Use of computer in genetic mapping and analysis of specialized samples in genome and genetic expression. Through the use and employment of specialized software languages.



Teaching Techniques:

Use of computer , Projector (Data show), Websites in the analysis and study of molecular sequences of genetic DNA such as NCBI using DNasequence analysis sequences



Dr. prof. Sundus N. AlKallak

Dr. Enaam A. Aldagstani

Subject name: biology I (theoretical)

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks Theoretical

Catalog Description: provides an idea for the student about the biology and classification of animal kingdom, and some subject about animals , and the histology and the chemical compounds.

Reference Book: biology2010/ by Sylvia s, mader and windelspecht/ 12th ed.

Course Outcomes: to provide the student with information about the biology

Weekly Teaching Plan:

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| Week 1&2&3 | Definitive of Biology/ important of biology/ the general characteristics of living organisms / invertebrates and characteristics of invertebrates |
| First Quiz | |
| Week 4&5&6&7 | Animal kingdom/ classification of animal phylum's/ phylum porefera- sponges/ phylum protozoa – plasmodium// phylum platyhelminthes – Fasciola hepatica / planaria |
| Second Quiz | |
| Week 8&9&10&11 | Histology - animal tissue/ definitive of animal tissue/ classification and function of animal tissue The cell division cycle Mitosis/ meiosis The chemical foundation of life The building blocks of molecules/ matter/ elements / atoms/isotopes Water properties Carbon/ organic molecules/ hydrocarbons/ isomer Biological macromolecular |



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| | Carbohydrates |
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Third Quiz

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| Week 12&13&14 | Carbon/ organic molecules/ hydrocarbons/ isomer Biological macromolecular Carbohydrates |
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2ndcourse Mid Term Examination

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| Week 15 | Lipids Proteins Nucleic acids |
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2ndcourse Final Term Examination

Students Behaviour in Class :excellent

Computer Usage: good

Teaching Techniques: variety



. **Muhammad Abdullah Al-Mashhadany**

Subject name: Biology II/ first class.

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description:

Biology is the natural science that studies life and living organisms, including their physical structure, chemical processes, molecular interactions, physiological mechanisms, development and evolution.

Reference Book:

Biological Science 1 and 2: v. 1&2 by D. J. Taylor, N. P. O. Green, G. W. Stou
Biology (Hardcover) Neil A. Campbell.

Essential Cell Biology (Hardcover) Bruce Alberts.

Practical Z B. Sc. I Year Practical Zoology .

Course Outcomes:

To provide students with technical and analytical skills used in modern biological research. Students will demonstrate proper and safe laboratory practice, proper use of equipment, and the ability to use basic techniques in several areas and advanced techniques in at least one area.

to provide students with technical and analytical skills used in modern biological research.

Depending on individual interests, biology careers can lead you on to study living organisms such as animals, plants, humans or even bacteria, to help develop biological knowledge and understanding of living processes for a number of different purposes, including treatment of disease and sustaining of the natural ...

Weekly Teaching Plan:

1. Equip the students with scientific knowledge and abilities so that they can correctly manage the laboratory.
2. Handle experiments correctly and write scientific and analytical summaries of laboratory results.
3. Scientific field tours to recognize and collect the specimens.



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| Week 1&2&3 | Platyhelminthes phylum, planaria, digestive system of planaria, Cross-section of planaria. Phylum porifera the (pore bearers), porifera organization and morphology, porifera classification. Phylum sporozoa, plasmodium vivax, plasmodium falciparum, life cycle. |
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First Quiz

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| Week 4&5&6&7 | Phylum apicomplexan, plasmodium malaria, plasmodium ovale, asexual cycle (schizogony), sexual cycle (sporogony). Platyhelminthes phylum, fasciola hepatica life cycle, digestive system. Cell division in Eukaryotic cells (Mitosis). Cell division in Eukaryotic cells (Meiosis). |
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Second Quiz

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| Week 8&9&10&11 | Biochemistry: Carbohydrate, monosaccharides disaccharides and polysaccharides. Proteins, classification of proteins, Types of Protein. Quantitative test of proteins and amino acids. Ninhydrin test. |
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Third Quiz

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| Week 12&13&14 | Quantitative test for carbohydrate, molisch test. Histology: Epithelial tissues, simple epithelial tissues, stratified epithelial tissues. Connective tissues: Mesenchyme tissues. |
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2nd course Mid Term Examination

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| Week 15 | Connective tissues: Muscular tissues, muscle skeleton, smooth muscle, cardiac muscles |
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2nd course Final Term Examination



Students Behavior in Class :

Acquisition of the ability and skill in zoology.

Acquire the skill of distinguishing between the right results and possible mistakes and how to avoid it.

Daily, weekly and continuous tests.

Exercises and activities in the classroom.

Computer Usage:

Identify the reliable scientific sites for searching and taking the information.

Use your computer to quickly access information in some difficult situations.

Use your computer and monitor (data view).

Teaching Techniques:

Develop the student's ability to perform duties and deliver them on time.

Analyze the problem and find solutions based on the expected results.

Developing the student's ability to discuss, participate and compete in the classroom and evaluate activities through the work of scientific reports and graduate research.



Subject name: Biomaterials

Academic Year : 2021-2020
Credit Hour : **Two hours per week for 15 week (Theoretical).**
Class code :
Pre-requisites : **Mechanical, chemical and biological properties**

Catalog Description:

This course provides students with basic concepts of biomaterials, definition of biomaterials, biocompatibility, Biological materials, Uses of biomaterials, Biomaterials in organs, Materials for use in the body, Polymer, Metals and its alloys, Ceramics , Composite materials, Applications of biomaterials, Biodegradable materials, Toxicology, Healing, Properties of biomaterials, Mechanical properties of biomaterials, Chemical properties of biomaterials, Biological soft tissues, Hard tissues, Materials in maxillofacial prosthetic,

Reference Book:

- 1- Biomaterials by Joyce Y.Wong and Joseph D.Bronzino
- 2- Biomaterials Science by Buddy Ratner Allan Hoffman Frederick Schoen Jack Lemons

Course Outcomes:

In this course, initially students will learn how to analysis electromagnetic problem. Upon successful completion of this course the student shall be able to:

- 1- What are the biomaterials?
- 2- Introduction to polymer, metals, ceramics and composite biomaterials.
- 3-Mechanical, physical and chemical properties of biomaterials
- 4- Applications of biomaterials.

Weekly Teaching Plan:

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|--------|----------------------------|
| Week 1 | definition of biomaterials |
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| Week 2&3 | biocompatibility, Biological materials, Uses of biomaterials |
| Week 4&5 | Biomaterials in organs, Materials for use in the body |
| Week 6&7 | Polymer , metals(alloys) and its applications |
| First Quiz | |
| Week 8 | Ceramics as biomaterials and its application |
| Second Quiz | |
| Week 9 | Composite materials as biomaterials and its applications |
| Week 10 | Biodegradable materials, Toxicology, Healing |
| Week 11 | Properties of biomaterials, Mechanical properties of biomaterials, |
| Week 12&13 | Chemical properties of biomaterials, Biological soft tissues, Hard tissues, Materials in maxillofacial prosthetic |

Students Behavior in Class

In all classes, to ensure a respectful environment that allows all students to learn effectively, please adhere to the following expectations.

- *Be on time in class hall (Plan for the transport delay possibilities). If you are late, be quiet and find a seat quickly (minimize disturbances to both the instructor and other students).
- * Do not speak to your friends during the lectures. If you have a question about the material, Please raise your hand to ask the instructor.
- * Ensure that mobile devices are set to silent mode to avoid disrupting the class. Also, please do not use electronic devices to access games, facebook, twitter or other non-related course Material.



*If you feel that you affected by the behavior of other students, please let the instructor know your concerns so he can solve the problem.

* Don't ask the instructor about the following:

1. Exam question patterns
2. Increase your grade or letter
3. Postpone exam or extend the due dates (deadlines) for submission projects and Homework .Failure to meet behavioral expectations may result in a request to leave the lecture hall.

Copy and Paste Policy

Students should avoid copy and paste jobs for their projects and/or any other assignments. However, sharing mark policy will be subjected, If the instructor notice any coping evidences, in this case, each student mark=Work Mark / No. of coping students)

Email Policy

The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, during office hours, or by appointment. Emails must come from official University email addresses. The instructor will not respond to outside email addresses.

Computer Usage:

Students are encouraged to use the Internet to search for various topics, including contents of similar courses offered elsewhere. MS Excel software is used for preparing projects. Students can reach the teaching material, solved problems, data sheets, past exam papers etc. on the allocated Web site.

Teaching Techniques:

Power point presentation and multimedia tools are used in classrooms; Examples and problems will be solved and illustrated on the classroom board; Tutorials are also organized to establish a closer contact with students.

Grading Policy:

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|-------------------------|-------|--|
| Two quizzes, (each 5pt) | 10pt | Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA". |
| Mid Semester Exam | 30pt | |
| Final Exam | 60pt | |
| Total | 100pt | |

Exam Policy:

- All exams will be Closed-Book, Closed-Notes. Bring a calculator, pencil, and eraser for the exams.
- No phones or electronic devices are allowed to use during the exams. Phones and electronic devices must be switched off and put away during the final exam.
- The final exam must be completed in order to complete the course
- Two Quizzes 20-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.
- Sharing of items during the exams is prohibited (e.g. calculators, rulers, erasers, etc.) under any circumstances.



Instructor : Dr. Marwan Zuhair Elias

Room No. :

Email ID : uomosul.edu.iq@marwanzt
marwanzt@yahoo.com

Last updated: 2020

Dr. Mahmoud Ahmed Mohammed Fakhri

Subject name: Biomolecules (Experimental)

Academic Yea: 2020-2021

Credit Hour: 3hr. *15 weeks Experimental

Catalog Description: Experimental

Biomolecules Lab. Contain many Experiments to study properties and structures for the following:

- Carbohydrates.
- Amino acids , peptides and proteins.
- Lipids.
- Enzymes .

Reference Book:

Practical Biochemistry for biomolecules testing -2012

Course Outcomes:

1. To make students practice laboratory applications
- 2 - Introduce students ideas and methods in the mechanism of detection or appreciation of some Biomolecules.

Weekly Teaching Plan:

Experimental

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| <p>Week 1&2&3 & 4</p> | <p>Experimentals in Carbohydrates (To know the types and varieties of sugars and how to distinguish between them in terms of reducing sugars and non-reducing, and in terms of being monosaccharide or oligosaccharides or polysaccharides)</p> <p style="text-align: right;">Unknown Exam</p> |
| <p>First Quiz</p> | |
| <p>Week 5&6&7 & 8</p> | <p>Experimentals in amino acids. (Detection of amino acids and study the properties of some of them)</p> <p>Experimentals in peptides and proteins (1) (Detection of peptides and proteins as well as methods of measurement as well as sedimentation methods used to separate proteins and their various types)</p> <p style="text-align: right;">Second Quiz</p> |
| <p>course Mid Term Examination</p> | |



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| Week 9&10&11 & 12 | Experimentals in peptides and proteins (2) Detection of peptides and proteins as well as methods of measurement as well as sedimentation methods used to separate proteins and their various types) Experimentals in lipids (Determination of some fat types in terms of saturation and solubility) |
| Third Quiz | |
| Week 13&14 &15 | Experimentals in enzymes. (Experiments on some enzymatic reactions) |
| Unknown Exam | |

course Final Term Examination

Students Behaviour in Lab.: **Excellent**
Computer Usage: **Very Good**
Teaching Techniques: **Variety**



Dr. Mahmoud Ahmed Mohammed Fakhri

Subject name: Biomolecules (Theoretical)

Academic Year: 2020-2021

Credit Hour: 3hr. *15 weeks *Theoretical*

Catalog Description: *Theoretical*

Students are study many fields :

- Water and pH .
- structures, properties and function of carbohydrates.
- structures, properties and function of amino acids.
- structures, properties and function of peptides and proteins.
- structures, properties and function of lipids.
- structures, properties and function of nucleosides and nucleotides.
- structures, properties and function of nucleic acids.
- structures, properties and function of enzymes.
- structures, properties and function of hormones.
- structures, properties and function of minerals and vitamins.

Reference Book:

- 1- Lehninger Principles of Biochemistry (8th Edition) 2016 *Authors: David L. Nelson, Michael M. Cox*
- 2- Harper's Illustrated Biochemistry (31th Edition) 2016 *Authors: [Peter J. Kennelly](#), [Robert Murray](#), [Victor Rodwell](#), [David Bender](#), [Kathleen M. Botham](#), [P. Anthony Weil](#)*

Course Outcomes:

- 1 - Enabling students to observe the material of Biomolecules.
- 2 - Explain the importance of the subject or article by linking it to the academic program (Biophysics).
- 3- Teaching students the terms of the Biomolecules.
- 4 - To inform students of the functions of each type of Biomolecules with their structures



Weekly Teaching Plan:

Theoretical

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|---|--|
| Week 1&2&3 | Water and pH + Structures, properties and function of carbohydrates |
| First Quiz | |
| Week 4&5&6&7 & 8 | Structures, properties and function of amino acids.+ Structures, properties and function of peptides and proteins. + structures, properties and function of lipids |
| Second Quiz | |
| course Mid Term Examination | |
| Week 9&10&11 | structures, properties and function of nucleosides and nucleotides.+ structures, properties and function of nucleic acids |
| Third Quiz | |
| Week 12&13&14 &15 | structures, properties and function of enzymes and hormones.+ structures, properties and function of minerals and vitamins. ++ |
| course Final Term Examination | |

Students Behaviour in Class : Excellent

Computer Usage: Very Good

Teaching Techniques: Variety



Dr. TALAL SABHAN SALIH

Subject name: Bionformatics II

Academic Year : 20-21

Credit Hour : 42

Catalog Description:

This course is a componentry for the course Bioinformatics I that should be given at the first semester. The course compromises of two parts. The first part is a theoretical part which describe the concepts of bioinformatics tools and global databases including genetics codes, STRs, Restricted enzymes, Decipher of DNA sequence , Global and Local alignment, cost and benefit of aligning two of more sequences. In the practical part, student will have the opportunity to make use of the tools and softwares available to practice the theoretical part.

Reference Book:

- 1- Bioinformatics: Principles and Applications by Bibekanand Mallick and Zhumur Ghosh (2008).
- 2- Essential bioinformatics by by Jin Xiong (2006)

Course Outcomes:

At the end of this course students should learn the following concepts:

- 1- How massive biological data can store and retrieve from the global database like NCBI and EMBL.
- 2- Students should learn how compare two or more sequences using STRs and RFLP techniques
- 3- How to collect the biological sample for DNA amplification and purification.
- 4- Students will learn the principle of PCR technique for DNA and RNA in vitro amplification
- 5- Students will learn how to Decipher (decode) of the DNA Sequence using Sanger methods
- 6- Students will learn how to analyse different sequence types for pairwise and multi alignment.
- 7- Students will learn how many sequence types are and how to differentiate among them.
- 8- Finally, students will learn how to calculate the cost and benefit of aligning two DNA sequences.



Weekly Teaching Plan:

| | |
|-----------------------------------|--|
| <p>Week 1 Feb 2019</p> | <p>Introduction to the Genetic Code, Principle of the genetic code, Characteristic of the genetic code, Special Codons</p> |
| <p>Week 2&3</p> | <p>Bioinformatics in carrying out the analysis of DNA Fingerprints, Short Tandem Repeats (STRs), How Does Forensic DNA Identification Work using STRs..?, Types of STRs.</p> <p style="text-align: center;">First Quiz</p> |
| <p>Week 4</p> | <p>Restriction Fragment Length Polymorphisms (RFLP) Method of DNA Profiling, Principle of RFLP, How does it Work?, DNA Extraction, DNA Fragmentation</p> |
| <p>Second Quiz</p> | |
| <p>Week 5,6 &7</p> | <p>Gel Electrophoresis, Example of forensic application of RFLP:, Paternity Case, Mitochondrial DNA (mtDNA), Y- Chromosome Analysis, Single Nucleotide Polymorphisms (SNP) analysis</p> <p style="text-align: center;">Third Quiz</p> |
| <p>Week 9&10</p> | <p>Collection of biological materials and transportation to the laboratory for obtaining DNA experimentally, Polymerase Chain Reaction (PCR)., Requirements of PCR amplification</p> <p style="text-align: center;">Midterm Exam</p> |
| <p>Week 11</p> | <p>Decipher (decode) of the DNA Sequence, principle of the DNA decoding, the modified ba dideoxynucleotide, coloured based for sequence decipher.</p> |
| <p>Week 12</p> | <p>Sequence Alignment, Sequences highly conserved regions, Types of Sequence Alignments, characterization of sequence alignments., Pair-wise alignment alignment, multiple sequence alignment,</p> |
| <p>Week 13</p> | <p>Global sequence Alignment, Local sequence Alignment, Cost-benefit approach to compare sequence alignments.</p> |



Forth Quiz

| | |
|---------|---|
| Week 14 | Phylogenetic tree, how to construct the phylogenetic tree, kinds of phylogenetic tree, and how it can be used to analyse DNA and RNA sequences and find the relationship among them |
|---------|---|

Students Behaviour in Class

Students were very well behaved in the class and the materials were very well delivered.

Computer Usage:

The practical part of this course was done using computers with appropriate softwares and tools.

Teaching Techniques: Different techniques were used including, lecturer, homework, case studies, reports and seminars delivered by students



Dr. Mahmoud Ahmed Mohammed Fakhri
Dr. Rafid Ahmed Abdullah

Subject name: Biophysics and Diseases

Academic Year : 2020-2021

Credit Hour : 2 hr. *15 weeks (Theoretical only)

Catalog Description:

This course deconstructs current and emerging diseases in terms of the malfunctioning of nucleic acids, proteins, and membranes and interactions between them. The diseases covered will include Alzheimer's, Parkinson's, Creutzfeldt-Jakob disease (or Mad-Cow disease), Cancer (Overview and Biophysical aspects in diagnosis and treatment), and other biological disorders. And study other diseases depended on type of organisms that found in human body.

A variety of biophysical methods for dissecting diseases at the atomic level be surveyed, including NMR spectroscopy, CT-SCAN, Endoscopy, X-ray crystallography, cryo-electron microscopy, single molecule imaging, and computational methods.

Reference Book:

1. **An Introduction to Human Disease: Pathology and Pathophysiology Correlations(2012)**by Leonard Crowley
2. **Human Diseases(2014)**by Marianne Neighbors and Ruth Tannehill-Jones
3. **Physics in Biology and Medicine(2008)** Davidovits , Paul

Course Outcomes:

1. Enabling students to learn about Biophysics and diseases.
2. Explain the importance of the subject or article by linking them to the academic program (Biophysics)
3. Teaching students the terms of Biophysics and diseases
4. Students' understanding of the types of diseases and their classification and symptoms of these diseases and diagnosis of these diseases
5. Enabling students to use modern molecular physics techniques to diagnose diseases
6. Enabling students to use modern molecular physics techniques to treat diseases



Weekly Teaching Plan:

| | |
|---|---|
| <p>Week 1 & 2 & 3</p> | <ol style="list-style-type: none"> 1. Introduction , pathology, department of pathology, diseases , department of disease , types of diseases 2. Syndrome , Diagnosis and Treatments of diseases . 3. Brain diseases and neurodegenerative(Alzheimer's , Parkinson's, Mad-Cow disease) <p style="text-align: right;">First Quiz</p> |
| <p>Week 4 & 5 & 6 &7 & 8</p> | <ol style="list-style-type: none"> 1. Diseases of the skeleton or Bone diseases 2. Diseases of the heart and blood vessels 3. Kidney disease and urinary tract 4. Diseases of the eye 5. Cancer diseases <p style="text-align: right;">Second Quiz</p> |
| <p>course Mid Term Examination</p> | |
| <p>Week 9 & 10 & 11 & 12</p> | <ol style="list-style-type: none"> 1. NMR spectroscopy 2. CT-SCAN and Endoscopy 3. X-ray crystallography <p style="text-align: right;">Third Quiz</p> |
| <p>Week 13 & 14 & 15</p> | <ol style="list-style-type: none"> 1. Cryo-electron microscopy 2. Single molecule imaging 3. computational methods (for imaging) <p style="text-align: right;">Fourth Quiz</p> |
| <p>course Final Term Examination</p> | |

Students Behaviour in Class :Excellent

Computer Usage:Very Good

Teaching Techniques: Variety



. **Muhammad Abdullah Al-Mashhadany**

Subject name: Biotechnology II/ fourth class

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description:

The exploitation of biological processes for industrial and other purposes, especially the genetic manipulation of microorganisms for the production of antibiotics, hormones, etc.

Reference Book:

Chacon-Cortes, D., Griffiths, L.R., 2014. Methods for extracting genomic DNA from whole blood samples: current perspectives. *J. Biorepos. Sci. Appl. Med.* 2, 1–9.

Cheng, H.-R., Jiang, N., 2006. Extremely rapid extraction of DNA from bacteria and yeasts. *Biotechnol. Lett.* 28, 55–59.

Costafreda, M.I., Bosch, A., Pintó, M., 2006. Development, evaluation, and standardization of a real-time TaqMan reverse transcription-PCR assay for quantification of hepatitis A virus in clinical and shellfish samples. *Appl. Environ. Microbiol.* 72, 3846–3855.

da Silva, A.K., Saux, J.-C., Parnaudeau, S., Pommepuy, M., Menachem, M., Le Guyader, F.S., 2007. Removal of norovirus in wastewater treatment using real-time RT-1 PCR: different behavior of genogroup I and genogroup II. *Appl. Environ. Microbiol.* 73, 7891–7897.

Berensmeier, S., 2006. Magnetic particles for the separation and purification of nucleic acids. *Appl. Microbiol. Biotechnol.* 73, 495–504.

GE Healthcare Life Sciences, 2010. Reliable extraction of DNA from Whatman™ FTA™ cards. GE Healthcare Application note 28-9822-22 AA.

R. E. Lenga, *The Sigma-Aldrich Library of Chemical Safety Data* (Sigma-Aldrich Corporation, Milwaukee, WI, 1985).

L.F. Diaz and others, “Alternatives for the treatment and disposal of healthcare wastes in developing countries”, *Waste Management*, vol.25 (2005), pp.626-637.

University of Wisconsin-Madison, Safety Department, Chemical and Radiation Protection Office, *Chemical Safety and Disposal Guide*, second revised edition, 2002. Available at <http://www2.fpm.wisc.edu/chemsafety/Guide/toc.htm> (31 December 2005).



Tejler, L., and Grubb, A. O., A complex-forming glycoprotein heterogeneous in charge and present in human plasma, urine and cerebrospinal fluid. *Biochim. Biophys. Acta* 439,82-96 (1976).

Wieme, R. J., *Agar Gel Electrophoresis*. Elsevier, Amsterdam, New York, 1965.

S. Jung, M. Cha, J. Park et al., "Dissociation of single-strand DNA: single-walled carbon nanotube hybrids by Watson-Crick base-pairing," *Journal of the American Chemical Society*, vol. 132, no. 32, pp. 10964–10966, 2010.

G. Sanchez-Pomales, L. Santiago-Rodriguez, and C. R. Cabrera, "DNA-functionalized carbon nanotubes for biosensing applications," *Journal of Nanoscience and Nanotechnology*, vol. 9, no. 4, pp. 2175–2188, 2009.

Course Outcomes:

Biotechnology has helped improve food quality, quantity and processing. It also has applications in manufacturing, where simple cells and proteins can be manipulated to produce chemicals. But biotechnology is most important for its implications in health and medicine. as well as The goal of biotechnology is to produce drugs by using living organisms such as bacterial cells, yeast, mammalian cells, etc., that are placed in culture to produce substances with pharmacological activity, such as monoclonal antibodies for the treatment of tumors.

Weekly Teaching Plan:

1. Provide the students with scientific knowledge and capabilities so that they can properly manage the laboratory.
2. as well as the healthy and precaution of chemicals, especially those used extensively in the laboratory.
3. Conduct experiments correctly and write scientific and analytical reports of laboratory results.
4. And then test their absorptive capacity of the scientific material through practical and theoretical tests.



| | |
|---|--|
| Week 1&2&3 | Introduction of biotechnology. Application of biotechnology. Proper handling and storage of chemical and reagents. |
| First Quiz | |
| Week 4&5&6&7 | Safety and lab equipment. The most common hazardous chemicals in countries in orientation biotechnology lab. A color- coded diamond shape lists numbers rating a hazardous. |
| Second Quiz | |
| Week 8&9&10&11 | Instrument that used in bio technique. Types and advantages of centrifuge. Preparation of cell extract. Phenol-chloroform extraction of DNA from <i>E.coli</i> . |
| Third Quiz | |
| Week 12&13&14 | DNA extraction and purification from whole blood. Prepare solution, which used in DNA extraction in general. Gel-agarose electrophoresis. Genetic engineering recombinant |
| 2nd course Mid Term Examination | |
| Week 15 | Detection of DNA by diphenylamine (DPA) reagent. |
| 2nd course Final Term Examination | |

Students Behaviour in Class :

- gain the knowledge and understanding
- Learn how to extract DNA from cells in appropriate scientific ways.
- Acquisition of the ability and skill in the use of tools and Devices such as centrifuges, gel electrophoresis and PCR ,etc.
- Acquire the skill of distinguishing between wright results and possible mistakes and how to avoid it.
- Learn the principles of safety and how to deal with caution with carcinogens and toxic gases.
- Learn how to prepare solutions with different concentrations.



Computer Usage:

The teaching staff uses all available modern facilities in communicating information to students, such as using computers and projectors.

Guide the students to some websites to benefit from and teach them to gain the ability and skill in the use of the Internet and the right methods of research and stay away from untrustworthy sites.

Teaching Techniques:

Develop the student's ability to perform duties and deliver them on time.

Analyzing the problem statistically and finding mathematical solutions based on the expected results.

Developing the student's ability to discuss and participate in the classroom and evaluate activities through the work of scientific prepare the reports and the graduation research.

Prepare the daily, weekly and continuous tests.

Solve the exercises and activities in the classroom.



Dr. ...Sheimaa talal atala AL Dabag.....

Subject name: Calculus I

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book: 1- Application Calculus for the managerial life and social sciences. Author (S.T.TAN), 2- Thomas Calculus BY George B. THOMAS, 2005.

Course Outcomes: second course

Weekly Teaching Plan:

| | |
|--|---|
| Week 1&2&3 | Limits , Properties of Limits Application of Derivatives, Integration. Integration rules , Techniques of Integration |
| First Quiz | |
| Week 4&5&6&7 | , Derivatives, Derivatives rules ,Application of differentiation |
| Second Quiz | |
| Week 8&9&10&11 | Integration, Integration rules |
| Third Quiz | |
| Week 12&13&14 | Techniques of Integration |
| 2ndcourse Mid Term Examination | |
| Week 15 | Computation method |
| 2ndcourse Final Term Examination | |

Students Behaviour in Class : **Excellent**

Computer Usage : **Very Good**

Teaching Techniques: **Variety**



Dr. ...Sheimaa talal atala AL Dabag.....

Subject name: Calculus II

Academic Year : 21-20

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book: 1- Application Calculus for the managerial life and social sciences. Author (S.T.TAN), 2- Thomas Calculus BY George B. THOMAS, 2005.

Course Outcomes: first course

Weekly Teaching Plan:

| | |
|--|--|
| Week 1&2&3 | Matrix ,Properties of matrix , a joint of square matrix |
| First Quiz | |
| Week 4&5&6&7 | Determinant , Properties of Determinant, Inverse of matrix Solution systems of equation by matrix inversion gramer.Grammer rules for solving system of equation. |
| Second Quiz | |
| Week 8&9&10&11 | Rule to solve system of equation coordinates and graph symmetry slope and equation of line, |
| Third Quiz | |
| Week 12&13&14 | slope of non- vertical line, angle of inclination ,even and odd equation Domain and Range, Shift formula |
| 2ndcourse Mid Term Examination | |
| Week 15 | |
| 2ndcourse Final Term Examination | |

Students Behaviour in Class : Excellent

Computer Usage : Very Good

Teaching Techniques: Variety

Mosul
University



College of science

Chemistry Department

Teaching Techniques:

Dr. ...Saad Ghanim Salih

Subject name: **cell physiology**

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book: human physiology

Course Outcomes: 100%

Weekly Teaching Plan:

| | |
|---|--|
| Week 1&2&3 | The living cell, prokaryot and euokayot, cell structure living and nonliving componnet plant and animal cell, shape of the cell |
| First Quiz | |
| Week 4&5&6&7 | Cell membrane structure function and chemical content, active and non active transport memmbrane protein function, passive transport ,receptors, nucleus and its function chromatin and DNA function nucleolus function and ribosome production nucleu membrane, endoplasmic reticulm rough and smooth structure and function, protein synthesis RNA function, |
| Second Quiz | |
| Week 8&9&10&11 | Cytoplasm content and function, golgi body structure and function, cytoskeleton (endo and exo skeleton) centromere,proxysome, lysosome mitochondria, |
| Third Quiz | |
| Week 12&13&14 | Cell division ,mitosis and meosis |
| 2nd course Mid Term Examination | |
| Week 15 | Cell cycle cell death(apptosis) aging cell production |



2nd course Final Term Examination

Students Behaviour in Class : sharing and answering questions discussing problems

Computer Usage: not applicable

Teaching Techniques: poster and report view and tutorial data show



Lecturer Eman Muwafaq Ramathan

Subject name: **Chemistry I / (Practical) first course**

Academic Year : 2021-2020

Credit Hour : 3hr. *15 weeks

Catalog Description: Experimental (first stage)

Chemistry I Lab contain many Experiments to study analytical chemistry which involve Volumetric analysis .

Reference Book: Vogel text book of quantitative chemical analysis ,5thEd. (1989)

Course Outcomes: To enable students to learn about theoretical and practice of Volumetric analysis.

Weekly Teaching Plan:

| | |
|---|--|
| Week 1&2&3 | Introduction and important Lab ,notes , introduction to volumetric analysis , Glassware First Quiz |
| Week 4&5&6&7 | Titration ,neutralization reaction (acid – base) Second Quiz |
| Week 8&9&10&11 | Unknown , precipitation titration + Unknown Third Quiz |
| Week 12&13&14 | Redox Titration , Unknown , Complex Formation Titration |
| 2nd course Mid Term Examination | |
| Week 15 | Comprehensive survey 2nd course Final Term Examination |

Students Behaviour in Class : Excellent

Computer Usage: very good

Teaching Techniques: variety



Lecturer Eman Muwafaq Ramathan

Subject name: **Chemistry II / (Practical) / second course**

Academic Year : 2021-2020

Credit Hour : 3hr. *15 weeks

Catalog Description: Experimental (first stage)

Chemistry II Lab contain many Experiments to study inorganic chemistry and organic chemistry

Reference Book:1. G.Pass and H.Sutcliffe 'Practical Inorganic Chemistry ' ,Second Edition ,(1974). 2. Laboratory text for organic chemistry ..4th .ed. by Roy and F. Bossert and Wallace . R.B.rode . 3. Organic experiments by Lois.F.Fieser and Kenneth L.Williamson 5th . ed.

Course Outcomes: to improve students scientific knowledge in the field of practical inorganic and organic chemistry.

Weekly Teaching Plan:

| | |
|---|--|
| Week 1&2&3 | Introduction and important Lab ,Notes, solubility |
| First Quiz | |
| Week 4&5&6&7 | first group, second group ,The element of groupIII |
| Second Quiz | |
| Week 8&9&10&11 | Halogen group, Glassware ,Determination of Melting point |
| Third Quiz | |
| Week 12&13&14 | Determination of boiling point , distillation |
| 2nd course Mid Term Examination | |
| Week 15 | recrystalztonaion |
| 2nd course Final Term Examination | |

Students Behaviour in Class : Excellent

Emanmuwafiq@uomosul.edu.iq

Computer Usage: very good

Teaching Techniques: variety



Dr. Rafid Ahmed Abdullah
Lecturer: Nadia Adel Saeed

Subject name: Computer and basic MATLAB Lab.

Academic Year : 2021-2020

Credit Hour : 1hr. *15 weeks

1. **Catalog Description:** Overview of matlab environment, basic mathematical description by matlab, solving simple math equations by matlab, vectors and matrix, plotting and graphics, solving equations by matlab, introduction to programming by matlab.

Reference Book:

1. MATLAB demystified, by: David McMahan, McGraw hill, 2007.
2. Introduction to MATLAB, California Institute of Technology, 2015.

Course Outcomes: To use MATLAB program to solve equations and different types of mathematical problems with plotting and programming.

Weekly Teaching Plan:

| | |
|-----------------------------------|--|
| Week 1&2&3 | 2. Overview of matlab environment 3. Basic mathematical description by matlab |
| First Quiz | |
| Week 4&5&6&7 | 1. Solving simple math equations by matlab 2. Vectors |
| Second Quiz | |
| Week 8&9&10&11 | 1. Matrix 2. Basic operations on matrixes 3. Plotting and graphics |
| Third Quiz | |



Week 12&13&14

1. Solving equations by matlab
2. Introduction to programming by matlab.

2nd course Mid Term Examination

Week 15

Solving different types of problems using matlab

2nd course Final Term Examination

Students Behaviour in Class : Very good

Computer Usage: yes (MATLAB program)

Teaching Techniques: Variety



Lecturer : Zakarya Abdulwahid Hameed

Lecturer: Nadia Adel Saeed

Subject name: Computer and basic MATLAB Lab.

Academic Year : 2020-2021

Credit Hour : 2hr. *15 weeks

1. **Catalog Description:** Overview of matlab environment, basic mathematical description by matlab, solving simple math equations by matlab, vectors and matrix, plotting and graphics, solving equations by matlab, introduction to programming by matlab.

Reference Book:

1. MATLAB demystified, by: David McMahan, McGraw hill, 2007.
2. Introduction to MATLAB, California Institute of Technology, 2015.

Course Outcomes: To use MATLAB program to solve equations and different types of mathematical problems with plotting and programming.

Weekly Teaching Plan:

| | |
|--------------------|--|
| Week 1&2&3 | 2. Overview of matlab environment 3. Basic mathematical description by matlab |
| First Quiz | |
| Week 4&5&6&7 | 1. Solving simple math equations by matlab 2. Vectors |
| Second Quiz | |
| Week 8&9&10&11 | 1. Matrix 2. Basic operations on matrixes 3. Plotting and graphics |
| Third Quiz | |



| | |
|---------------|---|
| Week 12&13&14 | 1. Solving equations by matlab 2. Introduction to programming by matlab. |
|---------------|---|

2nd course Mid Term Examination

| | |
|---------|--|
| Week 15 | Solving different types of problems using matlab |
|---------|--|

2nd course Final Term Examination

Students Behaviour in Class : Very good

Computer Usage: yes (MATLAB program)

Teaching Techniques: Variety

Dr. Rafid Ahmed Abdullah

Subject name: **Computer and basic MATLAB theoretical**

Academic Year : 2021-2020

Credit Hour : 2hr. *15 weeks

Catalog Description: Computer science, Operating system, BIOS, introduction to matlab, basic mathematical description by matlab, vectors and matrix, plotting and graphics, solving equations by matlab, introduction to programming by matlab.

Reference Book:

1. MATLAB demystified, by: David McMahan, McGraw hill, 2007.
2. Introduction to MATLAB, California Institute of Technology, 2015.

Course Outcomes: To use MATLAB program to solve equations and different types of mathematical problems with plotting and programming.

Weekly Teaching Plan:

| | |
|--------------------|--|
| Week 1&2&3 | <ol style="list-style-type: none">1. Computer science2. Operating system3. BIOS and binary system |
| First Quiz | |
| Week 4&5&6&7 | <ol style="list-style-type: none">1. Introduction to matlab2. Basic mathematical description by matlab3. Vectors |
| Second Quiz | |
| Week 8&9&10&11 | <ol style="list-style-type: none">1. Matrix2. Basic operations on matrixes3. Plotting and graphics |
| Third Quiz | |



Week 12&13&14

1. Solving equations by matlab
2. Introduction to programming by matlab.

2nd course Mid Term Examination

Week 15

Solving different types of problems using matlab

2nd course Final Term Examination

Students Behaviour in Class : Very good

Computer Usage: yes (MATLAB program)

Teaching Techniques: Variety



Dr. prof. Sundus N. AlKallak

Subject name: Development of biology

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks Theoretical

Catalog Description: provides an idea for student about the development of biology and many subject about invertebrates and vertebrates , life cycle , nervous system , stem cells .

Reference Book: developmental biology by scott f, etal., 2016/ 11th

Course Outcomes: to provide with information about the vertebrates and invertebrates .

Weekly Teaching Plan:

| | |
|--|---|
| Week 1&2&3 | Morphogenesis / organogenesis / |
| First Quiz | |
| Week 4&5&6&7 | Life cycle of invertebrates and vertebrates/ nervous system of invertebrates / nervous parasitic diseases |
| Second Quiz | |
| Week 8&9&10&11 | Medical imaging technology // stem cells |
| Third Quiz | |
| Week 12&13&14 | Types of medical imaging techniques , with parasitic diseases . histology tech |
| 2ndcourse Mid Term Examination | |
| Week 15 | histology techniques |
| 2ndcourse Final Term Examination | |

Students Behaviour in Class : excellent

Computer Usage: good

Teaching Techniques: variety



Raghad Riyadh Shafeeq.....

Subject name: Drug and Antimicrobials/ Practical

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book:

Course Outcomes:

Weekly Teaching Plan:

| | |
|-----------------------------------|---|
| Week 1&2&3 | Introduction to antimicrobials Classification of antimicrobials Methods of antimicrobials sensitivity test |
| First Quiz | |
| Week 4&5&6&7 | Disc diffusion susceptibility test Dilution susceptibility test Agar dilution method Broth dilution method |
| Second Quiz | |
| Week 8&9&10&11 | E-test susceptibility test Betalactamases enzyme Betalactamases detection test Antimicrobials resistance |
| Third Quiz | |
| Week 12&13&14 | Automated susceptibility test Genotypic methods PCR |



2ndcourse Mid Term Examination

Week 15

DNA hybridization methods

2ndcourse Final Term Examination

Students Behaviour in Class :

Computer Usage:

Teaching Techniques:



Dr. Mahmood Zeki Al-Hasso

Subject name: Drugs and Antimicrobials

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book: Introduction to Clinical Pharmacology; Prescott's Microbiology

Course Outcomes:

Weekly Teaching Plan:

| | |
|--|---|
| Week 1&2&3 | Introduction , drugs name , description, drug activity within the body , pharmaceutic phase , pharmacokinetic phase , absorption , distribution , metabolism , excretion , half-Life. |
| First Quiz | |
| Week 4&5&6&7 | Pharmacodynamics phase , receptor-mediated drug action , agonists , antagonists , receptor-mediated drug effects , adverse drug reactions , drug tolerance , allergic drug reactions , cumulative drug effect , toxic reactions , pharmacogenetic reactions , drug interactions, drug—food interactions, factors influencing drug response , routes of drug administration. |
| Second Quiz | |
| Week 8&9&10&11 | Chemotherapeutic agents , General considerations, antimicrobial drugs , kinds and mode of action , Factors influencing effectiveness of antimicrobials, Synthetics antimicrobials, Naturally occurring antimicrobials (antibiotics), Antibiotics from prokaryotes. |
| Third Quiz | |
| Week 12&13&14 | Antimycobacterial agents, Antiviral drugs, Antifungal drugs. |
| 2ndcourse Mid Term Examination | |
| Week 15 | Microbial Resistance Mechanisms |

2ndcourse Final Term Examination

Students Behaviour in Class : Good

Computer Usage: Yes

Teaching Techniques:

Subject name: Electricity and Magnetism

- Academic Year** : 2021-2020
- Credit Hour** : **Two hours per week for 15 weeks (Theoretical part).**
Two hours per week for 15 weeks (Practical part).
- Course web page** : <https://classroom.google.com>
- Class code :**
- Pre-requisites** : Electricity ,Magnetism, Electromagnetic field

Catalog Description:

This course provides students with basic concepts of electricity and magnetism. The relation between charge and matter, coulombs law, The electric field and how calculating it, Motion of the electron normally to the electric field, Gauss low for calculating the flux of electric field and its application, The electric potential, The relation between the electric field and electric potential, Application for calculation of the electric field, Capacitors in parallel and in series, Capacitors with dielectric placed between the plates, Stored energy in capacitor, electric current and dc circuits, Ohms law, The magnetic field, Magnetic flux, Motion of charged particles in magnetic field, Force on a current carrying conductor, Torque on a current loop, Magnetic field in current carrying conductor, Force between parallel current carrying conductor, Ampere Law, Electromagnetic induction and faradays law

Reference Book:

- 1- Electricity and magnetism and light by Wayne Saslow
- 2- Electricity and magnetism an introduction to the theory of electric and magnetic field by Oleg D. Jefimenko

Course Outcomes:

In this course, initially students will learn how to analysis electromagnetic problem. Upon successful completion of this course the student shall be able to:

- 1- What's the electricity and magnetism?
- 2- Introduction to electric and magnetic fields and Principal of electromagnetic theory.
- 3-Relations between electric and magnetic fields
- 4- Applications of electromagnetic fields.



Weekly Teaching Plan:

| | |
|--------------------|--|
| Week 1 | The relation between charge and matter |
| Week 2&3 | coulombs law, The electric field and how calculating it, Motion of the electron normally to the electric field |
| Week 4&5 | Gauss low for calculating the flux of electric field and its application, The electric potential, The relation between the electric field and electric potential |
| Week 6&7 | Application for calculation of the electric field |
| First Quiz | |
| Week 8 | Capacitors in parallel and in series |
| Second Quiz | |
| Week 9 | Capacitors with dielectric placed between the plates, Stored energy in capacitor, electric current and dc circuits, |
| Week 10 | Ohms law, The magnetic field |
| Week 11 | Magnetic flux, Motion of charged particles in magnetic field, Force on a current carrying conductor, Torque on a current loop |
| Week 12&13 | , Magnetic field in current carrying conductor, Force between parallel current carrying conductor, Ampere Law, Electromagnetic induction and faradays law |



Students Behavior in Class

In all classes, to ensure a respectful environment that allows all students to learn effectively, please adhere to the following expectations.

- *Be on time in class hall (Plan for the transport delay possibilities). If you are late, be quiet and find a seat quickly (minimize disturbances to both the instructor and other students).
- * Do not speak to your friends during the lectures. If you have a question about the material, Please raise your hand to ask the instructor.
- * Ensure that mobile devices are set to silent mode to avoid disrupting the class. Also, please do not use electronic devices to access games, facebook, twitter or other non-related course Material.
- *If you feel that you affected by the behavior of other students, please let the instructor know your concerns so he can solve the problem.
- * Don't ask the instructor about the following:
 1. Exam question patterns
 2. Increase your grade or letter
 3. Postpone exam or extend the due dates (deadlines) for submission projects and Homework. Failure to meet behavioral expectations may result in a request to leave the lecture hall.

Copy and Paste Policy

Students should avoid copy and paste jobs for their projects and/or any other assignments. However, sharing mark policy will be subjected, If the instructor notice any coping evidences, in this case, each student mark=Work Mark / No. of coping students)

Email Policy

The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, during office hours, or by appointment. Emails must come from official University email addresses. The instructor will not respond to outside email addresses.

Computer Usage:

Students are encouraged to use the Internet to search for various topics, including contents of similar courses offered elsewhere. MS Excel software is used for preparing projects. Students can reach the teaching material, solved problems, data sheets, past exam papers etc. on the allocated Web site.

Teaching Techniques:

Power point presentation and multimedia tools are used in classrooms; Examples and problems will be solved and illustrated on the classroom board; Tutorials are also organized to establish a closer contact with students.

Grading Policy:

| | |
|-------------------------|-------|
| Two quizzes, (each 5pt) | 10pt |
| Mid Semester Exam | 30pt |
| Final Exam | 60pt |
| Total | 100pt |

Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".



Exam Policy:

- All exams will be Closed-Book, Closed-Notes. Bring a calculator, pencil, and eraser for the exams.
 - No phones or electronic devices are allowed to use during the exams. Phones and electronic devices must be switched off and put away during the final exam.
 - The final exam must be completed in order to complete the course
 - Two Quizzes 20-minute duration time, will be held at the end of the class period on the dates indicated on the weekly schedule.
 - Sharing of items during the exams is prohibited (e.g. calculators, rulers, erasers, etc.) under any circumstances.
-

Instructor : Dr. Marwan Zuhair Elias

Room No. :

Email ID : uomosul.edu.iq@marwanzt
marwanzt@yahoo.com

Last updated: 2020



Mosul University

College of Science

Biophysics Department

Dr. Marwan Zuhair Elias

Lecturer : Nadia Adel Saeed

Lecturer : Sheima'a Talal Adabag

Subject name : Electromagnetic lab

Academic Year : 2020-2021

Credit Hour : 1.5hr . * 15 weeks

Catalog Description:

1. ohms Law
2. Electromotive force and the internal resistance of a battery using the graph method .
3. Whetstone Bridge.
4. Frequency of main electric power Line using Sonometer .
5. verification of reverse quadratic Law by means of magnetometer.
6. The horizontal component of the magnetic field using a battery of Know electromotive force.
7. Evaluation of Voltmeter resistance using the graph method.
8. Determination of the capacitance and resistance of electric capacitor.
9. Determination of the magnetic turqui of galvanometer.

Reference Book:

1. E. R Dobbs. Electricity and Magnetism, Routledge and Kegan paul. London (1984) 1st Edition.
2. Electncity and Magnetism. F. W. Sears. Addison Wesels 4964) 2nd printing.
3. Practical physics for units , E.R. Metaj , translated Dr. Admon tobya George ,1983.

Course Outcomes:

1. Connect the theoretical part with the experimental part .
2. To know the basics of electromagnetic .
3. To know how report and discuss the results of the experiment .

**Weekly Teaching plan:**

| | |
|------------------------------------|---|
| Week 1 &2&3 | <ol style="list-style-type: none"> 1. Introduction of lab instruments . 2. Ohms law . 3. Electromotive force and the internal resistance of a battery using the graph method . <p style="text-align: right;">First Quiz</p> |
| Week 4 &5&6&7 | <ol style="list-style-type: none"> 1. Whetstone bridge . 2. Frequency of main electric power line using sonometer . 3. Verification of revers quadratic power law by means of magnetometer . 4. Group discussion . <p style="text-align: right;">Second Quiz</p> |
| Weesk8 &9&10&11 | <ol style="list-style-type: none"> 1. The horizontal components of the magnetic field using a battery of know electromotive force . 2. Evaluation of voltmeter resistance using the graph method . 3. Determination of the capacitance and resistance of electric capacitor . 4. Group discussion <p style="text-align: right;">Third Quiz</p> |
| Weesk12 &13&14 | <ol style="list-style-type: none"> 1. Determination of the magnetic turqui of galvanometer . 2. Group Discussions . 3. Review . |
| | 2nd course Mid Term Examination |
| Week 15 | Final Review |
| | 2nd course Final Term Examination |

Student Behavior in Class:**Very Good****Computer Usage :****Yes****Teaching Techniques:****Variety**



Dr. Nadwa Ismaeel.....

Subject name: Environmental Physics

Academic Year : 2020-2021

Credit Hour : 4hr. 2 groups

Catalog Description: (syllabus)

- Laws of Thermodynamics and the human body,
- human environment and energy transfers,
- noise pollution,
- structure and composition of the atmosphere,
- ozone in the atmosphere,
- greenhouse effect,
- global warming,
- hydrosphere and hydrologic cycle,
- water in the atmosphere and clouds,
- physics of ground, and
- energy for leaving.

Reference Book:

1. Environmental Physics

M. Dželalija, University of Molise, University of Split, Valahia University of Targoviste

2. Biological and Environmental Physics

Dr. D. J. Miller

3. published data

Course Outcomes:

This course is designed to illustrate the many aspects of physics that pervade environmental processes in

our everyday lives and in naturally occurring phenomena.

. By the end of this course, a student will be able to:

- understand how to apply the basic thermodynamics to the human environment,
- understand the basic composition, structure and dynamics of the atmosphere,
- explain the workings of the hydrologic cycle and discuss the mechanisms of water transport in the atmosphere and in the ground,
- discuss specific environmental problems such as noise pollution, ozone depletion and global warming in the context of an overall understanding of the dynamics of the atmosphere,
- discuss the problems of energy demand and explain the possible contributions of renewables to energy supply,



Weekly Teaching Plan:

| | |
|-----------------------------------|---|
| Week 1&2&3 | <p>Laws of Thermodynamics and the human body,</p> <hr/> <p>human environment and energy transfers, Newton law of cooling , Heat loss of building</p> <hr/> <p>Sun light and the earth surface, ozone in the atmosphere,, ozone hole, greenhouse effect,</p> |
| First Quiz | |
| Week 4&5&6&7 | <p>pollution, noise , Acid rain, smog,</p> <hr/> <p>global warming, Energy for living</p> <hr/> <p>structure and composition of the atmosphere,</p> <hr/> <p>Equilibrium (stead – state) Models</p> |
| Second Quiz | |
| Week 8&9&10&11 | <p>Physics of grounds, black body radiation</p> <hr/> <p>Stefan- Boltzmann law. Wien law</p> <hr/> <p>hydrosphere and hydrologic cycle,</p> <hr/> <p>Weather and climate</p> <hr/> <p>water in the atmosphere and clouds,</p> <hr/> <p>Heat transfer and thermal insulation</p> <hr/> <p>Built environment, survival in cold climate</p> <hr/> <p>survival in hot climate</p> |
| Third Quiz | |
| Week 12&13&14 | <p>Domestic noise and the desighine of partions</p> <hr/> <p>Escape velocity, principal forces acting on air masses, A day at the sea side.</p> |



2ndcourse Mid Term Examination

Week 15

2ndcourse Final Term Examination

Students Behaviour in Class : Good

Computer Usage: No

Teaching Techniques: Classic

Prof. dr. sundus N. Al-Kallk ; Dr. ...Saad Ghanim Salih

Subject name: human anatomy and physiology

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks Theoretical

Catalog Description:

Reference Book: human physiology

Course Outcomes: 100%

Weekly Teaching Plan:

| | |
|---|--|
| Week 1&2&3 | |
| First Quiz | |
| Week 4&5&6&7 | |
| Second Quiz | |
| Week 8&9&10&11 | Digestive system function, enzyme and physical function respiratory system, renal system, malfunction |
| Third Quiz | |
| Week 12&13&14 | Circulatory system , blood |
| 2nd course Mid Term Examination | |
| Week 15 | Heart, artery and vein structure and disease |
| 2nd course Final Term Examination | |

Students Behaviour in Class : sharing and answering questions discussing problems

Computer Usage: not applicable

Teaching Techniques: poster and report view and tutrial data show

Dr. Rafid A. Abdullah

Subject name: **Laser and its applications**

Academic Year 2021-2020

Credit Hour : 3hr. *15 weeks

Catalog Description:

Basics of lasers & laser properties: Interaction of light with matter (Absorption, spontaneous and stimulated emissions), Einstein coefficients and light amplification, Einstein coefficients and find their relationships, Population inversion, Laser rate equations, Three-level and four-level laser systems, Optical resonators, Axial and transverse modes, Q-switching and mode locking, Coherence properties of laser, Temporal coherence, Spatial coherence, Monochromaticity, Directionality, Brightness, Linewidth, Focusing properties of laser radiation & tunability.

Types of lasers: Doped-insulator lasers (solid state lasers): Ruby laser, Nd: YAG and Nd: glass lasers, Gas lasers: Atomic lasers: He Ne Laser; Ion lasers: Argon laser; Molecular lasers: Carbon dioxide laser, Nitrogen laser, and excimer laser; Liquid dye laser; Semiconductor laser.

Applications of Lasers: Medical applications: Interaction of laser with tissue, Laser scalpels, Laser tweezers, Laser surgery in the eye and dermatology, Photo-dynamic therapy, Laser cancer therapy. Scientific: Absorption spectroscopy; Emission techniques (Laser induced fluorescence), Scattering techniques, Pump and probe techniques, Optical communication laser systems, Army applications: Measure distances, Missile guidance, Destroy the plane targets.

Reference Book:

1. Principles of Lasers , by : Orazio Svelto and David C. Hanna , Springer, Fifth edition , 2010.
2. Lasers for medical applications (Diagnostics, therapy and surgery), Edited by: Helena Jelínková , Woodhead Publishing Limited, 2013.

Course Outcomes: The students will learn the fundamental laser types and properties and how to use them in medicine and biophysical applications.

Weekly Teaching Plan:

| | |
|---------------------------|--|
| Week 1&2&3 | <ol style="list-style-type: none">1. Interaction of light with matter (Absorption, spontaneous and stimulated emissions).2. Einstein coefficients and light amplification, Einstein coefficients and find their relationships.3. Population inversion, Laser rate equations, Three-level and four-level laser systems, |
|---------------------------|--|

First Quiz



| | |
|---------------------------------|--|
| Week 4&5&6&7 | <ol style="list-style-type: none"> 1. Optical resonators, Axial and transverse modes. 2. Q-switching and mode locking, Coherence properties of laser, Temporal coherence, Spatial coherence, Monochromaticity, Directionality, Brightness. 3. Linewidth, Focusing properties of laser radiation & tunability. |
|---------------------------------|--|

Second Quiz

| | |
|-----------------------------------|--|
| Week 8&9&10&11 | <ol style="list-style-type: none"> 1. Doped-insulator lasers (solid state lasers): Ruby laser, Nd: YAG and Nd: glass lasers. 2. Gas lasers: Atomic lasers: He Ne Laser; Ion lasers: Argon laser; Molecular lasers: Carbon dioxide laser. 3. Nitrogen laser, and excimer laser; Liquid dye laser; Semiconductor laser. |
|-----------------------------------|--|

Third Quiz

| | |
|------------------------------|--|
| Week 12&13&14 | <ol style="list-style-type: none"> 1. Medical applications: Interaction of laser with tissue, Laser scalpels, Laser tweezers. 2. Laser surgery in the eye and dermatology, Photo-dynamic therapy, Laser cancer therapy. 3. Scientific: Absorption spectroscopy; Emission techniques (Laser induced fluorescence), Scattering techniques, Pump and probe techniques, |
|------------------------------|--|

2nd course Mid Term Examination

| | |
|----------------|--|
| Week 15 | <ol style="list-style-type: none"> 1. Optical communication laser systems. 2. Army applications: Measure distances, Missile guidance, Destroy the plane targets. |
|----------------|--|

2nd course Final Term Examination

Students Behaviour in Class : Very good

Computer Usage: Yes

Teaching Techniques: Classical



Dr. Ayman Abduljabar

Lecturer : Watfaa Khayri Al-Asadi

Lecturer : Nadia Adel Saeed

Subject name : Mechanics II lab

Academic Year : 2020-2021

Credit Hour : 1.5hr . * 15 weeks

Catalog Description:

1. Determining the acceleration of falling object by using the simple pendulum.
2. Determining the specific weight by using the water displacement method for solid object dives in water (iron and aluminum).
3. Determining specific weight by using the water displacement method for floating solid object in water (cork).
4. Determining specific weight by using the water displacement method for liquid (petroleum).
5. Determining the viscosity factor for the transparent liquid.
6. Coefficient of static friction between two contacted surfaces.
7. Proving Hooke's law for spiral spring and calculating the earth gravity.
8. Calculating the equivalent mass of spring and measuring the earth gravity.

Reference Book:

1. Mechanical and properties of matter. B.J. kohli Dhanpat Rai & sons (1983) IST Edition
2. Practical physics in S.I.E. Armitage. John Murray 3rd Edition (1977) .

Course Outcomes:

1. To learn students of using and understanding mechanical instrument and experimental .



Weekly Teaching plan:

| | |
|---|--|
| Week 1 &2&3 | <ol style="list-style-type: none"> 1. Introduction of Lab. Instruments. 2. Determining the acceleration of falling object by using the simple pendulum. 3. Determining the specific weight by using the water displacement method for solid object dives in water (iron and aluminum). <p style="text-align: center;">First Quiz</p> |
| Week 4 &5&6&7 | <ol style="list-style-type: none"> 1. Coefficient of static friction between two contacted surfaces. 2. Proving Hooke's law for spiral spring and calculating the earth gravity. 3. Group discussions. <p style="text-align: center;">Second Quiz</p> |
| Course Mid Term Examination | |
| Weesk8 &9&10&11 | <ol style="list-style-type: none"> 1. Calculating the equivalent mass of spring and measuring the earth gravity. 2. Group discussions. 3. Review <p style="text-align: center;">Third Quiz</p> |
| Week 12 & 13 & 14 | <ol style="list-style-type: none"> 1. Calculating the equivalent mass of spring and measuring the earth gravity . 2. Group discussion . 3. Review . |
| 2nd course mid Term Examination | |
| Week 15 | Final review |
| 2nd course Final Term Examination | |

Student Behavior in Class: Very good

Computer Usage : Yes

Teaching Techniques: Variety



Dr. Qusay Khattab Omer

Subject name : Mechanics lab (Experimental) First Course

Academic Year : 20-21

Credit Hour : 3hr . * 15 weeks Experimental

Catalog Description:

Mechanics lab contain many experimental in many topics find ground acceleration of fly smale body by bendol , find the refraction coefficient of glass, find fraction coefficient find the viscosity of liquid , determine hock constant of helix spring and also find the gravity acceleration , find ohome law and measurement anon resistance

Reference Book:

1. Michael Cohen, Professor Emeritus. 2012 Classical Mechanics: a Critical Introduction, Department of Physics and Astronomy. University of Pennsylvania.
2. V. K. Singh, Devraj Singh and D. P. Singh, 2013, Mechanics and Wave Motion--- for B.Sc.I, 1st Edition (For U.P. State Universities), I.K. International Pvt. Ltd, Delhi, (www.ikbooks.com), ISBN: 978-93-82332-32-9, Pages:420
3. Peter J. Nolan, 2014, Fundamentals of modern Physics First edition, state university of new york - Farmingdale

Course Outcomes:

1. Enabling students to lean about mechanics lab and the practice in society .
2. Explain the importance of the mechanics lab by linking them to the academic program .
3. Teaching the students the terms of mechanics lab and application with industry and health physics
4. Show the relationship between experimental mechanics with biophysics as physical therapy with devices which used in medicine .
5. Enabling the students to understood the advantage from study characteristic linear motion in Mechanics and connect with biophysics .
6. learning the students to understood the principle of mechanics lab in medicine



Weekly Teaching plan:

| | |
|--------------------------------------|--|
| Week 1 &2&3 | 1. Taking the data find ground acceleration of fly smale body by bendol , and drawing between the length of rod and the time motion of body as circular motion and find the slope and discuss the results to find ground acceleration. 2. Taking the data and find the refraction coefficient of glass and discuss the results of data for individual student <p style="text-align: center;">First Quiz</p> |
| Week 4 &5&6&7 | 1. Taking the data of find fraction coefficient by meaurment small scale and gradually increase the weight and discuss the results end the expirement for single student 2. find the viscosity of liquid , by taking the smale ball of Pband leave it from uoer tube contain glycerin liquid and drawing between the distance of ball from upper with time motion and find viscosity <p style="text-align: center;">Second Quiz</p> |
| Course Mid Term Examination | |
| Weesk8 &9&10&11 | 1. determine hock constant of helix spring as part one by taking relation between time of motion and change the length with increased add to drawing between weright of smale body and change length 2. and also find the gravity accelerating as part two <p style="text-align: center;">Third Quiz</p> |
| Week12 &13&14&15 | 1.Find the resistance in circuit by drawing betwe3n the current in A ans voltage in V and the slope represent resistance of circuit 2. Find the pressure of atopsppheric by Boel law were chage the length with time and drawing the data to obtaine the magnitude of pressure 3- re write all experiment and reading data in the end of course <p style="text-align: center;">Fourth Quiz</p> |
| Course Final Term Examination | |

Student Behavior in Class: **Excellent**

Computer Usage : **Very Good**

Teaching Techniques: **Variety**



Dr. Qusay Khattab Omer

Subject name : Mechanics

Academic Year : 2020-2021

Credit Hour : 3 hr . * 15 weeks

(Theoretical only)

Catalog Description:

Introduction in vectors , scalar product ,vector product,Force,composition of concurrent forces,torque, fraction, Newton first law of motion , Newton second and third law ,some special motions,curvi linear motion, tangential acceleration , normal acceleration , motion with constant acceleration , circular motion,kinematics,Equilibrium moment of a force

Reference Book:

1. Michael Cohen, Professor Emeritus. 2012 Classical Mechanics: a Critical Introduction, Department of Physics and Astronomy. University of Pennsylvania.
2. V. K. Singh, Devraj Singh and D. P. Singh, 2013, Mechanics and Wave Motion--- for B.Sc.I, 1st Edition (For U.P. State Universities), I.K. International Pvt. Ltd, Delhi, (www.ikbooks.com), ISBN: 978-93-82332-32-9, Pages:420
3. Peter J. Nolan, 2014,Fundamentals of modern Physics First edition, state university of new york - Farmingdale

Course Outcomes :

1. Enabling students to learn about Mechanics .
2. Explain the importance of the subject or article by linking them to the academic program (Mechanics)
3. Teaching the students the terms of Mechanics
4. Show the relationship between Mechanics with biophysics as technology of devices which used in medicine .
5. Enabling the students to understand the advantage from study characteristic linear motion in Mechanics and connect with biophysics .
6. learning the students to understand the principle vectors , scalar product ,vector product,Force,composition of concurrent forces mechanics and also application in biophysics.

**Weekly Teaching plan:**

| | |
|---|---|
| Week 1 &2&3 | 1. Introduction in vectors , scalar product , 2. vector oroduct,Force,composition of concurrent forces, First Quiz |
| Week 4 &5&6&7 | 1. Newton first low of motion , Newton second and third low ,some special motions,curvi linear motion, 2. , torque, fraction, Second Quiz |
| Course Mid Term Examination | |
| Week8 &9&10&11 | tangential acceleration , normal acceleration Third Quiz |
| Week12 &13&14&15 | Topics in ,kinematics,Equilibrium moment of a force, motion with constant acceleration , circular motion Fourth Quiz |
| <u>Course Final Term Examination</u> | |

Student Behavior in Class: Excellent

Computer Usage : Very Good

Teaching Techniques: Variety

Dr. Mahmoud Ahmed Mohammed Fakhri
Dr. Qusay Khattab Omer

Subject name: Medical Biophysics

Academic Year : 2020-2021

Credit Hour : 2 hr. * 15 weeks (Theoretical only)

Catalog Description:

Introduction to medical biophysics, Nature and effects of ionizing radiation on biomolecules structures, living cells and tissues. Genetic effects and methods of radiation protection. Radiobiological implications of diagnostic and therapeutic radiation , Biophysics principles underlying medical imaging and discusses the interaction of different kinds of radiation with biological matter.. Modalities covered: x-rays, computed tomography, nuclear medicine, ultra-sound, and magnetic resonance imaging. and positron emission tomography .

Topics include signal generation, detection and the associated mathematics to produce medically useful images, and factors affecting resolution and sensitivity. Relevant radiotherapy methods include the gamma knife, brachytherapy, and proton-beam therapy. Important & Principles of biomedical applications - C.T.scan – ultra .sonography. NMR

Reference Book:

1. Intermediate Physics for Medicine and Biology (2007) , by Russell K. Hobbie and Bradley J. Roth
2. MEDICAL PHYSICS AND BIOMEDICAL ENGINEERING (1999), by B H Brown, R H Smallwood, D C Barber,P V Lawford and D R Hose.
3. Radiation physics for medical physicists(2006), by E. B. Podgorsak

Course Outcomes:

1. Enabling students to learn about medical biophysics.
2. Explain the importance of the subject or article by linking them to the academic program (Biophysics)
3. Teaching students the terms of medical biophysics.
4. Enabling students to learn the effects of ionizing radiation on biomolecules, living cells and tissues.
5. Enabling students to learn the Genetic effects and methods of radiation protection.
6. Enabling students to learn the Biophysics principles underlying medical imaging and discusses the interaction of different kinds of radiation with biological matter(x-rays, computed tomography.....etc.).



7. Enabling students to learn the detection and the associated mathematics to produce medically useful images, and factors affecting resolution and sensitivity.
8. Enabling students to learn the Important & Principles of biomedical applications - C.T.scan – ultra .sonography. NMR.

Weekly Teaching Plan:

| | |
|------------------------------------|--|
| Week 1 & 2 & 3 | <ol style="list-style-type: none"> 1. Introduction to medical biophysics 2. Nature and effects of ionizing radiation on biomolecules structures, living cells and tissues. <p style="text-align: center;">First Quiz</p> |
| Week 4 & 5 & 6 & 7 | <ol style="list-style-type: none"> 1. Genetic effects and methods of radiation protection. 2. Radiobiological implications of diagnostic and therapeutic radiation . <p style="text-align: center;">Second Quiz</p> |
| course Mid Term Examination | |
| Week 8 & 9 & 10 & 11 | <p>Biophysics principles underlying medical imaging and discusses the interaction of different kinds of radiation with biological matter.. Modalities covered: x-rays, computed tomography, nuclear medicine, ultra-sound, magnetic resonance imaging and positron emission tomography</p> <p style="text-align: center;">Third Quiz</p> |
| Week 12 & 13 & 14 & 15 | <ol style="list-style-type: none"> 1. Topics include signal generation, detection and the associated mathematics to produce medically useful images, and factors affecting resolution and sensitivity. 2. Relevant radiotherapy methods include the gamma knife, brachytherapy, and proton-beam therapy. Important & Principles of biomedical applications - C.T.scan – ultra .sonography. NMR <p style="text-align: center;">Fourth Quiz</p> |

course Final Term Examination

Students Behaviour in Class : **Excellent**

Computer Usage: **Very Good**

Teaching Techniques: **Variety**



Dr. Nadwa Ismaeel

Subject name: **Medical Imaging**

Academic Year : 2020-2021

Credit Hour : 4hr. 2 group

Catalog Description:

Reference Book:

1. Fundamental physics of radiology, Meredith and Massy , 1986
2. Imaging for Students_Hodder Arnold© 2012 David A Lisle

Course Outcomes:

_Radiography (X-ray imaging), Contrast materials, Fluoroscopy

Computed radiography, Computed Tomography

Ultra-Sound, Scintigraphy (nuclear medicine) ,MRI

Weekly Teaching Plan:

| | |
|--|---|
| <p>Week 1&2&3</p> | <p>Modern Imaging modalities requirements</p> <hr/> <p>X-ray tubes</p> <hr/> <p>Physics of X-ray Production</p> <hr/> <p>Basic interaction of X-ray with matter</p> |
| <p>First Quiz</p> | |
| <p>Week 4&5&6&7</p> | <p>Computed radiography, Digital radiography</p> <hr/> <p>Fluoroscopy, Contrast materials</p> <hr/> <p>Computed Tomography: Type of scanners , Equipment And Methodology CT images and its parameters</p> |
| <p>Second Quiz</p> | |
| <p>Week</p> | <p>Scintigraphy (nuclear medicine):Introduction, Gamma camera principle</p> |



| | |
|-------------------------------------|---|
| <p>8&9&10&11</p> | <p>Types of emissions from Radioactive, Photon detection, Radiopharmaceuticals</p> <hr/> <p>Ideal radionuclide for In vivo diagnoses, radionuclide's used, radionuclide production</p> <hr/> <p>Radiopharmaceuticals:- produce, Detection (inviro,invivo)</p> <hr/> <p>Properties of Gama rays, The collimator, Spatial resolution and sensativity</p> <hr/> <p>Scintillation Crystal, Image types</p> <hr/> <p>Magnetic Imaging Resonance (MRI): Main components of Scanners , What is MRI</p> <hr/> <p>History, Common uses ,Synopsis of MRI, Hydrogen Atom , Angular, magnetic momentum, how its work, T1, T2, proton density weighted MRI</p> |
|-------------------------------------|---|

Third Quiz

| | |
|---|---|
| <p>Week 12&13&14</p> | <p>Limitations of MRI, Contraindications</p> |
|---|---|

2ndcourse Mid Term Examination

| | |
|-----------------------|--|
| <p>Week 15</p> | |
|-----------------------|--|

2ndcourse Final Term Examination

Students Behaviour in Class : Good

Computer Usage: No

Teaching Techniques: Clasic

Dr. Mahmood Zeki Al-Hasso

Subject name: Membrane Biophysics & Cell Communication

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book:

Course Outcomes:

Weekly Teaching Plan:

| | |
|---|---|
| Week 1&2&3 | Structure of the cytoplasmic membrane , Composition of Membrane , Membrane asymmetry , Membrane fluidity . Transport Across Membranes , Mechanisms of membrane transport ,Exocytosis ,Endocytosis, Phagocytosis, Pinocytosis , Transporters and Ion Channels and Membrane Potential Protein Sorting Vesicle Transport. |
| First Quiz | |
| Week 4&5&6&7 | Diffusion and Active Transport, Membrane Transport proteins in prokaryotes. Cell Communication , General Principles , types of signaling Cell , Methods used by Cells to Communicate , Local signaling , Long distance signaling Hormones , The basic elements of Cell Signaling. Autocrine signaling, paracrine signaling , endocrine signaling , synaptic signaling . Signal transduction pathways. |
| Second Quiz | |
| Week 8&9&10&11 | Membrane Receptors and hydrophobicity of signaling molecules - Cell surface receptors and hydrophilic signaling molecules. First messenger . Second messenger : Cyclic AMP (cAMP) as a second messenger. |
| Third Quiz | |
| Week 12&13&14 | Protein Kinase and Phosphatase receptors, G proteins-linked receptors and cAMP synthesis . Regulation of G proteins , cAMP and Transcriptional factors (messengers in nucleus) , Signaling amplification. |
| 2nd course Mid Term Examination | |
| Week 15 | Activation of one enzyme and inhibition of another one with opposite reaction , Immune Signaling , Cell death Signaling. |

2nd course Final Term Examination

Students Behaviour in Class : Good

Computer Usage: Yes

Teaching Techniques:

Dr. Mahmoud Ahmed Mohammed Fakhri

Subject name: Metabolism

Academic Year : 20-21

Credit Hour : 3 hr. * 15 weeks (Theoretical only)

Catalog Description:

Students are study many fields :

1. Bioenergetics and the role of ATP
2. Overview of metabolism and the profession of metabolic fuels, regulation of metabolism
3. Metabolism of carbohydrates
4. Metabolism of lipids
5. Catabolism of amino acids
6. Catabolism of peptides and proteins
7. Metabolism of purine and pyrimidine nucleotides

Reference Book:

- 1- **Lehninger Principles of Biochemistry (8th Edition) 2016** *Authors: David L. Nelson, Michael M. Cox*
- 2- **Harper's Illustrated Biochemistry (31th Edition) 2016** *Authors: Peter J. Kennelly, Robert Murray, Victor Rodwell, David Bender, Kathleen M. Botham, P. Anthony Weil*

Course Outcomes:

1. Enabling students to take up the metabolism.
2. Explain the importance of the subject or article by linking them to the academic program (Biophysics)
3. Teaching students the terminology related to metabolism.
4. Explain to students how to convert biomolecules into energy for the purpose of storage or use for certain functions, and how to build the biomolecules needed by the body of energy stored or energy from food.
5. Explain the students methods of regulation the catabolism and anabolism in the cell and what the materials organized and methods and their role in this organization , and what levels of life regulation of energy. In addition to enabling students to calculate the resulting energy from catabolism of biomolecules or building necessary of biomolecules.



6. To enable the student to know the metabolic pathways related to each type of biomolecules and to know the type of defect or disease resulting from a defect in metabolic pathway.
7. Enabling the student to know the location of each metabolic path worse at the cell or body level and what is its purpose, and when activates metabolic pathway and when become inactive .

Weekly Teaching Plan:

| | |
|--|---|
| <p>Week 1 & 2 & 3</p> | <ol style="list-style-type: none"> 1. Bioenergetics and the role of ATP 2. Overview of metabolism and the profession of metabolic fuels, regulation of metabolism 3. Metabolism of carbohydrates(glycolysis) 4. Metabolism of carbohydrates(HMPS) <p style="text-align: center;">First Quiz</p> |
| <p>Week 4 & 5 & 6 & 7 & 8</p> | <ol style="list-style-type: none"> 1. Metabolism of carbohydrates (Krebs cycle) 2. Metabolism of carbohydrates(electrontransport) 3. Metabolism of carbohydrates(glycogenesis) 4. Metabolism of carbohydrates(glycogenolysis) 5. Metabolism of carbohydrates(gluconeogenesis) <p style="text-align: center;">Second Quiz</p> |
| <p>course Mid Term Examination</p> | |
| <p>Week 9 &10&11</p> | <ol style="list-style-type: none"> 1. Metabolism of Lipid (lipolysis), (B- oxidation of FA) 2. Metabolism of Lipid (Cal. Energy for catabolism of lipid) 3. Metabolism of Lipid (Anabolism of FA) 4. Metabolism of Lipid (Ketone bodies) <p style="text-align: center;">Third Quiz</p> |
| <p>Week 12 & 13 &14 &15</p> | <ol style="list-style-type: none"> 1. Metabol. of protein(proteolysis) ,(glucose-alanine cycle) 2. Metabolism of protein(Urea cycle) 3. Metabolism of nucleotides (salvage pathway & De novo synthesis) 4. Metabolism of nucleotides (uric acid) <p style="text-align: center;">Fourth Quiz</p> |

course Final Term Examination

Students Behaviour in Class : **Excellent**
Computer Usage: **Very Good**
Teaching Techniques: **Variety**



Dr. Mahmood Zeki Al-Hasso

Subject name: **Microbiology I**

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book:

Course Outcomes:

Weekly Teaching Plan:

| | |
|--|--|
| Week 1&2&3 | Introduction to Microbiology, Prokaryotes & Eukaryotes , Microbial Cell morphology and shapes, Nucleic acids and Genome , Plasmids |
| First Quiz | |
| Week 4&5&6&7 | Cytoplasmic Membrane , Cell Wall (Peptidoglycan), Gram Stain, Archaeal Cell Wall and Membranes, |
| Second Quiz | |
| Week 8&9&10&11 | Capsule and extracellular structures, Inclusion Bodies, Motility mechanisms , Flagellar structure and function |
| Third Quiz | |
| Week 12&13&14 | Microbial sensing, Taxes Types in microorganisms, Microbial behavioral response |
| 2ndcourse Mid Term Examination | |
| Week 15 | Endospores Structure and characteristics, General Overview |
| 2ndcourse Final Term Examination | |

Students Behaviour in Class : Good

Computer Usage: Yes

Teaching Techniques:

Raghad Riyadh Shafeek

Subject name: Microbiology I practical

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book:

Course Outcomes:

Weekly Teaching Plan:

| | |
|--------------------|--|
| Week 1&2&3 | Safety rules in microbiology laboratory. Microscope. Microbiological culture media |
| First Quiz | |
| Week 4&5&6&7 | Types of culture media. Media preparation. Sterilization of Media and Equipment. Microorganisms' culture Transfer Instrument |
| Second Quiz | |
| Week 8&9&10&11 | Aseptic techniques for bacterial transferring and Subculturing. Pure Culture Techniques <ul style="list-style-type: none"> • The Streak-Plate technique. • Spread-Plate Technique. • Pour-Plate Technique. |
| Third Quiz | |
| Week 12&13&14 | Staining and Observation of Bacteria. Smear preparation. Staining methods <ul style="list-style-type: none"> • Simple staining • Negative staining • Differential stains(Gram stain, Acid- Fast staining) |



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- | | |
|--|---|
| | <ul style="list-style-type: none">• Special stains (Spore staining, Capsular staining, Flagella staining) |
|--|---|
-

2ndcourse Mid Term Examination

Week 15

Determining bacterial motility

2ndcourse Final Term Examination

Students Behaviour in Class :

Computer Usage:

Teaching Techniques:



Sumaya Adnan Salih

Subject name :Microbiology II

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book:

Course Outcomes:

Weekly Teaching Plan:

| | |
|--|---|
| <p>Week 1&2&3</p> | <p>Environmental requirements for microbial growth . The control of microbial growth (physical and chemical agent). Enumeration of bacteria (Measurement of microbial growth)</p> |
| <p>First Quiz</p> | |
| <p>Week 4&5&6&7</p> | <p>Direct methods of Measurement of microbial growth) A- Microscopic counts (Breed method and a Petroff-chamber) B- Viable count(VC) includes (Pour plate and Spread plate count) C- Membrane filter method. The Most Probable Number (MPN) method Estimating bacterial numbers by indirect methods</p> |
| <p>Second Quiz</p> | |
| <p>Week 8&9&10&11</p> | <p>Calculation the generation time. Determination of a Bacterial Growth Curve . Biochemical activities of bacteria Carbohydrates I: Fermentation and β-galactosidase activity.</p> |



Third Quiz

| | |
|------------------------------|--|
| Week 12&13&14 | Carbohydrates III: Starch Hydrolysis. Proteins, Amino Acids, and Enzymes I: Gelatin hydrolysis, Proteins, Amino Acids, and Enzymes II: Hydrogen Sulfide Production and Motility |
|------------------------------|--|

2nd course Mid Term Examination

| | |
|----------------|---|
| Week 15 | Proteins, Amino Acids, and Enzymes III: The IMViC Tests. Proteins, Amino Acids, and Enzymes III: The Catalase Activity Tests. |
|----------------|---|

2nd course Final Term Examination

Students Behaviour in Class :

Computer Usage:

Teaching Techniques:

Dr. Mahmood Zeki Al-Hasso

Subject name: **Microbiology II**

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book: Brock *et al.*, 2019 "Biology of Microorganisms"

Course Outcomes:

Weekly Teaching Plan:

| | |
|--|--|
| Week 1&2&3 | Microbial Nutrition and Growth, Macronutrients and Micronutrients, Population Growth and Exponential Growth |
| First Quiz | |
| Week 4&5&6&7 | Microbial Growth Cycle, Microbial Growth Control, Physical and chemical control methods, introduction to microbial genetics and evolution, |
| Second Quiz | |
| Week 8&9&10&11 | Environmental conditions and Microbial Growth , Temperature , pH , Oxygen , Salinity , |
| Third Quiz | |
| Week 12&13&14 | Eukaryotic microbes (Protozoa, Fungi, Algae) ; Structure and Differences |
| 2ndcourse Mid Term Examination | |
| Week 15 | Viruses; basic structure and differences |
| 2ndcourse Final Term Examination | |

Students Behaviour in Class : GOOD

Computer Usage: Yes

Teaching Techniques:



Dr. Qusay Khattab Omer & Nadwa Ismeel Mahmood

Subject name : Modern Physics I (Experimental) First Course

Academic Year : 20-21

Credit Hour : 2 hr . * 15 weeks Experimental

Catalog Description:

Modern physics lab contain many experimental in many topics as yield x-ray and determine the Plank constant, study the Balmer series of hydrogen atom and compute Redberg constant, find inverse law. Measurement the infrared radiation dose by thermopile, find Stevan –Poltesman constant , study the changing of $k\alpha$ and $k\beta$ intensity with anode potential , determine cross section of absorption photoelectric on atomic number.,study the linear absorption coefficient and half layer of the absorbed .in thermal absorption

Reference Book:

1. Arthur Beiser, Concept of Modern physics six adition, 2012, Published by McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 1221
2. RAYMOND A. SERWAY, CLEMENT J. MOSES, CURT A. MOYER, 2005, Modren physics, International Student Edition: ISBN 0-534-40624-6
3. Peter J. Nolan, 2014, Fundamentals of modern Physics First edition, state university of new york - Farmingdale

Course Outcomes:

1. Enabling students to lean about modern physics lab and the practice in society .
2. Explain the importance of the modern physics lab by linking them to the academic program .
3. Teaching the students the terms of modern physics lab and application with industry
4. Show the relationship between experimental modern physics with biophysics as technology of devices which used in medicine .
5. Enabling the students to understood the advantage from study characteristic linear motion in modern physics and connect with biophysics .
6. learning the students to understood the principle in modern physics



Weekly Teaching plan:

| | |
|--------------------------------------|---|
| Week 1 &2&3 | <p>Taking the data of yield x-ray and determine the Plank constant, according to energy of photon and discuss the results of data for individual student</p> <p style="text-align: center;">First Quiz</p> |
| Week 4 &5 &6&7 | <p>1. Taking the data of study the Balmer series of hydrogen atom and compute Rydberg constant by drawing between inverse wavelength of color and inverse of initial number of series of Balmer</p> <p>Taking the data of find inverse law by changing the position of thermopile and find the intensity of absorption add to that discuss the results in the end of experimental</p> <p style="text-align: center;">Second Quiz</p> |
| Course Mid Term Examination | |
| Weeks 8 &9&10&11 | <p>1. Taking the data of Measurement the infrared radiation dose by thermopile, by connect the electric circuit of experimental to find the current in mA and voltage in mV to determine infrared radiation dose, add to discuss the results from drawing between power density with distance</p> <p>2. Taking the data find Stefan –Boltzmann constant by drawing between the power in watt and distance, add to discuss the results at the end of experimental</p> <p style="text-align: center;">Third Quiz</p> |
| Week 12 &13&14&15 | <p>1. taking the data of any one layer and find the intensity by galvanometer</p> <p>2. increase the number of layer and return compute the intensity of them</p> <p>3. find the half value from drawing between the intensity with distance of thickness and study the linear absorption coefficient and half layer of the absorbed in thermal absorption</p> <p style="text-align: center;">1. Fourth Quiz</p> |
| Course Final Term Examination | |

Student Behavior in Class: **Excellent**

Computer Usage: **Very Good**

Teaching Techniques: **Variety**



Dr. Qusay Khattab Omer & Nadwa Ismeel Mahmood & Sheimaa talal aldabag

Subject name : Modern Physics II (Experimental) Second Course

Academic Year : 2020-2021

Credit Hour : 3hr . * 15 weeks Experimental

Catalog Description:

Modern physics lab contain many experimental in many topics as yield x-ray and determine the Plank constant, study the Balmer series of hydrogen atom and compute Redberg constant, find inverse law. Measurement the infrared radiation dose by thermopile, find Stevan –Poltesman constant , study the changing of $k\alpha$ and $k\beta$ intensity with anode potential , determine cross section of absorption photoelectric on atomic number.,study the linear absorption coefficient and half layer of the absorbed .in thermal absorption

Reference Book:

1. Arthur Beiser, Concept of Modern physics six adition, 2012, Published by McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 1221
2. RAYMOND A. SERWAY, CLEMENT J. MOSES, CURT A. MOYER, 2005, Modren physics, International Student Edition: ISBN 0-534-40624-6
3. Peter J. Nolan, 2014, Fundamentals of modern Physics First edition, state university of new york - Farmingdale

Course Outcomes:

1. Enabling students to lean about modern physics lab and the practice in society .
2. Explain the importance of the modern physics lab by linking them to the academic program .
3. Teaching the students the terms of modern physics lab and application with industry
4. Show the relationship between experimental modern physics with biophysics as technology of devices which used in medicine .
5. Enabling the students to understood the advantage from study characteristic linear motion in modern physics and connect with biophysics .
6. learning the students to understood the principle im modern physics.



Weekly Teaching plan:

| | |
|--------------------------------------|--|
| Week 1 &2&3 | <p>Taking the data of yield x-ray and determine the Plank constant, according to energy of photon and discuss the results of data for individual student</p> <p style="text-align: center;">First Quiz</p> |
| Week 4 &5 &6&7 | <ol style="list-style-type: none"> 1. Taking the data of study the Balmer series of hydrogen atom and compute Rydberg constant by drawing between inverse wavelength of color and inverse of initial number of series of Balmer 2. Taking the data of find inverse law by changing the position of thermopile and find the intensity of absorption add to that discuss the results in the end of experimental <p style="text-align: center;">Second Quiz</p> |
| Course Mid Term Examination | |
| Weeks 8 &9&10&11 | <ol style="list-style-type: none"> 1. Taking the data of Measurement the infrared radiation dose by thermopile, by connect the electric circuit of experimental to find the current in mA and voltage in mV to determine infrared radiation dose, add to discuss the results from drawing between power density with distance 2. Taking the data find Stefan –Boltzmann constant by drawing between the power in watt and distance, add to discuss the results at the end of experimental <p style="text-align: center;">Third Quiz</p> |
| Week 12 &13&14&15 | <ol style="list-style-type: none"> 1. taking the data of any one layer and find the intensity by galvanometer 2. increase the number of layer and return compute the intensity of them 3. find the half value from drawing between the intensity with distance of thickness and study the linear absorption coefficient and half layer of the absorbed in thermal absorption <p style="text-align: center;">Fourth Quiz</p> |
| Course Final Term Examination | |

Student Behavior in Class: **Excellent**

Computer Usage : **Very Good**

Teaching Techniques: **Variety**



Dr. Qusay Khattab Omer & Nadwa Ismeel Mahmood

Subject name : Modern Physics

Academic Year : 20-21

First course

Credit Hour : 2 hr . * 15 weeks

(Theoretical only)

Catalog Description:

Introduction in special theory of relativity , postulate of special relativity ,time dilation ,length contraction ,mouons decay , relative of mass , mass and energy ,energy and momentum ,electromagnetic waves,photoelectric effect ,what is light, x-rayproduction , charcteristics of x-ray,Beamstrahlung , x-ray diffraction compton , effect, pair production , the inverse of pair production ,photon absorbtion.DEBroglie, waves of whats ? wave function ,probability, density, how waves are described , mathmematically . formula of (y) as function both x and T , partical in a box , uncertainty principle E , H -bar.

Topics in Modern Physics II as Atomic structure , quntum mechanics . quntum theory of hydrogen atom , many –electron atoms , molecular , nuclear transformation ..

Reference Book:

1. Arthur Beiser, Concept of Modern physics six adition, 2012, Published by McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 1221
2. RAYMOND A. SERWAY, CLEMENT J. MOSES, CURT A. MOYER, 2005, Modren physics, International Student Edition: ISBN 0-534-40624-6
3. Peter J. Nolan, 2014, Fundamentals of modern Physics First edition, state university of new york - Farmingdale

Course Outcomes :

1. Enabling students to lean about Modern Physics
2. Explain the importance of the subject or article by linking them to the academic program (Modern Physics)
3. Teaching the students the terms of Modern physics
4. Show the relationship between modern physics with biophysics as technology of devices which used in medicine .
5. Enabling the students to understood the advantage from study characteristic of x-ray and nuclear radiation .



6. learning the students to understand the principle of special relativity and quantum mechanics and also application in biophysics.

Weekly Teaching plan:

| | |
|--------------------------------------|---|
| Week 1 &2&3 | 1. Introduction about special theory of relativity 2. , postulate of special relativity ,time dilation First Quiz |
| Week 4 &5&6&7 | 1. length contraction ,mouns decay , relative of mass , mass and energy ,energy and momentum ,electromagnetic waves,photoelectric effect 2. ,what is light, x-rayproduction , charcteristics of x-ray,Beamstrahlung , x-ray diffraction compton , effect, pair production , theinverse of pair production ,photon absorbtion.DEBroglie, waves of whats ? wave function ,probability, Second Quiz |
| Course Mid Term Examination | |
| Week8 &9&10&11 | , density, how waves are described , mathmematically . formula of (y) as function both x and T , partical in a box , uncertainty principle E , H -bar. Third Quiz |
| Week12 &13&14&15 | Topics in Modern Physics II as Atomic structure , quntum mechanics . quntum theory of hydrogen atom , many –electron atoms , molecular , nuclear transformation .. Fourth Quiz |
| Course Final Term Examination | |

Student Behavior in Class: **Excellent**

Computer Usage : **Very Good**

Teaching Techniques: **Variety**



Dr. Qusay Khattab Omer & Dr. Marwan Zuhair

Subject name : Modern Physics II

Academic Year : 21-20

Second course

Credit Hour : 2 hr . * 15 weeks

(Theoretical only)

Catalog Description:

Introduction in special theory of relativity , postulate of special relativity ,time dilation ,length contraction ,mouons decay , relative of mass , mass and energy ,energy and momentum ,electromagnetic waves,photoelectric effect ,what is light, x-rayproduction , charcteristics of x-ray,Beamstrahlung , x-ray diffraction compton , effect, pair production , the inverse of pair production ,photon absorbtion.DEBroglie, waves of whats ? wave function ,probability, density, how waves are described , mathmematically . formula of (y) as function both x and T , partical in a box , uncertainty principle E , H -bar.

Topics in Modern Physics II as Atomic structure , quntum mechanics . quntum theory of hydrogen atom , many –electron atoms , molecular , nuclear transformation ..

Reference Book:

1. Arthur Beiser, Concept of Modern physics six adition, 2012, Published by McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 1221
2. RAYMOND A. SERWAY, CLEMENT J. MOSES, CURT A. MOYER, 2005, Modren physics, International Student Edition: ISBN 0-534-40624-6
3. Peter J. Nolan, 2014, Fundamentals of modern Physics First edition, state university of new york - Farmingdale

Course Outcomes :

1. Enabling students to lean about Modern Physics
2. Explain the importance of the subject or article by linking them to the academic program (Modern Physics)
3. Teaching the students the terms of Modern physics
4. Show the relationship between modern physics with biophysics as technology of devices which used in medicine .
5. Enabling the students to understood the advantage from study characteristic of x-ray and nuclear radiation .



6. learning the students to understand the principle of special relativity and quantum mechanics and also application in biophysics.

Weekly Teaching plan:

| | |
|--------------------------------------|---|
| Week 1 &2&3 | 1. Introduction about special theory of relativity 2. , postulate of special relativity ,time dilation First Quiz |
| Week 4 &5&6&7 | 1. length contraction ,mouns decay , relative of mass , mass and energy ,energy and momentum ,electromagnetic waves,photoelectric effect 2. ,what is light, x-rayproduction , charcteristics of x-ray,Beamstrahlung , x-ray diffraction compton , effect, pair production , theinverse of pair production ,photon absorbtion.DEBroglie, waves of whats ? wave function ,probability, Second Quiz |
| Course Mid Term Examination | |
| Week8 &9&10&11 | , density, how waves are described , mathmematically . formula of (y) as function both x and T, partical in a box , uncertainty principle E, H-bar. Third Quiz |
| Week12 &13&14&15 | Topics in Modern Physics II as Atomic structure , quntum mechanics . quntum theory of hydrogen atom , many –electron atoms , molecular , nuclear transformation .. Fourth Quiz |
| Course Final Term Examination | |

Student Behavior in Class: **Excellent**

Computer Usage: **Very Good**

Teaching Techniques: **Variety**



Dr. TALAL SABHAN SALIH

Subject name: Molecular Biophysics

Academic Year : 20-21

Credit Hour : 30

Catalog Description:

This course is given to the students in the third class. This course involves many new and up to date topics in molecular biophysics for both Eukaryotes and Prokaryotes organisms. The course comprises theoretical lectures and solid back ground in the concept of molecular biophysics.

Reference Book:

- 1- Genetics: Analysis and Principles by Rob Brooker (2017).
- 2- Biology of microorganisms (Brock) (2011)

Course Outcomes:

At the end of this course students should learn the following concepts:

- 1- Learn the principle and fundamental concepts of molecular biophysics.
- 2- Students should know the methods in genetic engineering and for manipulating DNA
- 3- Students will gain a good knowledge in molecular biophysics entitled them for better understanding the biology of living things

Weekly Teaching Plan:

| | |
|--------------------|--|
| Week 1 Oct 2018 | Introduction to molecular biophysics, principles and fundamentals. Genetic Engineering and Methods for Manipulating DNA. |
|--------------------|--|



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|-------------|--|
| | |
| Week 2&3 | Restriction and Modification Enzymes, Nucleic Acid Hybridization, Molecular Cloning, Molecular Methods for Mutagenesis |
| | First Quiz |
| Week 4 | Molecular basis of gene mutation, Acquired and inherited mutations, types of possible gene mutations. Deletion and insertion mutations |
| | |
| | Second Quiz |
| Week 5,6 &7 | Mutagenesis, Chemical Mutagens, Physical mutagens using Radiation, UV effect on DNA, DNA Repair Systems, |
| | Third Quiz |
| Week 9&10 | Mutagenesis and Carcinogenesis: The Ames Test, Principle of Ames test, Result Interpretation, significance of Ames test |
| | Midterm Exam |
| Week 11 | Genetic Disorder and Gene Therapy, types of genetic disorders, Examples of genetic disorders: Oncogenes and tumor suppressor genes, approaches to gene therapy, |
| | |
| Week 12 | Age determination using the DAN analysis, age-dependent accumulation of deletions in mtDNA., age determination based on phenomenon of telomere shortening during aging, Genes Can be On or Off |
| | |
| Week 13 | The lac OPERON, Adapting to the environment, situations of the lac operon in E.coli, Structure of Lac Operon, |
| | Forth Quiz |
| | |
| Week 14 | Gene Transfer in Prokaryotes, mechanisms of genetic exchange in prokaryotes, transformation, transduction, conjugation |



Students Behaviour in Class

Students were very well behaved in the class and the materials were very well delivered.

Teaching Techniques: Different techniques were used including, lecturer, homework, case studies, reports and seminars delivered by students



Dr. TALAL SABHAN SALIH

Subject name: Molecular Genetics

Academic Year : 2020-2021

Credit Hour : 52.5

Catalog Description:

This course is given to the students in the third class. This course involves many new and up to date topics in molecular genetics for both Eukaryotes and Prokaryotes organisms. The course comprises theoretical and practical parts. In the practical part, student will have the opportunity to carry out experiments and lab work that are available to practice the theoretical part.

Reference Book:

- 1- Genetics: Analysis and Principles by Rob Brooker (2017).
- 2- Biology of microorganisms (Brock) (2011)

Course Outcomes:

At the end of this course students should learn the following concepts:

- 1- Learn the principle and fundamental concepts of molecular genetics.
- 2- Students should know the major differences between biology of Eukaryotes and prokaryotes
- 3- Students will gain a good knowledge in molecular genetics entitled them for better understanding the biology of living things

Weekly Teaching Plan:

| | |
|---------------------------|--|
| Week 1 Oct 2018 | Introduction to molecular genetics, principles and fundamentals. DNA Structure and genetics information, Macromolecules and genes. |
|---------------------------|--|



| | |
|-------------|---|
| | |
| Week 2&3 | The double helix, supercoiling, chromosomes and other genetics elements (viruses, plasmids and transposable elements), DNA replication, template and enzymes, First Quiz |
| Week 4 | The replication fork, bidirectional replication and the replisome, RNA synthesis: Transcription, sigma factors and consensus sequences, Second Quiz |
| Week 5,6 &7 | Termination of transcription, Translation and The Genetic proteins, gene transfer, genetic recombination, transformation, transduction, conjugation, Mobile DNA TRANSPOSABLE elements, mutation. Third Quiz |
| Week 9&10 | Genes and Chromosomes in Eukaryota, Operons in prokaryotes, Exons and Introns in Eukaryotes, Genome sizes and Gene Functions Midterm Exam |
| Week 11 | Open Reading Frame (ORF), How to find an ORF?, Size Range of Prokaryotic Genomes, Size Range of Eukaryotes Genomes, |
| Week 12 | Replication of Linear DNA, The RNA primer. Structure of the RNA–DNA hybrid formed during initiation of DNA synthesis, |
| Week 13 | Replication of Linear DNA Using a Protein Primer, Telomeres and Telomerase, Centromeres and Kinetochores Forth Quiz |
| Week 14 | Transcription and Translation in Eukaryota, Transcription and Translation in prokaryota, Major differences between in Transcription and Translation in both kingdoms |
| Week 15 | RNA Interference (RNAi), Regulation by MicroRNA, enzymes involved and processings |



Students Behaviour in Class

Students were very well behaved in the class and the materials were very well delivered.

Teaching Techniques: Different techniques were used including, lecturer, homework, case studies, reports and seminars delivered by students

Dr. ...Saad Ghanim Salih

Subject name: neuroscience

Academic Year : 2020-2021

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: neuroscience by Dale Purves and George J. Augustine *et. al.*

Course Outcomes: 90%

Weekly Teaching Plan:

| | |
|---|---|
| Week 1&2&3 | The cellular components of nervous system,neurons ,neurological cells, cellular diversity , neural circuits |
| First Quiz | |
| Week 4&5&6&7 | Central nervous system, organization principles of neural system, function analysis of neural system, analyzing complex behaavior, brain imaging techniques, neural signaling, electrical potential, ionic movment produce electrical signal, membrane potential, action potential, |
| Second Quiz | |
| Week 8&9&10&11 | Neuroanatomical terminology,neurotransmitter, hormon and signaling, |
| Third Quiz | |
| Week 12&13&14 | Abnormality of neural system , memory , phobia , alzheimer , epilepsy, schizophrenia , aggressive, parkinson |
| 2nd course Mid Term Examination | |
| Week 15 | Brain anatomy, neural system anatomy |
| 2nd course Final Term Examination | |

Students Behaviour in Class : sharing and answering questions discussing problems

Computer Usage: not aplicable

Teaching Techniques: poster and report view and tutrial data show



Dr. ...shaimaa talal atala al Dabag, Nadwa Ismaeel.....

Subject name: Nuclear practical physics

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book: Nuclear Radiation, Detectors and Experiments, k.Mahesh and S.M. Mostafa, 1976.

Course Outcomes:

Weekly Teaching Plan:

| | |
|--|---|
| Week 1&2&3 | Introduction about Radioactive decay law and activity of radioactive sources and Introduction about interaction of gamma ray and charge particle with matter. |
| First Quiz | |
| Week 4&5&6&7 | Practical Study of characteristics Geiger – Muller counter, Practical study of verification inverse square law for gamma ray, Practical Study of characteristics the parallel plate Ionization chamber. |
| Second Quiz | |
| Week 8&9&10&11 | Taking practical measurements using the sonar Device for students and identifying Ultrasonic device properties and safety procedures. |
| Third Quiz | |
| Week 12&13&14 | Taking practical measurements using the X- Ray Device for students and identifying x –ray properties and safety procedures. |
| 2ndcourse Mid Term Examination | |
| Week 15 | |
| 2ndcourse Final Term Examination | |

Students Behaviour in Class : good

Computer Usage: non

Teaching Techniques: Varsity



Lecturer Jasim MY. Ahmed

Subject name: **Practical Cell physiology**

Academic Year : 2021-2020

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book:

Course Outcomes:

Weekly Teaching Plan:

| | |
|--|---|
| Week 1 & 2 & 3 | How to make exact measurement cells using the microscope / Cell forms and distinguish between prokaryotic and eukaryotic cell |
| First Quiz | |
| Week 4 & 5 & 6 & 7 | Study of cell parts: The cell membrane / The composition of cell membrane/ The cellular functions of cell membrane |
| Second Quiz | |
| Week 8&9&10&11 | The Mitochondria / The Golgi apparatus and Centrosome / Endoplasmic reticulum and Lysosomes / Plastids |
| Third Quiz | |
| Week 12&13 | Cell division : Mitosis / Meiosis |
| 2ndcourse Mid Term Examination | |
| Week 14 & 15 | Chromosomal studies /Special chromosomes |
| 2ndcourse Final Term Examination | |

Students Behaviour in Class :

Computer Usage:

Teaching Techniques:

Lecturer: Omar Mu'ayad Al-Obaidy

Subject name: Practical Developmental Biology

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description: In this course we will gradually study the introduction and terms of developmental biology, also we take a different developmental examples in fungi, *Echinococcus granuloseus*, frog, sperm and ovum development etc.. and also study the different laboratory tools that are used in the developmental biology.

Reference Book: *Developmental Biology A GUIDE FOR EXPERIMENTAL STUDY*
Third Edition Mary S. Tyler

Course Outcomes: In this course the student should be able to know different terms, examples and tools that are used in the developmental biology.

Weekly Teaching Plan:

| | |
|--------------------|--|
| Week 1&2&3 | Introduction to developmental biology Things that are needed in the developmental biology lab. Developmental biology and embryological practical lab tools |
| First Quiz | |
| Week 4&5&6&7 | Introduction to fungi Collection of fungi samples <i>Penicillium</i> life cycle Practical work and microscopic slides |
| Second Quiz | |
| Week 8&9&10&11 | <i>Echinococcus granuloseus</i> : Introduction and life cycle Practical work and microscopic slides The frog life cycle and microscopic slides Introduction to embryology |
| Third Quiz | |
| Week 12&13&14 | The sperm concepts, life cycle ,and microscopic slides The ovum concepts, life cycle ,and microscopic slides Student's seminars and discussions |



2nd course Mid Term Examination

Week 15

Summary of the course and discussion

2nd course Final Term Examination

Students Behaviour in Class : students acts positively in the class during the course such as by questions and discussions and the good answers in the exams

Computer Usage: yes

Teaching Techniques: use of the different practical laboratory tools and methods for the illustrations and practice in the class , also the data slide show was used to enhance the understanding and simplification of the lectures such as pictures and videos.



Lecturer: Omar Mu'ayad Al-Obaidy

Subject name: Practical Drug and antimicrobial

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description: In this course we will gradually study the drugs and antibiotics as terms, classification, susceptibility, and tools and methods and the new techniques for the antibiotics tests.

Reference Book:

Essential Microbiology(2005) Stuart Hogg, the university of Glamorgan, UK.

Course Outcomes: In this course the student should be able to know different types of antibiotics and their classifications and also should know different methods and techniques for a different antibiotics tests.

Weekly Teaching Plan:

| | |
|---|---|
| Week 1&2&3 | Introduction to antimicrobial drugs Classification of antimicrobials Methods of antibiotics sensitivity tests |
| First Quiz | |
| Week 4&5&6&7 | Disc diffusion susceptibility test Dilution susceptibility test Agar dilution method Broth dilution method |
| Second Quiz | |
| Week 8&9&10&11 | E-test susceptibility Beta lactamases enzymes Beta lactamases detection tests Antimicrobial resistance |
| Third Quiz | |
| Week 12&13&14 | Automated susceptibility method Genotypic methods PCR method |
| 2nd course Mid Term Examination | |
| Week 15 | DNA hybridization methods Summary of the course |



2nd course Final Term Examination

Students Behaviour in Class : students acts positively in the class during the course such as by questions and discussions and the good answers in the exams

Computer Usage: yes

Teaching Techniques: use of the different practical laboratory tools and methods for the illustrations and practice in the class , also the data slide show was used to enhance the understanding and simplification of the lecture such as pictures and videos.

Lecturer Jasim MY. Ahmed

Subject name: Practical Anatomy & Human Physiology

Academic Year : 22021-2020

Credit Hour : 3hr. *15 weeks

Catalog Description:

Reference Book: human physiology

Course Outcomes: 100%

Weekly Teaching Plan:

| | |
|---|---|
| Week 1& 2 & 3 | The blood / The RBC count / The WBC count |
| First Quiz | |
| Week 4 & 5 & 6 & 7 | Platelet count / Preparation of blood smear / Hemolysis / Estimation of hemoglobin Hb |
| Second Quiz | |
| Week 8 & 9 & 10 & 11 | Erythrocyte sedimentation rate ESR / Bleeding time / Clouting time / |
| Third Quiz | |
| Week 12 & 13 & 14 | Blood pressure measurement / General urine examination GUE |
| 2nd course Mid Term Examination | |
| Week 15 | Review |
| 2nd course Final Term Examination | |

Students Behaviour in Class : sharing and answering questions discussing problems

Computer Usage: not applicable

Teaching Techniques: poster and report view and tutrial data show



Lecturer: Omar Mu'ayad Al-Obaidy

Subject name: Practical Immunology

Academic Year : 20-21

Credit Hour : 3hr. *15 weeks

Catalog Description: In this course we will gradually study the immunological concepts and terms , and the different practical methods and tools that related to human health and the detection of different immunological diseases and disorders. Such as antigen-antibody reactions, inflammation test, ELISA test etc...

Reference Book: Essential clinical immunology (2009) John B. Zabriskie
The Rockefeller University

Course Outcomes: In this course the students should be able to know different immunological concepts and terms and the practical methods and tests for the detection of different immunological reactions and diseases such as inflammation , ELISA test etc...

Weekly Teaching Plan:

| | |
|-----------------------------------|--|
| Week 1&2&3 | 1-Introduction to immunology 2-Leukocytes and differential count 3-Haemocytometer and blood film |
| First Quiz | |
| Week 4&5&6&7 | 4-Phagocytosis- practical microscopic slides 5-Antigen 6-Antibody 7-Practical injection in lab. animals |
| Second Quiz | |
| Week 8&9&10&11 | 8-Complement system-practical detection test 9-Inflammation tests 10-Immunofluorescence assay 11-ELISA test |
| Third Quiz | |
| Week 12&13&14 | 12-Allergy tests 13-Precipitation tests 14-Agglutination tests |



2nd course Mid Term Examination

| | |
|---------|---|
| Week 15 | 15-Antigen-antibody reaction tests Summary of the course and discussion |
|---------|---|

2nd course Final Term Examination

Students Behaviour in Class : students acts positively in the class during the course such as by questions and discussions and the good answers in the exams

Computer Usage: yes

Teaching Techniques: use of the different practical laboratory tools and methods for the illustrations and practice in the class , also the data slide show was used to enhance the understanding and simplification of the lecture such as pictures and videos.

Subject name: Practical Molecular genetics

Academic Year : 21-20

Credit Hour: 3hr. *15 weeks (practical)

Catalog Description:

Reference Book: Variety of books

Course Outcomes: Molecular genetics Lab. Contain many Experiments use to study the genetic materials DNA and RNA structure, properties and isolation

Weekly Teaching Plan:

| | |
|---|--|
| Week 1 & 2 | Introduction to practical molecular genetics and the biohazards and preparation the molecular biology lab. / The concept of genetics |
| First Quiz | |
| Week 3 & 4 & 5 & 6 | Cell disruption : Physical methods / Chemical methods / Enzymatical methods |
| Second Quiz | |
| Week 7 & 8 & 9 | DNA extraction / RNA extraction / DNA purity and concentration |
| Third Quiz | |
| Week 11 & 12 & 13 | Polymerase chain reaction PCR experiment / Electrophoresis |
| 2nd course Mid Term Examination | |
| Week 14 & 15 | Real-Time PCR / DNA sequencing (videos) |
| 2nd course Final Term Examination | |

Students Behaviour in Class : During the course students acts positively in the class via questions and discussions and the good answers in exams.

Computer Usage: Essential

Teaching Techniques: Use of the different tools and methods for Experimental Techniques in the lab, also the data slide show was used to enhance the understanding and simplification of the lecture such as diagrams, pictures and videos.

Dr. Zeyad Thonnoon Dawood Alrassam

Subject name: Theoretical Immunology

Academic Year : 2020-2021

Credit Hour : 2hr. *15 weeks Theoretical

1. **Catalog Description:** In this course we will gradually study Introduction Principle Concept Of Immunology, Overview Of The Immune System , Immune System: Definition, Immune Organs (Structure & Function) , Immune Cells, Defense Systems , Types Of Immunity , Innate Immunity, Adaptive Response Mechanisms , T&B Cells , Immunoglobulin(Antibodies) , Antigens , The Major Histocompatibility Complex, Receptors And Signaling: B And T Cell Receptors : Cytokines And Chemokines , Immunological Tolerance , Transfusion & Transplantation , Immunological Disorders: Hypersensitivity, Autoimmunity and Cancer Immunology

Reference Book:

- 1- John B. Zabriskie. Essential Clinical Immunology. Cambridge University Press 2009.
- 2- Clinical Immunology & Serology A LABORATORY PERSPECTIVE 3rd Ed 2010 By F.A. Davis Company
- 3- Essential clinical immunology (2009) John B. Zabriskie .The Rockefeller University

Course Outcomes: In this course the students should be able to know different immunological concepts , terms , different immunological reactions and diseases.

Weekly Teaching Plan:

| | |
|-----------------------------------|--|
| Week 1&2&3 | 1- Overview of immunology and immune system 2- Immune system definition, Innate and Adaptive immunity mechanisms 3- Cells of the Immune System |
| First Quiz | |
| Week 4&5&6&7 | 4-Phagocytosis 5-Inflamation 6-Complement 7- T and B lymphocyte |
| Second Quiz | |
| Week 8&9&10&11 | 8- antibody or immunoglobulin 9- Antibody Response 10- The antigen-antibody interaction 11- Cytokines |

Third Quiz



| | |
|---------------|---|
| Week 12&13&14 | 12- organs of the immune system 13- Major Histocompatibility Complex (MHC) 14- Immune disorders |
|---------------|---|

2nd course Mid Term Examination

| | |
|---------|----------------------|
| Week 15 | 15- Immune tolerance |
|---------|----------------------|

2nd course Final Term Examination

Students Behaviour in Class : students acts positively in the class during the course such as by questions and discussions and the good answers in exams

Computer Usage: essential

Teaching Techniques: use of the different tools and methods for the illustrations and practice in the class , also the data slide show was used to enhance the understanding and simplification of the lecture such as pictures and videos.



Dr. Zeyad Thonnoon Dawood Alrassam

Subject name: Theoretical Virology

Academic Year : 21-20

Credit Hour : 2 hr. *15 weeks Theoretical

Catalog Description: In this course we will study Introduction and Principles of Virology History, Scientists contributed into the virology, Virus Structure, Virus Host Specificity, Bacteriophages and its replication Cycle, Animal Viruses replication Cycle, Virus replication and protein synthesis, Replication of viral genome, viral infection and Host resistance to viral infections, virus groups, Viruses and cancer.

Reference Book:

- 1- E. K. Wagner, M. J. Hewlett, D. C. Bloom, D. Camerini.(2008) "Basic Virology " Third Edition. 2008 by Blackwell Publishing.
- 2- G. Kudesia, T. Wreghitt "Clinical and Diagnostic Virology"2009. Cambridge University Press.
- 3- A. J. Zuckerman, J. E. Banatvala, B. D. Schoub, P. D. Griffiths, P. Mortimer. "Principles and Practice of Clinical Virology" SIXTH EDITION 2009 John Wiley & Sons Ltd.
- 4- Willey J M, Sherwood L M. and Woolverton C J. (2009). Prescott's principles of microbiology. 1st ed..Published by McGraw-Hill Companies, Avenue of the Americas, New York.

Course Outcomes:

Enabling students to learn: the meaning of virology, importance of viruses, Viral Nomenclature and Classification, viral Spread and infection, viral replication. virus groups and examples of each family, association between viruses and diseases, Finally the prophylaxis and viruses control.

Weekly Teaching Plan:

| | |
|---------------------------------|---|
| Week 1&2&3 | <ol style="list-style-type: none"> 1- History , Recognition of viruses 2- Structure of Viruses 3- Virus classification |
| First Quiz | |
| Week 4&5&6&7 | <ol style="list-style-type: none"> 4- Viral Production 5- The interaction between virus and host cell: The Life Cycle of Viruses with Prokaryote Hosts (Lysis and Lysogeny) 6- Infection of Eukaryotic Cells 7- Herpesviridae |
| | |



| | |
|---|--|
| Second Quiz | |
| Week 8&9&10&11 | 8- parvovirus B19 9- Orthomyxoviridae 10- Paramyxoviridae 11- Hepatitis viruses |
| Third Quiz | |
| Week 12&13&14 | 12- Corona viruses and SARS 13- HIV 14- Papilloma and Polyoma viruses |
| 2nd course Mid Term Examination | |
| Week 15 | 15- Viruses and Cancer |
| 2nd course Final Term Examination | |

Students Behaviour in Class : students acts positively in the class during the course such as by questions and discussions and the good answers in exams

Computer Usage: Essential

Teaching Techniques: Use of the different tools and methods for the illustrations and practice in the class , also the data slide show was used to enhance the understanding and simplification of the lecture such as diagrams, pictures and videos.



Dr.Kahlid Kader

Dr. Alaa Mohamatayeb Hussien Al-Layla

Ass. Lecture: Nadia Adel

Subject name: Thermodynamic(Practical)

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks

Catalog Description: This course gives practical skills to students through laboratory experiments. The concept of this course is based on the determination of certain physical properties of solid matter. In addition, measurement the surface tension for different unknown solutions, also find the of molecular weight practically. Calculate the heat of neutralization of strong acid and strong base.

1. Reference Book: Assistant book for physical experiments.

Course Outcomes: Give practical experience to the student and applied the theoretical rules in the Lab.

Weekly Teaching Plan:

| | |
|----------------|--|
| Week 1&2&3 | |
| | First Quiz |
| Week 4&5&6&7 | |
| | Second Quiz |
| Week 8&9&10&11 | Surface tension ,determination Heat of Neutralization for strong acid and strong base ,Discussion. |
| | Third Quiz |
| Week 12&13&14 | Determination of molecular weight for solid by Rast method, Discussion. |



Week 15

Summarize of experiments

2nd course Final Term Examination

Students Behaviour in Class : V.Good. They are cooperative and there is a response to lecturers comments.

Computer Usage: Use the computer and internet to explain some of the unconventional results that may arise during the experiment.

Teaching Techniques: practical applications.



Dr. Khalid Qasim Khdhur

Dr. Alaa Mohamed Tayeb

Lecturer : Nadia Adel Saeed

Subject name : thermodynamics lab

Academic Year : 20-21

Credit Hour : 1.5hr . * 15 weeks

Catalog Description:

1. Measuring of the specific heat capacity for a Solid.
2. Measuring & Value for air.
3. Alcohol vapor pressure change with temperature (first part) .
4. Calculation of Latent evaporation heat for water.
5. Electro motione force (EMF) change with temperature for a therm_couple
6. Surface Tension.
7. Determination of molecular weight of Solid by Rast method.
8. Enthalpy of Neutralization
((Determination of heat of Neutralization of strong acid with Strong base)).
(First part).
9. Enthalpy of Neutralization
((Determination of heat of Neutralization for hydrochloric acid with Sodium Hydroxides)). (Second part).

Reference Book:

1. Callean, H. B. : " Thermodynamics", John Wiley & Sons, Inces New York, 1960.
2. Morse, p. Me ;k Thermal physics, William A. Benjamin, Anese New York, 1964.
3. Reid,C.E. : “ principles of chemical thermo dynamics “ Rien hold publishing corporation , new york , 1960 .

**Course Outcomes:**

1. Connect the theoretical part with the experimental part .
2. To know the basics of thermodynamics
3. To know how report and discussion the results of the experiment .

Weekly Teaching plan:

| | |
|--|---|
| Week 1 &2&3 | <ol style="list-style-type: none"> 1. Introduction of Lab. Instruments . 2. Measuring of the specific heat capacity for a solid . 3. Measuring & value for air. <p style="text-align: right;">First Quiz</p> |
| Week 4 &5&6&7 | <ol style="list-style-type: none"> 1. ALCOHOL vapor pressure change with temperature (first part) . 2. Calculation of latent evaporation heat for water . 3. Electro motion force (EMF) change with temperature for therm-couple. 4. Group discussion . <p style="text-align: right;">Second Quiz</p> |
| Course Mid Term Examination | |
| Weesk8 &9&10&11 | <ol style="list-style-type: none"> 1. Surface tension . 2. Determination of molecular weight of solid by rast method . 3. Enthalpy of neutralization ((Determination of heat of neutralization of strong base)) (first part) 4. Group discussion <p style="text-align: right;">Third Quiz</p> |
| Week 12 & 13 & 14 | <ol style="list-style-type: none"> 1. Enthalpy of neutralization ((determination of heats of neutralization of hydrochloric acid with sodium hydroxide)) . (second part) 2. Group Discussion . 3. Review . |
| <u>2nd course Mid Term Examination</u> | |
| Week 15 | Final Review |
| <u>2nd Course Final Term Examination</u> | |

Student Behavior in Class: **Very Good**

Computer Usage : **Yes**

Teaching Techniques: **Variety**



Dr. Rafid Ahmed Abdullah

Subject name: **Wave and optics theoretical**

Academic Year : 2021-2020

Credit Hour : 3hr. *15 weeks

Catalog Description: Wave motion, wave types, mathematical descriptions of waves, wave in two and three dimensional space, energy, power and intensity of waves. Standing wave and resonance, sound wave and intensity, Doppler effect, applications of Doppler effect in medicine, electromagnetic spectrum. Reflection and plane mirrors. Curved mirrors. Refraction and Snell's law. Optical fiber and endoscope. Lenses and magnifier microscope. Human eye. Contact lens. Correct the sight by laser. Laser tweezers.

Reference Book:

1. University physics, by: Bauer and Westfall, Mcgraw Hill, 2011.
2. College physics, by: Alan Giambattista, Betty M. Richardson, Robert C. Richardson, Mcgraw Hill, 2011.

Course Outcomes: To understand the fundamental wave properties, sound, electromagnetic and geometric optics.

Weekly Teaching Plan:

| | |
|-----------------------------------|---|
| Week 1&2&3 | <ol style="list-style-type: none"> 1. Wave motion and wave types 2. Mathematical descriptions of waves 3. Wave in two and three dimensional space |
| First Quiz | |
| Week 4&5&6&7 | <ol style="list-style-type: none"> 1. Energy, power and intensity of waves 2. Standing wave and resonance 3. Sound wave and intensity 4. Doppler effect |
| Second Quiz | |
| Week 8&9&10&11 | <ol style="list-style-type: none"> 1. Applications of Doppler effect in medicine |



| | |
|--|---|
| | <ol style="list-style-type: none">2. Electromagnetic spectrum3. Reflection and plane mirrors4. Curved mirrors |
|--|---|

Third Quiz

| | |
|------------------------------|--|
| Week 12&13&14 | <ol style="list-style-type: none">1. Refraction and Snell's law.2. Optical fiber and endoscope3. Lenses and magnifier microscope4. Human eye. Contact lens. |
|------------------------------|--|

2nd course Mid Term Examination

| | |
|----------------|--|
| Week 15 | Correct the sight by laser and laser tweezers. |
|----------------|--|

2nd course Final Term Examination

Students Behaviour in Class : Very good

Computer Usage: Yes

Teaching Techniques: White board and some optical instruments.

Dr. Rafid Ahmed Abdullah

Lecturer: Watfaa Khayri Al-Asadi

Lecturer: Nadia Adel Saeed

Subject name: Wave and optics Lab.

Academic Year : 2020-2021

Credit Hour : 1.5hr. *15 weeks

Catalog Description:

1. Determining the focal length of a convex lens by parallel rays and plane mirror.
2. Determining the focal length of a convex lens by graph curve.
3. Determining the focal length of a concave mirror by parallel rays and plane mirror.
4. Determining the focal length of a concave mirror by graph curve.
5. Determining the speed of sound in the air by using a resonance tube opening from one end.
6. Sonometer (to determine the frequency of a resonance fork).
7. Angular pendula.

Reference Book:

1. Physics 2521 Laboratory Manual, Edited by: Brian Cudnik & Qwadwo Agyepong, 2006.
2. University physics, by: Bauer and Westfall, Mcgraw Hill, 2011.

Course Outcomes: The students will use simple wave and optics instruments correctly.

Weekly Teaching Plan:

| | |
|---------------------------|---|
| Week 1&2&3 | <ol style="list-style-type: none">1. Learn student how using the Lab. Instruments.2. Determining the focal length of a convex lens by parallel rays and plane mirror.3. Determining the focal length of a convex lens by graph curve. |
|---------------------------|---|



First Quiz

| | |
|---------------------------------|--|
| Week 4&5&6&7 | <ol style="list-style-type: none">1. Determining the focal length of a concave mirror by parallel rays and plane mirror.2. Determining the focal length of a concave mirror by parallel rays and plane mirror.3. Group discussions |
|---------------------------------|--|

Second Quiz

| | |
|-----------------------------------|---|
| Week 8&9&10&11 | <ol style="list-style-type: none">1. Determining the speed of sound in the air by using a resonance tube opening from one end.2. Sonometer (to determine the frequency of a resonance fork).3. Group discussion |
|-----------------------------------|---|

Third Quiz

| | |
|------------------------------|---|
| Week 12&13&14 | <ol style="list-style-type: none">1. Angular pendula.2. Review |
|------------------------------|---|

2nd course Mid Term Examination

| | |
|----------------|----------------------|
| Week 15 | Final review. |
|----------------|----------------------|

2nd course Final Term Examination

Students Behaviour in Class : Very good

Computer Usage: No

Teaching Techniques: Some optical, mechanical and sound instruments.

Dr. prof. Sundus N. AlKallak

Subject name: الثقافة الصحية

Academic Year 2020-2021

Credit Hour : 3hr. *15 weeks

Catalog Description: تعريف الطلبة بمفهوم الثقافة الصحية وما يترتب عنها من الوقاية من الامراض المعدية والعناية بنظافة الغذاء وتعريف الطلبة بالغذاء الصحي المتكامل وكذلك معرفة القواعد الاساسية للاسعافات الاولية وصحة البيئة

Reference Book: الثقافة الصحية المؤلفون د. احمد محمد بدح واخرون / 2014 / الاردن

Course Outcomes: مفهوم الصحة العامة وعلاقتها مع صحة الانسان والبيئة التي يعيش بها

Weekly Teaching Plan:

| | |
|--|---|
| Week 1&2&3 | مفهوم الصحة والثقافة الصحية /الخمج والالتهاب /عوامل ومسببات المرض/الامراض المخمجة والامراض غير المخمجة/ |
| First Quiz | |
| Week 4&5&6&7 | الغذاء الكامل الصحي / مكسبات الغذائية وتأثيرها على صحة الغذاء/ العناصر الغذائية |
| X Second Quiz | |
| Week 8&9&10&11 | الامراض الناتجة عن الافراط في تناول الغذاء/ الامراض الناتجة عن سوء التغذية/ الاسعافات الاولية // |
| Third Quiz | |
| Week 12&13&14 | صحة البيئة / انعكاس صحة البيئة على صحة الفرد / البيئة والتلوث |
| 2ndcourse Mid Term Examination | |
| Week 15 | كيف نحقق صحة البيئة |

2ndcourse Final Term Examination

Students Behaviour in Class : جيد جدا

Computer Usage: نعم

Teaching Techniques:

Dr. Zeyad Thonnoon Dawood Alrassam

Subject name: Practical Virology

Academic Year : 20-21

Credit Hour: 3hr. *15 weeks (practical)

Catalog Description:

Reference Book: Variety of books

Course Outcomes: Virology Lab. Contain many Experiments use to study of viral structures, properties, its pathogenicity and techniques using in detection of viruses

Weekly Teaching Plan:

| | |
|---|--|
| Week 1&2&3 | 1- Biological hazards and Sample preparation 2- Detection of viruses direct Examination using Light microscopy (Histological study). 3- Morphology study using Electron Microscopy (videos) |
| First Quiz | |
| Week 4&5&6&7 | 4- Culture, Growth of virus on embryonated eggs . 5- Cell line and tissue culture techniques 6- Virus cultivation in tissue culture. 7- Virus inoculation in lab. animals. |
| Second Quiz | |
| Week 8&9&10&11 | 8- Bacteriophage plaque assay for phage titer. 9- Serology detection of virus using ELISA. 10- Serology detection of virus using Immunofluorescence techniques. 11- Agglutination and precipitation test. |
| Third Quiz | |
| Week 12&13&14 | 12- Haemagglutination inhibition and Neutralization tests. 13- Detection of viruses using molecular methods (nucleic acid extraction) 14- Viral Genome Detection: PCR technique. |
| 2nd course Mid Term Examination | |
| Week 15 | 15- Real-Time PCR & DNA sequencing (videos) |



2nd course Final Term Examination

Students Behaviour in Class : During the course students acts positively in the class via questions and discussions and the good answers in exams.

Computer Usage: Essential

Teaching Techniques: Use of the different tools and methods for Experimental Techniques in the lab, also the data slide show was used to enhance the understanding and simplification of the lecture such as diagrams, pictures and videos.



Dr.Eman A. Al-Jawady

Dr. Alaa Mohamatayeb Hussien Al-Layla

Subject name: **Bioelectronics**

Academic Year : 2020-2021

Credit Hour : **2hr. *15 weeks**

Catalog Description: This course provides an overview about the electrical properties of molecule, dipole moment, intermolecular forces, and calcification of martials according to its conductivity, Dielectrics properties of some biological component, Electrical Conductance in Biological Molecules. It concerned with the use of biological materials and processes in electronic devices

Reference Book :General Chemistry (Books I and II) *McGraw Hill Education*, Bioelectronics Edited by I. Willner, E. Katz , Semiconductor Electronics by A.K.Sharma.

Course Outcomes: To provide the student with informations about the electronic properties of the materials and how to harmonize with the biological systems and knowledge the evolution in the field of electrons.

Weekly Teaching Plan:

| | |
|---|--|
| <p>Week 1&2&3</p> | <p>Introduction to bioelectronics, The electrical properties of molecule ,intermolecular forces, .Polarization and its types</p> |
| <p>First Quiz</p> <p>Has been done</p> | |
| <p>Week 4&5&6&7</p> | <p>Electrical Conductance in Biological Molecules Conductors, Insulators and Semiconductors, Doping process, The Doping of Semiconductor and its types, Dielectric constant , Dielectrics properties of some biological component(amino acids, proteins ,DNA).</p> |



Second Quiz

Has been done

Week 8&9&10&11

Third Quiz

Week 12&13&14

2nd course Mid Term Examination

Week 15

2nd course Final Term Examination

Students Behaviour in Class : They are cooperative and there is a response during the lecture

Computer Usage: Instruct students to use the internet to find answers of some the questions that are raised in the class.

Teaching Techniques: Discussion methods, Motivational methods, ect.



Dr . Eman A. Al-Jawady

Dr. Alaa Mohamatayeb Hussien Al-Layla

Lecturer:Amal Taha

Lecturer: Zena Osama

Lecturer: Mafaz Khalid Saeed Al-Sayegh

Lecturer: Raghad Abd Almowjood Mohammed Hamo

Lecturer: Eman Muwafaq Ramadthan

Subject name: Bioelectronics(Practical)

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks

Catalog Description: This course gives practical skills to students through laboratory experiments. The concept of this course is based on the measurement of certain electrical properties of certain biological molecules such as amino acids, proteins and enzymes. In addition, they are identified by spectroscopic and biosensor , then comparing the two methods.

- 1. Reference Book:** Practical clinical biochemistry Harold Varley 5th edition, 1984. Clinical biochemistry principle and practice Praful B. Godkar 1994. Tietz text book of clinical chemistry 2nd edition, 1994. Micro analysis in medical biochemistry ed. I.D.P. Wooten 6th edition. Practical biochemistry R.C. Gupta 3rd edition, 2004. Hawk's physiological chemistry ed. Osler 14th edition. Lecture notes on clinical chemistry Whitby, Robb and Smith 2nd edition. Clinical Biochemistry Allan Gaw 2nd edition, 1999. Newman, J.D.; Tumer, A.P.F. Biosensor. Bioelectron. 2005, 2005, 20, 2388. Wilson. G.S.; Gifford, R. Biosens. Bioelectron. 2005, 20, 2388.



Course Outcomes: Give practical experience to the student to conduct some biometrics and clinical tests, as well as to learn about the new techniques of measurement through the experiments of biosensor and Biodrop technique.

Weekly Teaching Plan:

| | |
|--|--|
| <p>Week 1&2&3</p> | <p>Acid – Base Properties of Amino Acids, Isoelectric Point of casein , Discuss the reports submitted by students</p> |
| <p style="text-align: center;">First Quiz Has been done</p> | |
| <p>Week 4&5&6&7</p> | <p>Condumetric titration , Glass electrode, Discuss the reports submitted by students</p> |
| <p style="text-align: center;">Second Quiz Has been done</p> | |
| <p>Week 8&9&10&11</p> | <p>Estimation of Blood Glucose ,Glucose Biosensor, Estimation of Serum Alkaline Phosphatase, Discuss the reports submitted by students</p> |
| <p style="text-align: center;">Third Quiz Has been done</p> | |
| <p>Week 12&13&14</p> | <p>Lipid Profile,Lipid Biosensor, Blood Pressure Monitor Biodrop μLITE</p> |

2nd course Mid Term Examination

Has been done

Week 15

Discuss the reports submitted by students

2nd course Final Term Examination

Has been done

Students Behaviour in Class : V.Good

Computer Usage: Use the computer and internet to explain some of the unconventional results that may arise during the experiment.

Teaching Techniques: practical applications.



جامعة الموصل
كلية العلوم
رئاسة قسم الفيزياء الطبية