Mosul University

College of science Chemistry Department

Prof. Dr. Thikra Ali Allwsh

Subject name: Advance Biochemistry for MS.c Class first course

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: This course will highlight modern topics regarding provide biochemistry majors with a detailed understanding of the structure, function, and biophysical properties of biomolecules . proteins ,carbohydrates , enzyme ....., the central metabolic pathways, and signaling and metabolic regulation, biological membranes that are important for human physiology and disease.

Reference Book: **1-** Nelson, D. L., Cox, M. M., 2005. Lehninger Principles of Biochemistry. _4th Ed., USA -2- Berg, J. M., Tymoczko, J. L., stryer, L. 2003. Biochemistry. 5th ed. W. H.Freeman and Company and Sumanas, Inc. USA

Course Outcomes: Through this course the students are exposed to importance of biological macromolecules and they acquire knowledge on structure, function of biomolecules also they study the influence and role of structure in reactivity of biomolecules. At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions

Weekly Teaching Plan:

Week 1&2&3	Introduction of Biochemistry – types of the cells - GETTING IN & OUT OF CELLS
	First Quiz
Week 4&5&6&7	The Energy of Life- organism's metabolism- laws of thermodynamics
	Second Quiz
Week 8&9&10&11	Enzymes , Coenzymes and Protein structure and functions
	Third Quiz
Week 12&13&14	fibers -Vitamins- The mineral elements-
	2nd course Mid Term Examination
Week 15	Digestion & absorption : parts of digestion system
	2nd course Final Term Examination

Students Behaviour in Class : good

Computer Usage: Assign students to duties requiring computer use

Teaching Techniques: different techniques

Mosul University

College of science Chemistry Department

Prof. Dr. Thikra Ali Allwsh

Subject name: Molecular Biology for PH. D Class 1st course

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: this introductory course teaches how to understand biological structure and function. new nucleic acid biology concepts have been developed and what types of experiments have made advances possible DNA replication and repair, transcription, translation, and regulation of gene expression.

Reference Book: 1- Molecular Biology (Int'l Ed) . 2011. by Robert Weaver
2- Molecular Biology: Principles of Genome Function . 2014. by Nancy Craig , Rachel Green , Carol Greider , Gisela Storz & 2 More

Course Outcomes: Students will be taught genetics, their principles and gene interaction. They learn about chromosomal and Structure and Characterization of DNA and RNA also gene expression . The student will gain a basic understanding on human genetics and hereditary

Weekly Teaching Plan:

Week 1&2&3	Genomic, Chromosomes, chromatin
First Quiz	
Week 4&5&6&7	Structure and Characterization of DNA and RNA, Physicochemical properties of nucleic acids
Second Quiz	
Week 8&9&10&11	Genetic Code, mtDNA, Plasmids, Reproduction of cells
Third Quiz	
Week 12&13&14	DNA replication, DNA mutation and Repair, Transcription, Transcription,
2nd course Mid Term Examination	
Week 15	regulation of gene expression
2nd course Final Term Examination	

Students Behaviour in Class : students interaction very good

Computer Usage: Assign students to duties requiring computer use

Teaching Techniques: data show by using power point, videos and pictures ,pdf and word programs by classroom.

Mosul University

College of science Chemistry Department

Prof. Dr. Thikra Ali Allwsh

Subject name : Biotechniques for M.Sc Class-Second Couse

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: A major emphasis of this course is on the theory and principles of biological techniques—to understand their application . Methods covered include: Optical Spectroscopy, Fluorescence, Types of Chromatography, DSC, Electrophoresis , ,,,,

Reference Book: 1- Biotechniques Theory and Practice.2009. RANA

2- Analytical Techniques in Biochemistry and Molecular Biology. 2011 . Rajan Katoch.

3- Principles and Techniques of Biochemistry and Molecular Biology Seventh edition. 2010. KEITH WILSON AND JOHN WALKER

Course Outcomes: This course will teach the students the various instrumentations that are used in the analytical laboratories.This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules. At the end of the course, the student has the basic knowledge on the theory, operation and function of analytical instruments

Weekly Teaching Plan:

Week 1&2&3	Electromagnetic spectrum, Ultraviolet and visible spectra, rophotometry,
	First Quiz
Week 4&5&6&7	FLUORESCENCE, Phosphorescence, Cells lysis, Centrifugation, Protein precipitation
	Second Quiz
Week 8&9&10&11	Dialysis, Types of Chromatography
	Third Quiz
Week 12&13&14	HPLC, Gel Filtration chromatography, DSC, Electrophoresis
	2nd course Mid Term Examination
Week 15	Extraction and purification of Enzymes
	2nd course Final Term Examination

Students Behaviour in Class : students interaction very good

Computer Usage: Assign students to duties requiring computer use

Teaching Techniques: data show by using power point, videos and pictures ,pdf and word programs by classroom.

Mosul University

College of science Chemistry Department

Prof. Dr. Thikra Ali Allwsh

Subject name: Biotechnology for PH. D 2nd course

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Biotechnology is technology that utilizes biological systems, living organisms or parts of this to develop or create different products. developed rapidly because of the new possibility to make changes in the organisms' genetic material (DNA). Biotechnology utilizes living cells and cellular materials to create pharmaceutical, diagnostic, agricultural, environmental, and other products to benefit society. It is also used to study and to alter genetic information in animals so that human diseases can be modeled and studied

Reference Book: 1- Research in Biotechnology: 2018 Edition (RCHS Science Research) by Principles of Experimental Design in Biotechnology (Author)

2- Genetic Engineering: Techniques and Applications by Enrique Preston , 2017

Course Outcomes: To provide education that leads to comprehensive understanding of the principles and practices of biotechnology. To understand the steps involved in recombinant DNA technology, PCR. • To explain the construction of DNA & c DNA library and their applications. • To get in applications in production of therapeutic proteins, enzymes, antibiotic, hormones , agriculture,

Weekly Teaching Plan:

Week 1&2&3	Definition of Biotechnology, classifications, Application, the risks
	First Quiz
Week4 &5&6&7	RECOMBINANT DNA MOLECULES, General Steps of Cloning
	Second Quiz
Week 8&9&10&11	ENZYMES IN GENETIC ENGINEERING, Restriction
	Third Quiz
Week 12&13&14	METHODS OF NUCLEIC ACID DETECTION, ISOLATION AND PURIFICATION OF NUCLEIC ACIDS
	2nd course Mid Term Examination
Week 15	DNA Sequencing, Polymerase chain reaction (PCR), Gel electrophoresis
	2nd course Final Term Examination

Students Behaviour in Class : students interaction very good

Computer Usage: Assign students to duties requiring computer use

Teaching Techniques: data show by using power point, videos and pictures ,pdf and word programs by classroom.

Mosul University

College of science Chemistry Department

Prof. Dr. Luay Abed Ali Al-Helaly

Subject name: OXIDANTS AND ANTIOXIDANTS COURSE FOR Ph.D STUDENTS

Academic Year : 2021-2022
Credit Hour : 3hr. *15 weeks

Catalog Description: This course provides an overview about oxidants and antioxidants in the cells of human in healthy and diseases .

Reference Book: 1- Banerjee, R., Becker, D., Dickman, M., Gladyshev, V., Ragsdale, S. (2008). Redox Biochemistry. John Wiley and Sons, Inc., Hoboken, New Jersey. Canada.pp.201-209.USA

2- Beal, M. F., Howell, N., Bodis-Wollner, I.(1997). "Mitochondria and Free Radicals in Neurodegenerative Diseases. Wiley- Liss, Inc., USA.

Course Outcomes: To enable the student to know oxidant compounds effect on human cells and how antioxidants removed the oxidative stress .

Weekly Teaching Plan:

Week 1&2&3	PART I: OXIDANTS IN THE CELLS Introduction What is a free radical? The Radical Nature of O_2 Characteristics of Reactive Oxygen Species Oxygen Major Sources of Primary Reactive Oxygen Species in the Cell
First Quiz	
Week 4&5&6&7	Mechanism of free radicals production Normal generation of radicals in biological systems How do free radicals damage cells and tissues? Reactive Nitrogen Species(RNS) NITRIC OXIDE AND REACTIVE NITROGEN-OXYGEN SPECIES Biological Targets of Peroxynitrite
Second Quiz	
Week 8&9&10&11	PART II : THE ANTIOXIDANTS CELLULAR DEFENSES AGAINST OXYGEN TOXICITY A. NON ENZYMATIC ANTIOXIDANTS WITH MECHANISM B. ANTIOXIDANTS SCAVENGING ENZYMES WITH MECHANISM
Third Quiz	

Week 12&13&14	PART III: OXIDATIVE STRESS and DISEASES A.Oxidative Stress and Cataract B. Les Dopaman has "primary" parkinsonism PART III: OXIDATIVE STRESS and DISEASES A.Oxidative Stress and Cataract B. Les Dopaman has "primary" parkinsonism C.THE OXIDANTS OF ALCOHOL D.THE OXIDANTS AND DIABETES
1St course Mid Term Examination	
Week 15	E. THE OXIDANTS AND ATHEROSECLOSIS F.MEDICINAL APPLICATIONS OF ANTIOXIDANTS
2St course Final Term Examination	

Students Behaviour in Class : good
Computer Usage: Assign students to duties requiring computer use
Teaching Techniques: different techniques

Prof. Dr. Zena A.M. Al-Jawadi

Subject name: Physiology of Hormones

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Hormonal Physiology / Ph.D Students
Reference Book:
Course Outcomes: V. good

Weekly Teaching Plan: 2ed course

Week 1&2&3	What do the terms "endocrine" and "hormone" mean? Hormone Control of Carbohydrate Metabolism Physiology of hypothalamus glands **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018** **Al-Jawadi Z. AM., Principles of Biochemistry,2021**
First Quiz	
Week 4&5&6&7	Physiology of pituitary glands Physiologic Effects of Thyroid Hormones Physiologic Effects of Growth Hormone PARATHYROID GLAND **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018**
Second Quiz	
Week 8&9&10&11	ADRENAL GLAND Physiology: Hormones involved in breast development and breastfeeding Physiology of Sleep and Hormones REM & Non-REM sleep

	Patricio E. Molina, Endocrine Physiology 5th Edition, 2018
	Third Quiz
Week 12&13&14	Fluid Physiology Hormones & Stress **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018**
	2nd course Mid Term Examination
Week 15	Seminar
	2nd course Final Term Examination

Students Behaviour in Class: Excellent
Computer Usage: V.good
Teaching Techniques: Variety

Update the curriculum and add the effect of Covid-19 on hormone physiology

Prof. Dr. Zena A.M. Al-Jawadi

Subject name: Advance Hormones

Academic Year : 2021-2022
Credit Hour : 2hr. *15 weeks
Catalog Description: Advance Hormones / Ph.D Students
Reference Book:
Course Outcomes: V. good
Weekly Teaching Plan: 1st course

Week 1&2&3	Advance Hormones & Types of Hormones Hormone receptor Mechanism of Hormones **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018** **Al-Jawadi Z. AM., Principles of Biochemistry,2021**
	First Quiz
Week 4&5&6&7	Action of Steroid Hormones Hormone Control of Carbohydrate Metabolism Hypothalamus and pituitary glands Thyroid Hormones **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018** **Al-Jawadi Z. AM., Principles of Biochemistry,2021**
	Second Quiz
Week 8&9&10&11	Regulation of T4 and T3 & Thyroid Disease States Growth Hormone & Pediatric Growth Hormone Deficiency Control of Growth & Causes of Growth Hormone Deficiency Diabetes & Symptoms & Gestational diabetes & What Causes Diabetes?

	Patricio E. Molina, Endocrine Physiology 5th Edition, 2018
	Third Quiz
Week 12&13&14	Addison's disease? What are estrogen and testosterone? / Causes of Hormonal Imbalance in Men & Women Diseases Caused by a Hormonal Imbalance Relaxin **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018**
	2^{nd} course Mid Term Examination
Week 15	Seminar
	2^{nd} course Final Term Examination

Students Behaviour in Class: Excellent
Computer Usage: V.good
Teaching Techniques: Variety

Update the curriculum and add the effect of Covid-19 on functions of hormone in the body

Prof. Dr. Zena A.M. Al-Jawadi

Subject name: Enzymes & Hormones

Academic Year : 2021-2022
Credit Hour : 2hr. *15 weeks
Catalog Description: Enzymes & Hormones/ MSc Students
Reference Book:
Course Outcomes: V. good
Weekly Teaching Plan: 2^{ed} course

Week 1&2&3	An introduction to enzymes Specifity of enzyme action Monomeric and oligomeric enzymes **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018** **Al-Jawadi Z. AM., Principles of Biochemistry,2021**
	First Quiz
Week 4&5&6&7	The factors effecting on enzyme activity Enzyme inhibition &The chemical nature of enzyme catalysis Allosteric enzymes & Iso enzymes The relationship between the endocrine and nervous system, Endocrinology & Hormones **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018** **Al-Jawadi Z. AM., Principles of Biochemistry,2021**
	Second Quiz
Week 8&9&10&11	Synthesis of hormones &Transfer of hormones Catabolisim of hormones & Classification of hormones Effect of hormone on the body, Measure the concentration of hormone

	& signals hormones. Hormone receptor, Mechanism of hormones & regulation of hormones. **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018** **Al-Jawadi Z. AM., Principles of Biochemistry,2021**
	Third Quiz
Week 12&13&14	Hormones of the hypothalamus gland & Pituitary gland Anterior pituitary hormones & Postirior pituitary hormones Gastrointestinal hormones **Patricio E. Molina, Endocrine Physiology 5th Edition, 2018** **Al-Jawadi Z. AM., Principles of Biochemistry,2021**
	2nd course Mid Term Examination
Week 15	Seminar
	2nd course Final Term Examination

Students Behaviour in Class: Excellent
Computer Usage: V.good
Teaching Techniques: Variety

Update the curriculum and add the effect of Covid-19 on hormone

Assist. Prof. Dr. Layla Abdulla Mostafa

Subject name: Advanced Enzymes

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: PhD.

Reference Book: Understanding enzymes.
Biochemistry

Course Outcomes: V. good

Weekly Teaching Plan: 1ST course

Week 1&2&3&4	Biological catalysis, the role of enzymes. The effect of catalysis. Transition states and reaction rates.
	First Seminar
Week 5&6	What a catalysis does. How enzymes act as catalysts, principles and examples.

Second Seminar

Week 7&8&9	The kinetics of enzymatic catalysis. Types of substrate reactions

Third Seminar

Week 10&11&12	Enzymes enhibition. Types of inhibitions. Kinetics of inhibitions.

2nd course Mid Term Examination

Week 13&14&15	Nonproteins biocatalyst, Ribozymes, Abzymes. Allosteric enzymes.

2nd course Final Term Examination

Students Behaviour in Class : Excellent
Computer Usage: V. good

Teaching Techniques: Variety

Assist. Prof. Dr. Layla Abdulla Mostafa

Subject name: Enzymes and Hormones

Academic Year : 2021-2022
Credit Hour : 2hr. *15 weeks
Catalog Description: MSc Students.

Reference Book: Understanding enzymes. Biochemistry
Course Outcomes: V. good
Weekly Teaching Plan: 2ed course

Week 1&2&3	An introduction to enzymes Specifity of enzyme action Monomeerric and oligomeric enzymes.

First Quiz

Week 4&5&6&7	The factors effecting on enzyme activity Enzyme inhibition &The chemical nature of enzyme catalysis. Allosteric enzymes & Iso enzymes The relationship between the endocrine and nervous system Endocrine &Hormones.

Second Quiz

Week 8&9&10&11	Synthesis of hormones &transfer of hormones Catabolism of hormones &classification of hormones. Effect of hormones on the body, Measure the concentration of

	hormones &signals hormones. Hormone receptor, Mechanism of hormones& regulation of hormones.

Third Quiz

Week 12&13&14	Hormones of the hypothalamus gland &pituitary gland Anterior pituitary hormones& posterior pituitary hormones. Gastrointestinal hormones.

2nd course Mid Term Examination

Week 15	Seminar

2nd course Final Term Examination

Students Behaviour in Class : Excellent
Computer Usage: V. good

Teaching Techniques: Variety.

Dr. Wasan Khairallah Ali

Subject name: immunochemical techniques:

Academic Year : 2021-2022

Credit Hour : 1hr. *15 weeks

Catalog Description: Biochemical investigations goals are involved in every branch of clinical medicine. Each biochemical test measures the value of a different substance in the blood

Reference Book: Text book of clinical biochemistry 2018 ,6th Eidtion **,** lehninger biochemistry 4e 2005 ,Harper s Illustrated biochemistry 29 th 2015 **, Tietz text book of clinical chemistry**

Course Outcomes: Learn about some diseases and examinations for each disease

Weekly Teaching Plan:

Week 1&2&3	1. 1-Immunty system and its components 2-Function of the immune system

Week 4&5&6&7	3-Types of the immunity

	4- Immune diseases 5-Principlies of immunochemical techniques 6- Antigen- antibody binding
Week 8&9&10&11	7- Qualitative methods 8- Immunoelectrophoresis 9- Western blotting 10- Quantitative methods 11-Enzyme immunoassays 12-Radioimmunoassays
Week 12&13&14,15	13-Aggtutinationassays 14- Labeled immunochmical assays 15-Analytical sensitivity 16- Fluoroimmunoassay
2nd course Mid Term Examination	
2nd course Final Term Examination	

Students Behaviour in Class : student interaction Very good with us in clinical Biochemistry lecture

Computer Usage: good. Computer was used in lecture

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word programs.... by classroom

Mosul University

College of science Chemistry Department

Dr. Eman Adel

Subject name: immunochemical techniques:

Academic Year : 2021-2022

Credit Hour : 1hr. *15 weeks

Catalog Description: Biochemical investigations goals are involved in every branch of clinical medicine. Each biochemical test measures the value of a different substance in the blood

Reference Book: Text book of clinical biochemistry 2018 ,6th Eidtion **,** lehninger biochemistry 4e 2005 ,Harper s Illustrated biochemistry 29 th 2015 **, Tietz text book of clinical chemistry**

Course Outcomes: Learn about some diseases and examinations for each disease

Weekly Teaching Plan:

Week 1&2&3	1. 1-Immunty system and its components 2-Function of the immune system
Week 4&5&6&7	3-Types of the immunity 4- Immune diseases 5-Principlies of immunochemical techniques 6- Antigen- antibody binding
Week 8&9&10&11	7- Qualitative methods 8- Immunoelectrophoresis 9- Western blotting 10- Quantitative methods 11-Enzyme immunoassays 12-Radioimmunoassays

Week 12&13&14,15	13-Aggtutinationassays 14- Labeled immunochmical assays 15-Analytical sensitivity 16- Fluoroimmunoassay

2nd course Mid Term Examination

2nd course Final Term Examination

Students Behaviour in Class : student interaction Very good with us in clinical Biochemistry lecture

Computer Usage: good. Computer was used in lecture

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word programs.... by classroom

Assist. Prof. Dr. Saba Zaki Mahmood Al-Abachi

Subject name: Metabolic Pathways

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Msc.

Reference Book: Biochemistry by Lubert Stryer, 9th Ed. 2019.
Biochemistry by Lippincott, Illustrated reviews, 8thEd. 2022.
Walters klower

Course Outcomes: V. good

Weekly Teaching Plan: 2nd course

Week 1&2&3	Integration of metabolism. Major metabolism pathways and their control sites. Introduction to metabolism.

First Seminar

Week 4&5&6&7	Key junctions between pathways. Introduction to metabolism at cellular levels. Introduction to metabolism at tissue or organ level.

Second Seminar

Week 8&9&10&11	Organ specialization: Liver, Skeletal muscle, Adipose tissue, Heart, Brain .

Third Seminar

Week 12&13	Metabolic adaptation. Metabolism in fed and in starvation state. Metabolism during exercise and during Diabetic mellitus.

2nd course Mid Term Examination

Week 14&15	Regulation of metabolism.

2nd course Final Term Examination

Students Behaviour in Class : Excellent
Computer Usage: V. good

Teaching Techniques: Variety

Prof. Dr. Luay A. Al-helaly

Subject name: Biochemistry 4th class first course

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: This course provides an overview about metabolism of carbohydrates in the body also give an idea about energy generation .

Reference Book: **1-** Nelson, D. L., Cox, M. M., 2005. Lehninger Principles of Biochemistry. _4th Ed., USA

2- Berg, J. M., Tymoczko, J. L., stryer, L. 2003. Biochemistry. 5th ed. W. H. Freeman and Company and Sumanas, Inc. USA

Course Outcomes: To enable the student to know metabolic processes of carbohydrate metabolism and calculate the amount of energy generated from them

Weekly Teaching Plan:

Week 1&2&3	Introduction to Metabolism - Glycolysis pathway

First Quiz

Week 4&5&6&7	Krebs cycle- Glyoxylate cycle
	Second Quiz
Week 8&9&10&11	Phosphogluconate pathway- Electron transport and oxidative phosphorylation- Glycogenolysis pathway
	Third Quiz
Week 12&13&14	Glycogenesis pathway - Gluconeogenesis
	2^{nd} course Mid Term Examination
Week 15	Substrate cycle- Photosynthesis
	2^{nd} course Final Term Examination

Students Behaviour in Class : good

Computer Usage: Assign students to duties requiring computer use

Teaching Techniques: different techniques

Dr. Sukayna H. Rashed

Subject name: Biochemistry 4^{th} class first course

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: This course provides an overview about metabolism of carbohydrates in the body also give an idea about energy generation .

Reference Book: **1-** Nelson, D. L., Cox, M. M., 2005. Lehninger Principles of Biochemistry. _4th Ed., USA

2- Berg, J. M., Tymoczko, J. L., stryer, L. 2003. Biochemistry. 5th ed. W. H. Freeman and Company and Sumanas, Inc. USA

Course Outcomes: To enable the student to know metabolic processes of carbohydrate metabolism and calculate the amount of energy generated from them

Weekly Teaching Plan:

Week 1&2&3	Introduction to Metabolism - Glycolysis pathway
	First Quiz

Week 4&5&6&7	Krebs cycle- Glyoxylate cycle
	Second Quiz
Week 8&9&10&11	Phosphogluconate pathway- Electron transport and oxidative phosphorylation- Glycogenolysis pathway
	Third Quiz
Week 12&13&14	Glycogenesis pathway - Gluconeogenesis
	2^{nd} course Mid Term Examination
Week 15	Substrate cycle- Photosynthesis
	2^{nd} course Final Term Examination

Students Behaviour in Class : good

Computer Usage: Assign students to duties requiring computer use

Teaching Techniques: different techniques

Dr.Thikra Ali Allwsh

Subject name: Biochemistry practical

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description :clinical biochemistry 4^{th} class 1^{st} course

Reference Book: Clinical biochemistry and drug development , biochemistry and cell biology of ageing ,2019 , basic concepts in clinical biochemistry :practical guide ,2018

Course Outcomes: To make students practice laboratory application and to introduce them the ideas and methods which determine qualitative and quantitative of some biochemical parameters and their relation with some disease .

Weekly Teaching Plan:

Week 1&2&3	Introduction , GUE
	First Quiz
Week 4&5&6&7	In organic constituent of urine , nitrogenous substances in

	urine .
Second Quiz	
Week 8&9&10&11	Abnormal constituent of urine
Third Quiz	
Week 12&13&14	Microscopical examination , Calculus
2nd course Mid Term Examination	
Week 15	**Gallstones .**
2nd course Final Term Examination	

Students Behaviour in Class : students interaction very good with us biochemistry laboratory

Computer Usage: good computer was used in laboratory

Teaching Techniques: variety of laboratory tools and equipment

Sana Abdlillah Ahmed

Subject name: Biochemistry practical

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description :clinical biochemistry 4^{th} class 1^{st} course

Reference Book: Clinical biochemistry and drug development , biochemistry and cell biology of ageing ,2019 , basic concepts in clinical biochemistry :practical guide ,2018

Course Outcomes: To make students practice laboratory application and to introduce them the ideas and methods which determine qualitative and quantitative of some biochemical parameters and their relation with some disease .

Weekly Teaching Plan:

Week 1&2&3	Introduction , GUE
First Quiz	
Week 4&5&6&7	In organic constituent of urine , nitrogenous substances in urine .

Second Quiz

Week 8&9&10&11	Abnormal constituent of urine

Third Quiz

Week 12&13&14	Microscopical examination , Calculus

2nd course Mid Term Examination

Week 15	**Gallstones .**

2nd course Final Term Examination

Students Behaviour in Class : students interaction very good with us biochemistry laboratory

Computer Usage: good computer was used in laboratory

Teaching Techniques: variety of laboratory tools and equipment

Nuha Abdalkader

Subject name: Biochemistry practical

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description :clinical biochemistry 4^{th} class 1^{st} course

Reference Book: Clinical biochemistry and drug development , biochemistry and cell biology of ageing ,2019 , basic concepts in clinical biochemistry :practical guide ,2018

Course Outcomes: To make students practice laboratory application and to introduce them the ideas and methods which determine qualitative and quantitative of some biochemical parameters and their relation with some disease .

Weekly Teaching Plan:

Week 1&2&3	Introduction , GUE

First Quiz

Week 4&5&6&7	In organic constituent of urine , nitrogenous substances in urine .

Second Quiz

Week 8&9&10&11	Abnormal constituent of urine

Third Quiz

Week 12&13&14	Microscopical examination , Calculus

2nd course Mid Term Examination

Week 15	**Gallstones .**

2nd course Final Term Examination

Students Behaviour in Class : students interaction very good with us biochemistry laboratory

Computer Usage: good computer was used in laboratory

Teaching Techniques: variety of laboratory tools and equipment

Dr. Fatima Abd hammd

Subject name: Biochemistry 4th class second course

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: This course provides an overview about metabolism of Lipids, nucleotides, Amino acids and protein, in the body also give an idea Nucleic acids, Protein Synthesis , blood , urine and nutrition

Reference Book: **1-** Nelson, D. L., Cox, M. M., 2005. Lehninger Principles of Biochemistry. _4th Ed., USA

2- Berg, J. M., Tymoczko, J. L., stryer, L. 2003. Biochemistry. 5th ed. W. H. Freeman and Company and Sumanas, Inc. USA

Course Outcomes: To enable the student to know metabolic processes of Lipids, nucleotides, Amino acids and protein and To enable the student to know Nucleic acids and Protein Synthesis also blood , urine and nutrition

Weekly Teaching Plan:

Week 1&2&3	Metabolism of Lipids

First Quiz

Week 4&5&6&7	Metabolism of nucleotides , Metabolism of Amino acids

Second Quiz

Week 8&9&10&11	Metabolism of protein , Nucleic acids

Third Quiz

Week 12&13&14	Protein Synthesis , blood , urine

2^{nd} course Mid Term Examination

Week 15	Nutrition

2^{nd} course Final Term Examination

Students Behaviour in Class : good

Computer Usage: Assign students to duties requiring computer use

Teaching Techniques: different techniques

Nuha Abdalkader

Subject name: Biochemistry practical

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description :clinical biochemistry 4^{th} class 2^{nd} course

Reference Book: Clinical biochemistry and drug development , biochemistry and cell biology of ageing ,2019 , basic concepts in clinical biochemistry :practical guide ,2018

Course Outcomes: To make students practice laboratory application and to introduce them the ideas and methods which determine qualitative and quantitative of some biochemical parameters and their relation with some disease .

Weekly Teaching Plan:

Week 1&2&3	Introduction In blood , blood coagulation .

First Quiz

Week 4&5&6&7	ESR , blood type , Hemoglobin , Estimation of Glu.

Second Quiz

Week 8&9&10&11	Estimation of protein , Urea , Creatinine .

Third Quiz

Week 12&13&14	Estimation of uric acid , Bilirubin , cholesterol

2^{nd}course Mid Term Examination

Week 15	**Calcium , phosphorous .**

2^{nd}course Final Term Examination

Students Behaviour in Class : students interaction very good with us biochemistry laboratory

Computer Usage: good computer was used in laboratory

Teaching Techniques: data show by using power point, videos and pictures ,pdf and word programs by classroom

Dr. Wasan khairallah Ali

Subject name: Biochemistry practical

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description :clinical biochemistry 4^{th} class 2^{nd} course

Reference Book: Clinical biochemistry and drug development , biochemistry and cell biology of ageing ,2019 , basic concepts in clinical biochemistry :practical guide ,2018

Course Outcomes: To make students practice laboratory application and to introduce them the ideas and methods which determine qualitative and quantitative of some biochemical parameters and their relation with some disease .

Weekly Teaching Plan:

Week 1&2&3	Introduction In blood , blood coagulation .

First Quiz

Week 4&5&6&7	ESR , blood type , Hemoglobin , Estimation of Glu.

Second Quiz

Week 8&9&10&11	Estimation of protein , Urea , Creatinine .

Third Quiz

Week 12&13&14	Estimation of uric acid , Bilirubin , cholesterol

2nd course Mid Term Examination

Week 15	**Calcium , phosphorous .**

2nd course Final Term Examination

Students Behaviour in Class : students interaction very good with us biochemistry laboratory

Computer Usage: good computer was used in laboratory

Teaching Techniques: data show by using power point, videos and pictures ,pdf and word programs by classroom

Dr. Mohammed bahry Hassin

Subject name: Biochemistry practical

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description :clinical biochemistry 4^{th} class 2^{nd} course

Reference Book: Clinical biochemistry and drug development , biochemistry and cell biology of ageing ,2019 , basic concepts in clinical biochemistry :practical guide ,2018

Course Outcomes: To make students practice laboratory application and to introduce them the ideas and methods which determine qualitative and quantitative of some biochemical parameters and their relation with some disease .

Weekly Teaching Plan:

Week 1&2&3	Introduction In blood , blood coagulation .

First Quiz

Week 4&5&6&7	ESR , blood type , Hemoglobin , Estimation of Glu.

Second Quiz

Week 8&9&10&11	Estimation of protein , Urea , Creatinine .

Third Quiz

Week 12&13&14	Estimation of uric acid , Bilirubin , cholesterol

2^{nd}course Mid Term Examination

Week 15	**Calcium , phosphorous .**

2^{nd}course Final Term Examination

Students Behaviour in Class : students interaction very good with us biochemistry laboratory

Computer Usage: good computer was used in laboratory

Teaching Techniques: data show by using power point, videos and pictures ,pdf and word programs by classroom

Dr. Sukayna A. Rashed

Subject name: Biochemistry practical

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description :clinical biochemistry 4^{th} class 2^{nd} course

Reference Book: Clinical biochemistry and drug development , biochemistry and cell biology of ageing ,2019 , basic concepts in clinical biochemistry :practical guide ,2018

Course Outcomes: To make students practice laboratory application and to introduce them the ideas and methods which determine qualitative and quantitative of some biochemical parameters and their relation with some disease .

Weekly Teaching Plan:

Week 1&2&3	Introduction In blood , blood coagulation .

First Quiz

Week 4&5&6&7	ESR , blood type , Hemoglobin , Estimation of Glu.

Second Quiz

Week 8&9&10&11	Estimation of protein , Urea , Creatinine .

Third Quiz

Week 12&13&14	Estimation of uric acid , Bilirubin , cholesterol

2^{nd}course Mid Term Examination

Week 15	**Calcium , phosphorous .**

2^{nd}course Final Term Examination

Students Behaviour in Class : students interaction very good with us biochemistry laboratory

Computer Usage: good computer was used in laboratory

Teaching Techniques: data show by using power point, videos and pictures ,pdf and word programs by classroom

Dr. Fatima A. hammd

Subject name: Biochemistry practical

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description :clinical biochemistry 4^{th} class 2^{nd} course

Reference Book: Clinical biochemistry and drug development , biochemistry and cell biology of ageing ,2019 , basic concepts in clinical biochemistry :practical guide ,2018

Course Outcomes: To make students practice laboratory application and to introduce them the ideas and methods which determine qualitative and quantitative of some biochemical parameters and their relation with some disease .

Weekly Teaching Plan:

Week 1&2&3	Introduction In blood , blood coagulation .

First Quiz

Week 4&5&6&7	ESR , blood type , Hemoglobin , Estimation of Glu.

Second Quiz

Week 8&9&10&11	Estimation of protein , Urea , Creatinine .

Third Quiz

Week 12&13&14	Estimation of uric acid , Bilirubin , cholesterol

2nd course Mid Term Examination

Week 15	**Calcium , phosphorous .**

2nd course Final Term Examination

Students Behaviour in Class : students interaction very good with us biochemistry laboratory

Computer Usage: good computer was used in laboratory

Teaching Techniques: data show by using power point, videos and pictures ,pdf and word programs by classroom

Lecturer.Dr. Dr. Wasan khairallah Ali

Subject name: **Biochemistry 1**

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: **Biochemistry 3rd class-1st course**

Reference Book: Biochemistry by Stryer

Course Outcomes: V. good

Weekly Teaching Plan: 1st course

Week 1	Biochemistry
	Macromolecules
Week 2&3&4	Carbohydrate

First Quiz

Week 5	Amino acid
Week 6	Peptides
Week 7&8&9	Proteins

Second Quiz

Week 10&11&12&13	Lipids

Third Quiz

1st course Mid Term Examination

Week 14&15	Nucleotides and Nucleic acids

Fourth Quiz

1st course Final Term Examination

Students Behaviour in Class : Excellent
Computer Usage: V.good

Teaching Techniques: Variety

Lecturer. Dr. Amel Taha Yaseen

Subject name: **Biochemistry 1**
Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: **Biochemistry 3rd class-1st course**

Reference Book: Biochemistry by Stryer
Course Outcomes: V. good

Weekly Teaching Plan: 1st course

Week 1	Biochemistry
	Macromolecules
Week 2&3&4	Carbohydrate

First Quiz

Week 5	Amino acid
Week 6	Peptides
Week 7&8&9	Proteins

Second Quiz

Week 10&11&12&13	Lipids

Third Quiz

1st course Mid Term Examination

Week 14&15	Nucleotides and Nucleic acids

Fourth Quiz

1st course Final Term Examination

Students Behaviour in Class : Excellent
Computer Usage: V.good

Teaching Techniques: Variety

Prof. Dr. Zena A.M. Al-Jawadi

Subject name: Practical Biochemistry 1

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 1st course

Reference Book: **Fundamental of Biochemistry, Donald Voet, Judith, G Voet and Charlotte W. Pratte , 2016.----Practical Biochemistry, Damodaran Geetha K, 2016**
Advances in Carbohydrate Chemistry and Biochemistry, David C. Baker-Volume 79, Pages 2-170 (2021)

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine qualitative and quantitative of some biomolecules which considered the basics of biochemistry.

Weekly Teaching Plan: 1st course / 3rd class

Week 1&2&3	**Carbohydrates,** Introduction and Qualitative tests of carbohydrates. then applied the practical tests in the laboratory such as molish, benedict, barfoed, bial,selivanoff and iodine tests.

First Quiz

Week 4&5&6&7	Hydrolysis of sucrose. Acid Hydrolysis of starch. Then unknown of carbohydrates, were performed as a practical application of these tests.

Second Quiz

Week 8&9&10&11	**Proteins,** introduction and their types. **Amino acids** and their types. Then applied the practical tests in the laboratory such as Coagulation test, Biuret, Ninhydrin tests.
	Third Quiz
Week 12&13&14	Millon, Sakagucchi, Hopkins cole , cystein and cystine tests were applied. Then Precipitation of proteins tests.
	1st course Mid Term Examination
Week 15	**Unknown of Proteins and amino acids.**
	1st course Final Term Examination

Students Behaviour in Class : students interaction Very good with us in Biochemistry laboratory.

Computer Usage: good. Computer was used in laboratory.

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word pprogramms.... by google classroom.

Lecturer. Dr.Rafad rabee Saadun

Subject name: Practical Biochemistry 1

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 1st course

Reference Book: Fundamental of Biochemistry, Donald Voet, Judith, G Voet and Charlotte W. Pratte , 2016.----Practical Biochemistry, Damodaran Geetha K, 2016 Advances in Carbohydrate Chemistry and Biochemistry, David C. Baker-Volume 79, Pages 2-170 (2021)

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine qualitative and quantitative of some biomolecules which considered the basics of biochemistry.

Weekly Teaching Plan: 1st course / 3rd class

Week 1&2&3	**Carbohydrates,** Introduction and Qualitative tests of carbohydrates. then applied the practical tests in the laboratory such as molish, benedict, barfoed, bial,selivanoff and iodine tests.
	First Quiz
Week 4&5&6&7	Hydrolysis of sucrose. Acid Hydrolysis of starch. Then unknown of carbohydrates, were performed as a practical application of these tests.

	Second Quiz
Week 8&9&10&11	**Proteins,** introduction and their types. **Amino acids** and their types. Then applied the practical tests in the laboratory such as Coagulation test, Biuret, Ninhydrin tests.
	Third Quiz
Week 12&13&14	Millon, Sakagucchi, Hopkins cole , cystein and cystine tests were applied. Then Precipitation of proteins tests.
	1st course Mid Term Examination
Week 15	**Unknown of Proteins and amino acids.**
	1st course Final Term Examination

Students Behaviour in Class : students interaction Very good with us in Biochemistry laboratory.

Computer Usage: good. Computer was used in laboratory.

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word pprogramms.... by google classroom.

Lecturer. Dr.Safaa Abdulazeez Alameen

Subject name: Practical Biochemistry 1

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 1st course

Reference Book: Fundamental of Biochemistry, Donald Voet, Judith, G Voet and Charlotte W. Pratte , 2016.----Practical Biochemistry, Damodaran Geetha K, 2016 Advances in Carbohydrate Chemistry and Biochemistry, David C. Baker-Volume 79, Pages 2-170 (2021)

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine qualitative and quantitative of some biomolecules which considered the basics of biochemistry.

Weekly Teaching Plan: 1st course / 3rd class

Week 1&2&3	**Carbohydrates,** Introduction and Qualitative tests of carbohydrates. then applied the practical tests in the laboratory such as molish, benedict, barfoed, bial,selivanoff and iodine tests.
	First Quiz

Week 4&5&6&7	Hydrolysis of sucrose. Acid Hydrolysis of starch. Then unknown of carbohydrates, were performed as a practical application of these tests.
	Second Quiz
Week 8&9&10&11	**Proteins,** introduction and their types. **Amino acids** and their types. Then applied the practical tests in the laboratory such as Coagulation test, Biuret, Ninhydrin tests.
	Third Quiz
Week 12&13&14	Millon, Sakagucchi, Hopkins cole , cystein and cystine tests were applied. Then Precipitation of proteins tests.
	1st course Mid Term Examination
Week 15	**Unknown of Proteins and amino acids.**
	1st course Final Term Examination

Students Behaviour in Class : students interaction Very good with us in Biochemistry laboratory.

Computer Usage: good. Computer was used in laboratory.

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word pprogramms.... by google classroom.

Dr. Saba Alabachi

Subject name: Practical Biochemistry 1

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 1st course

Reference Book: **Fundamental of Biochemistry, Donald Voet, Judith, G Voet and Charlotte W. Pratte , 2016.----Practical Biochemistry, Damodaran Geetha K, 2016 Advances in Carbohydrate Chemistry and Biochemistry, David C. Baker-Volume 79, Pages 2-170 (2021)**

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine qualitative and quantitative of some biomolecules which considered the basics of biochemistry.

Weekly Teaching Plan: 1st course / 3rd class

Week 1&2&3	**Carbohydrates,** Introduction and Qualitative tests of carbohydrates. then applied the practical tests in the laboratory such as molish, benedict, barfoed, bial,selivanoff and iodine tests.

	First Quiz
Week 4&5&6&7	Hydrolysis of sucrose. Acid Hydrolysis of starch. Then unknown of carbohydrates, were performed as a practical application of these tests.
	Second Quiz
Week 8&9&10&11	**Proteins,** introduction and their types. **Amino acids** and their types. Then applied the practical tests in the laboratory such as Coagulation test, Biuret, Ninhydrin tests.
	Third Quiz
Week 12&13&14	Millon, Sakagucchi, Hopkins cole , cystein and cystine tests were applied. Then Precipitation of proteins tests.
	1st course Mid Term Examination
Week 15	**Unknown of Proteins and amino acids.**
	1st course Final Term Examination

Students Behaviour in Class : students interaction Very good with us in Biochemistry laboratory.

Computer Usage: good. Computer was used in laboratory.

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word pprogramms.... by google classroom.

Raghad A. Hamo

Subject name: Practical Biochemistry 1

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 1st course

Reference Book: **Fundamental of Biochemistry, Donald Voet, Judith, G Voet and Charlotte W. Pratte , 2016.----Practical Biochemistry, Damodaran Geetha K, 2016 Advances in Carbohydrate Chemistry and Biochemistry, David C. Baker-Volume 79, Pages 2-170 (2021)**

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine qualitative and quantitative of some biomolecules which considered the basics of biochemistry.

Weekly Teaching Plan: 1st course / 3rd class

Week 1&2&3	**Carbohydrates,** Introduction and Qualitative tests of carbohydrates. then applied the practical tests in the laboratory such as molish, benedict, barfoed, bial,selivanoff and iodine tests.

	First Quiz
Week 4&5&6&7	Hydrolysis of sucrose. Acid Hydrolysis of starch. Then unknown of carbohydrates, were performed as a practical application of these tests.
	Second Quiz
Week 8&9&10&11	**Proteins,** introduction and their types. **Amino acids** and their types. Then applied the practical tests in the laboratory such as Coagulation test, Biuret, Ninhydrin tests.
	Third Quiz
Week 12&13&14	Millon, Sakagucchi, Hopkins cole , cystein and cystine tests were applied. Then Precipitation of proteins tests.
	1st course Mid Term Examination
Week 15	**Unknown of Proteins and amino acids.**
	1st course Final Term Examination

Students Behaviour in Class : students interaction Very good with us in Biochemistry laboratory.

Computer Usage: good. Computer was used in laboratory.

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word pprogramms.... by google classroom.

Mafaz Khalid

Subject name: Practical Biochemistry 1

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 1st course

Reference Book: Fundamental of Biochemistry, Donald Voet, Judith, G Voet and Charlotte W. Pratte , 2016.----Practical Biochemistry, Damodaran Geetha K, 2016 Advances in Carbohydrate Chemistry and Biochemistry, David C. Baker-Volume 79, Pages 2-170 (2021)

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine qualitative and quantitative of some biomolecules which considered the basics of biochemistry.

Weekly Teaching Plan: 1st course / 3rd class

Week 1&2&3	**Carbohydrates,** Introduction and Qualitative tests of carbohydrates. then applied the practical tests in the laboratory such as molish, benedict, barfoed, bial,selivanoff and iodine tests.

	First Quiz
Week 4&5&6&7	Hydrolysis of sucrose. Acid Hydrolysis of starch. Then unknown of carbohydrates, were performed as a practical application of these tests.
	Second Quiz
Week 8&9&10&11	**Proteins,** introduction and their types. **Amino acids** and their types. Then applied the practical tests in the laboratory such as Coagulation test, Biuret, Ninhydrin tests.
	Third Quiz
Week 12&13&14	Millon, Sakagucchi, Hopkins cole , cystein and cystine tests were applied. Then Precipitation of proteins tests.
	1st course Mid Term Examination
Week 15	**Unknown of Proteins and amino acids.**
	1st course Final Term Examination

Students Behaviour in Class : students interaction Very good with us in Biochemistry laboratory.

Computer Usage: good. Computer was used in laboratory.

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word pprogramms.... by google classroom.

Dr. Eman Adel

Subject name: Practical Biochemistry 1

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 1st course

Reference Book: **Fundamental of Biochemistry, Donald Voet, Judith, G Voet and Charlotte W. Pratte , 2016.----Practical Biochemistry, Damodaran Geetha K, 2016 Advances in Carbohydrate Chemistry and Biochemistry, David C. Baker-Volume 79, Pages 2-170 (2021)**

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine qualitative and quantitative of some biomolecules which considered the basics of biochemistry.

Weekly Teaching Plan: 1st course / 3rd class

Week 1&2&3	**Carbohydrates,** Introduction and Qualitative tests of carbohydrates. then applied the practical tests in the laboratory such as molish, benedict, barfoed, bial,selivanoff and iodine tests.

	First Quiz
Week 4&5&6&7	Hydrolysis of sucrose. Acid Hydrolysis of starch. Then unknown of carbohydrates, were performed as a practical application of these tests.
	Second Quiz
Week 8&9&10&11	**Proteins,** introduction and their types. **Amino acids** and their types. Then applied the practical tests in the laboratory such as Coagulation test, Biuret, Ninhydrin tests.
	Third Quiz
Week 12&13&14	Millon, Sakagucchi, Hopkins cole , cystein and cystine tests were applied. Then Precipitation of proteins tests.
	1st course Mid Term Examination
Week 15	**Unknown of Proteins and amino acids.**
	1st course Final Term Examination

Students Behaviour in Class : students interaction Very good with us in Biochemistry laboratory.

Computer Usage: good. Computer was used in laboratory.

Teaching Techniques: Data show by using power point, videos and pictures , pdf and word pprogramms.... by google classroom.

Lecturer. Dr.Safaa Abdulazeez Alameen

Subject name: Biochemistry 2 (3ed class 2 nd course)

Academic Year **2021 - 2022**

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

Catalog Description: Study of the biochemistry subject to identify the components of living organisms including carbohydrates, proteins, fats, and other.

Reference Book: Text book of biochemistry 2018 V.1 , Harper s Illustrated biochemistry 29 th 2015 , Lehninger biochemistry 4e 2005 . Clinical physiology. A. Banerjee 2005 CAMBRIDGE.

Course Outcomes: To learn and study some life compounds such as fats, proteins, carbohydrates, vitamins, Bioenergetics , etc.

Weekly Teaching Plan:

Week 1&2&3	Enzymes, Types , Kinetic, functions and metabolic pathways related to these enzymes.

	First Quiz
Week 4&5&6&7	Bioenergetics, types of energy reactions:- Exergonic and Endergonic reactions, Adenosine mono –P and its function, high energy compounds , types and functions.
	Second Quiz
Week 8&9&10&11	Hormones and endocrine glands, Types , Functions, regulation, secretion, receptors types and the biochemical processes which activated by hormones.
	Third Quiz
Week 12&13&14	Vitamins, types (fat soluble vit. and water soluble vit.) and funtions of vitamins....as coenzymes. Diseases results from vitamines difficiency.
	2nd course Mid Term Examination
Week 15	Water & Buffers, types of buffers,

Students Behaviour in Class : student interaction Very good with us in Biochemistry lecture

Computer Usage: good. Computer was used in lecture

Teaching Techniques: Data show by using power point, videos, youtube to send the recorded lecture, pdf and word programs.... by classroom platform.

Lecturer. Dr.Rafad rabee Saadun

Subject name: Biochemistry 2 (3ed class 2 nd course)

Academic Year **2021 - 2022**

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

Catalog Description: Study of the biochemistry subject to identify the components of living organisms including carbohydrates, proteins, fats, and other.

Reference Book: Text book of biochemistry 2018 V.1 , Harper s Illustrated biochemistry 29 th 2015 , Lehninger biochemistry 4e 2005 . Clinical physiology. A. Banerjee 2005 CAMBRIDGE.

Mosul University

College of science Chemistry Department

Course Outcomes: To learn and study some life compounds such as fats, proteins, carbohydrates, vitamins, Bioenergetics , etc.

Weekly Teaching Plan:

Week 1&2&3	Enzymes, Types , Kinetic, functions and metabolic pathways related to these enzymes.
	First Quiz
Week 4&5&6&7	Bioenergetics, types of energy reactions:- Exergonic and Endergonic reactions, Adenosine mono –P and its function, high energy compounds , types and functions.
	Second Quiz
Week 8&9&10&11	Hormones and endocrine glands, Types , Functions, regulation, secretion, receptors types and the biochemical processes which activated by hormones.
	Third Quiz
Week 12&13&14	Vitamins, types (fat soluble vit. and water soluble vit.) and funtions of vitamins....as coenzymes. Diseases results from vitamines difficiency.
	2nd course Mid Term Examination
Week 15	Water & Buffers, types of buffers,

Students Behaviour in Class : student interaction Very good with us in Biochemistry lecture

Computer Usage: good. Computer was used in lecture

Teaching Techniques: Data show by using power point, videos, youtube to send the recorded lecture, pdf and word programs.... by classroom platform.

Dr. Luay A. Al-helaly

Subject name: Practical Biochemistry 2

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Mosul University

College of science Chemistry Department

Catalog Description: Practical Biochemistry 3rd class- 2nd course

Reference Book: Stryer L., (2005) : Biochemistry 4th e.d. & King M.W. (2004)Medical biochemistry page. Principles of Biochemistry- Lehninger- 2021

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine some molecules.

Weekly Teaching Plan: 3rd Class/ December 2021

Week 1&2	Determination of protein concentration by Folin test. Unknown of protein.
	First Quiz
Week 3&4	Lipids :- solubility test. Iodine number.
	Second Quiz
Week 5&6	Vitamin C determination. Unknown of vitamin C.
	Third Quiz
Week 7&8&9&10&11 Week 12	Study of Enzymes (enz. conc. , substrate conc. Temp., pH.,.. Unknown ..
Week 13	2nd course Mid Term Examination
Week 14&15	Nucleic acids. Unknown.
	2nd course Final Term Examination

Students Behaviour in Class : v. good

Computer Usage: good

Teaching Techniques: different techniques: by google classroom, Power point.

Mafaz Khalid

Subject name: Practical Biochemistry 2

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 2nd course

Reference Book: Stryer L., (2005) : Biochemistry 4th e.d. & King M.W. (2004)Medical biochemistry page. Principles of Biochemistry- Lehninger- 2021

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine some molecules.

Weekly Teaching Plan: 3rd Class/ December 2021

Week 1&2	Determination of protein concentration by Folin test. Unknown of protein.
	First Quiz
Week 3&4	Lipids :- solubility test. Iodine number.
	Second Quiz
Week 5&6	Vitamin C determination. Unknown of vitamin C.
	Third Quiz
Week 7&8&9&10&11 Week 12	Study of Enzymes (enz. conc. , substrate conc. Temp., pH.,.. Unknown ..
Week 13	2nd course Mid Term Examination
Week 14&15	Nucleic acids. Unknown**.**
	2nd course Final Term Examination

Students Behaviour in Class : v. good
Computer Usage: good

Teaching Techniques: different techniques: by google classroom, Power point.

Raghad A. Hamo

Subject name: Practical Biochemistry 2

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 2nd course

Reference Book: Stryer L., (2005) : Biochemistry 4th e.d. & King M.W. (2004)Medical biochemistry page**.** Principles of Biochemistry- Lehninger- 2021

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine some molecules.

Weekly Teaching Plan: 3rd Class/ December 2021

Week 1&2	Determination of protein concentration by Folin test. Unknown of protein.
	First Quiz
Week 3&4	Lipids :- solubility test. Iodine number.

	Second Quiz
Week 5&6	Vitamin C determination. Unknown of vitamin C.
	Third Quiz
Week 7&8&9&10&11 Week 12	Study of Enzymes (enz. conc. , substrate conc. Temp., pH.,.. Unknown ..
Week 13	2nd course Mid Term Examination
Week 14&15	Nucleic acids. Unknown.
	2nd course Final Term Examination

Students Behaviour in Class : v. good

Computer Usage: good

Teaching Techniques: different techniques: by google classroom, Power point.

Dr. Amel Taha Yaseen

Subject name: Practical Biochemistry 2

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 2nd course

Reference Book: Stryer L., (2005) : Biochemistry 4th e.d. & King M.W. (2004)Medical biochemistry page. Principles of Biochemistry- Lehninger- 2021

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine some molecules.

Weekly Teaching Plan: 3rd Class/ December 2021

Week 1&2	Determination of protein concentration by Folin test. Unknown of protein.
	First Quiz
Week 3&4	Lipids :- solubility test. Iodine number.
	Second Quiz
Week 5&6	Vitamin C determination. Unknown of vitamin C.
	Third Quiz
Week 7&8&9&10&11 Week 12	Study of Enzymes (enz. conc. , substrate conc. Temp., pH.,.. Unknown ..

Week 13	2nd course Mid Term Examination
Week 14&15	Nucleic acids. Unknown**.**

2nd course Final Term Examination

Students Behaviour in Class : v. good

Computer Usage: good

Teaching Techniques: different techniques: by google classroom, Power point.

Dr. Rafad Saadun

Subject name: Practical Biochemistry 2

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 2nd course

Reference Book: Stryer L., (2005) : Biochemistry 4th e.d. & King M.W. (2004)Medical biochemistry page**.** Principles of Biochemistry- Lehninger- 2021

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine some molecules.

Weekly Teaching Plan: 3rd Class/ December 2021

Week 1&2	Determination of protein concentration by Folin test. Unknown of protein.
	First Quiz
Week 3&4	Lipids :- solubility test. Iodine number.
	Second Quiz
Week 5&6	Vitamin C determination. Unknown of vitamin C.
	Third Quiz
Week 7&8&9&10&11 Week 12	Study of Enzymes (enz. conc. , substrate conc. Temp., pH.,.. Unknown ..

Week 13	2nd course Mid Term Examination
Week 14&15	Nucleic acids. Unknown**.**

Mosul University

College of science Chemistry Department

2nd course Final Term Examination

Students Behaviour in Class : v. good
Computer Usage: good

Teaching Techniques: different techniques: by google classroom, Power point.

Dr. Safaa Abdulazeez Alameen

Subject name: Practical Biochemistry 2

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 2nd course

Reference Book: Stryer L., (2005) : Biochemistry 4th e.d. & King M.W. (2004)Medical biochemistry page. Principles of Biochemistry- Lehninger- 2021

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine some molecules.

Weekly Teaching Plan: 3rd Class/ December 2021

Week 1&2	Determination of protein concentration by Folin test. Unknown of protein.
	First Quiz
Week 3&4	Lipids :- solubility test. Iodine number.
	Second Quiz
Week 5&6	Vitamin C determination. Unknown of vitamin C.
	Third Quiz
Week 7&8&9&10&11 Week 12	Study of Enzymes (enz. conc. , substrate conc. Temp., pH.,.. Unknown ..
Week 13	2nd course Mid Term Examination
Week 14&15	Nucleic acids. Unknown.

2nd course Final Term Examination

Students Behaviour in Class : v. good
Computer Usage: good

Teaching Techniques: different techniques: by google classroom, Power point.

Mosul University

College of science Chemistry Department

Dr. saba alabachi

Subject name: Practical Biochemistry 2

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Practical Biochemistry 3rd class- 2nd course

Reference Book: Stryer L., (2005) : Biochemistry 4th e.d. & King M.W. (2004)Medical biochemistry page. Principles of Biochemistry- Lehninger- 2021

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine some molecules.

Weekly Teaching Plan: 3rd Class/ December 2021

Week 1&2	Determination of protein concentration by Folin test. Unknown of protein.
	First Quiz
Week 3&4	Lipids :- solubility test. Iodine number.
	Second Quiz
Week 5&6	Vitamin C determination. Unknown of vitamin C.
	Third Quiz
Week 7&8&9&10&11 Week 12	Study of Enzymes (enz. conc. , substrate conc. Temp., pH.,.. Unknown ..
Week 13	2nd course Mid Term Examination
Week 14&15	Nucleic acids. Unknown.
	2nd course Final Term Examination

Students Behaviour in Class : v. good

Computer Usage: good

Teaching Techniques: different techniques: by google classroom, Power point.

Dr. Eman Adel

Subject name: Practical Biochemistry 2

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Mosul University

College of science Chemistry Department

Catalog Description: Practical Biochemistry 3rd class- 2nd course

Reference Book: Stryer L., (2005) : Biochemistry 4th e.d. & King M.W. (2004)Medical biochemistry page. Principles of Biochemistry- Lehninger- 2021

Course Outcomes: To make students practice laboratory applications and to introduce them the ideas and methods which determine some molecules.

Weekly Teaching Plan: 3rd Class/ December 2021

Week 1&2	Determination of protein concentration by Folin test. Unknown of protein.
	First Quiz
Week 3&4	Lipids :- solubility test. Iodine number.
	Second Quiz
Week 5&6	Vitamin C determination. Unknown of vitamin C.
	Third Quiz
Week 7&8&9&10&11 Week 12	Study of Enzymes (enz. conc. , substrate conc. Temp., pH.,.. Unknown ..
Week 13	2nd course Mid Term Examination
Week 14&15	Nucleic acids. Unknown.
	2nd course Final Term Examination

Students Behaviour in Class : v. good

Computer Usage: good

Teaching Techniques: different techniques: by google classroom, Power

Mosul University

College of science Chemistry Department

professor. Dr. Zahraa Mohammed Ali Hamodat

Subject name: **Clinical Biochemistry/ M.Sc. Chemistry/2021-2022**

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalogue Description: Clinical Biochemistry, Diagnosis, Test.

The branch of chemistry known as clinical chemistry is generally concerned with the examination of body fluids for diagnostic and therapeutic purposes. It is often referred to as chemical pathology, clinical biochemistry, or medical biochemistry. It is a biochemistry application (not to be confused with medicinal chemistry, which involves basic research for drug development).

Testing for numerous components of blood and urine using straightforward chemical reactions gave rise to the subject in the late 19th century. Since then, as science and technology have developed, other methods have been used. These methods include the use of enzymes and the measuring of their activity, spectrophotometry, electrophoresis, and immunoassay. Today, a wide variety of blood tests and clinical urine tests with powerful diagnostic capabilities are available. Most current laboratories are now highly automated to accommodate the high workload typical of a hospital laboratory.[1] Tests performed are closely monitored and quality controlled.

Reference Book:

- Crook, M. (2013). *Clinical biochemistry and metabolic medicine*: CRC Press.
- Marshall, W. J., Lapsley, M., Day, A., & Ayling, R. (2014). Clinical biochemistry E-book: Metabolic and clinical aspects: Elsevier Health Sciences.
- Text Book Of Clinical Biochemistry 2000
- Lehninger Biochemistry 4e 2005 ,Harpers Illustrated Biochemistry 29 th 2015

Course Outcomes:

Weekly Teaching Plan:

Week 1&2&3	✚ Introducing Clinical Biochemistry ✚ The clinical biochemistry laboratory ✚ The use of the laboratory ✚ Fluid and electrolyte balance: Concepts ✚ and vocabulary ✚ Water and sodium balance ✚ Osmolality
First Quiz	
Week 4&5&6&7	✚ Hyponatraemia and Hyponatraemia ✚ Hypokalaemia and Hyperkalaemia ✚ Investigation of renal function ✚ Acute and chronic renal failure
2nd course Mid Term Examination	
Week 8&9&10&11	✚ 4. Glucose metabolism and diabetes mellitus ○ Diagnosis and monitoring of diabetes mellitus ✚ Diabetic ketoacidosis ✚ Hypoglycaemia and Hypercalcaemia
Second Quiz	
Week 12&13	✚ Calcium regulation and ✚ Bone disease ✚ Hypertension ✚ Clinical disorders of lipid metabolism ✚ Tumor markers
Week 14&15	✚ Pregnancy ✚ Inborn errors of metabolism
2^{nd}-course Final Term Examination	

Mosul University

College of science Chemistry Department

Students Behaviour in Class :

Computer Usage:

Teaching Techniques:

Dr. Mohammed bahry hassin

Subject name: metabolism of lipids

Academic Year : 2021 -2021

Credit Hour : 2hr. *15 weeks

Catalog Description : lipid metabolism ,phd class- 1st course

Reference Book: Harber biochemistry 2019 /Lippin cott's biochemistry 2018.

Course Outcomes: The students learned about classification of lipids,W3,HDL,LDL,VLDL metabolism, brow adipose tissue,apoA,B48,B100 biosynthesis and transported of cholesterol and metabolism of ecosanoids.

Weekly Teaching Plan:

Week 1&2&3	Introduction , Lipids ,liposomes
First Quiz	
Week 4&5&6&7	Lipoprotein, apo protein ,pathway of HDL,VLDL,LDL
Second Quiz	
Week 8&9&10&11	Balance of lipid in the adipose tissue
Third Quiz	
Week 12&13&14	**Biosynthesis , transported and extraction of cholesterol**
1st course Mid Term Examination	
Week 15	**Cyclooxygenase and lipooxygenase mechanism**
1st course Final Term Examination	

Students Behaviour in Class : students interaction very good with us biochemistry .

Computer Usage: good computer was used in laboratory lecture

Teaching Techniques: Data show Over head .

Mosul University

College of science Chemistry Department

Dr. Asaad Faisal Khattab

Subject name: Material science 1st semester for Ph.D. student

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: Fundamentals of Materials Science and Engineering by William D. Gallister, Jr and David G. Rethwisch.

Course Outcomes: The course is useful for Ph.D student where it give them good idea about the description of materials and their applications .

Weekly Teaching Plan:

Week 1&2&3&4	Classification of matrials
first Quiz	
Week 5&6&7&8	Fine crystal structure of matrials
Second Quiz	
Week 9&10&11&12	Flexibility and thermal properties of polymer Liquid crystals
Third Quiz	
Week 13&14&15	Electrical properties of materials
1st course Final Term Examination	

Students Behaviour in Class : They behave good and all listen to the lectures

Computer Usage: yes

Teaching Techniques: **books, computer and internet.**

Mosul University

College of science Chemistry Department

Dr. Fawzi Habeeb Jabrail

Subject name: Advanced polymer (PhD Course) 1st Course

Academic Year : 2021-2022

Credit Hour : 2h for 15 week

Class code :

SCCH22-F6411

Catalog Description: Give good idea for biopolymers and their behavior and concentrated on recognition at a glance for its technologies.

Reference Book: Polymer Science and Technology (plastics, Rubbers, Blends and Composites) By Premamoy Ghosh

Smart Polymers for Bioseparation and Bioprocessing By I.Y.Galaev and B. Mattiasson

Polymer Science and Technology By Fried J.R.

Course Outcomes: The course is applied on PhD students which it gives the students good idea about the biopolymers and their technologies. Explain the physical and thermal properties of biopolymers. In addition to, details about the hydrogels and their applications.

Weekly Teaching Plan:

Week 1&2&3 Oct. 2021	Free radical polymerization, Kinetic of free radical addition (chain) polymerization
First Quiz	
Week 4&5&6&7 Nov. 2021	Cationic polymerization, Anionic polymerization, Coordination polymerization
Second Quiz	
Week 8&9&10&11 Dec. 2021	Kinetic of cationic polymerization, Kinetic of anionic polymerization
Week 12&13&14 Jan. 2022	Nomenclature of Polymers ,Basic and IUPAC systems

1st course Mid Term Examination	
Week 15, Jan. 2022	Isomerization, orientation of polymers, Secondary forces of polymers, Conformation of polymers.
1st course Final Term Examination	

Students Behaviour in Class: They behave Very well and all listen to the lecture
Computer Usage: The computer was used for preparing the lectures and used for data show

Teaching Techniques: white board + Data show + open for discussion with the students

Students Behaviour in Class

Copy and Paste Policy

Email Policy

Computer Usage:

Teaching Techniques:

Grading Policy:

Two quizzes, (each 5pt)	10pt	Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".
2nd term Exam	20pt	
Final Exam	60pt	
Total	100pt	

Exam Policy:

Mosul University

College of science Chemistry Department

Dr. Fawzi Habeeb Jabrail

Subject name: Advanced Biopolymers (PhD Course) 2nd Course

Pre-requisites	**:**	Class room
Course web page	**:**	https://classroom.google.com **Class code : SCCH22-F7161**

Credit Hour : 2h for 15 week

Catalog Description: Give good idea for biopolymers and their behavior and concentrated on recognition at a glance for its technologies.

Reference Book: Polymer Science and Technology (plastics, Rubbers, Blends and Composites) By Premamoy Ghosh
Smart Polymers for Bioseparation and Bioprocessing By I.Y.Galaev and B. Mattiasson
Polymer Science and Technology By Fried J.R.

Course Outcomes: The course is applied on MSC students which it gives the students good idea about the biopolymers and their technologies. Explain the physical and thermal properties of biopolymers. In addition to, details about the hydrogels and their applications.

Weekly Teaching Plan:

Week 1&2&3 Feb. 2022	Macromolecular Concept, Structural features of a polymer, Classification of polymers, Structure-property relationship.
First Quiz	
Week 4&5&6&7 Mar. 2022	Configuration involving an asymmetric carbon atom, structural requirements for crystallinity, the amorphous state, crystallinity, Polymer morphology…….
Second Quiz	

Week 8&9&10&11 App. 2022	Biodegradability and photodegradability, biodegradability of natural polymers and synthetic polymers, polymeric prodrugs, controlled drug delivery systems.

Week 12&13&14 May 2022	Polymeric smart hydrogels, temperature stimuli hydrogel, pH stimuli hydrogel

2st course Mid Term Examination

Week 15, May 2022	Preparation of thermosensitive microspheres, Bio-applications of hydrogel polymers.

2st course Final Term Examination

Students Behaviour in Class: They behave Very well and all listen to the lecture
Computer Usage: The computer was used for preparing the lectures and used for data show

Teaching Techniques: classroom + Meet for discussion with the students

Students Behaviour in Class

Copy and Paste Policy

Email Policy

Computer Usage:

Teaching Techniques:

Grading Policy:

Two quizzes, (each 5pt)	10pt	Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".
2nd term Exam	20pt	
Final Exam	60pt	
Total	100pt	

Exam Policy:

Instructor :
Room No. :

Mosul University

College of science Chemistry Department

Dr. Asaad Faisal Khattab

Subject name: Material science 2nd semester for Ms.C. students

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: books in material science

Course Outcomes: The course is useful MS.c student where it give them good idea about the materials classes and characterizations.

Weekly Teaching Plan:

Week 1&2&3&4	Classification of materials
first Quiz	
Week 5&6&7&8	Mechanical properties
Second Quiz	
Week 9&10&11&12	Electrical properties
Third Quiz	
Week 13&14&15	Thermal and optical propereties
1st course Final Term Examination	

Students Behaviour in Class : They behave good and all listen to the lectures

Computer Usage: yes

Teaching Techniques: **Books, computer and internet.**

Mosul University

College of science Chemistry Department

Dr. Asaad Faisal Khattab

Subject name: Polymer Experiments1st semester

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: Report of polymer science by wafaa abbas

Course Outcomes: The course is useful for the fourth year class student where it give them good idea about the industrial chemistry and especially monomers and polymers.

Weekly Teaching Plan:

Week 1&2&3&4	Description and preparing of the experiment: 1- (preparation of poly methylmethacrelate polymerization) 2- (preparation of polyester by condensation polymerization)
	first Quiz
Week 5&6&7&8	Description and preparing of the experiment: Techniques of polymerization Bulk , solution ,suspension polymerization
	Second Quiz
Week 9&10&11&12	Description and preparing of the experiment: 1-(Preparing acrylonitrile by emulsion polymerization) 2-(preparing of urea formaldehyde resins

Third Quiz

Week 13&14&15	Description and preparing of the experiment: Preparation of rayon by digestion of cellulose

1st course Final Term Examination

Students Behaviour in Class : They behave good and all listen to the lectures
Computer Usage: yes

Teaching Techniques: **Polymer laboratory apparatuses**

Dr. Asaad Faisal Khattab

Subject name: Polymer Experiments 2nd semester

Academic Year : 2021-20122

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: Report of polymer science by wafaa abbas
Course Outcomes: The course is useful for the fourth year class student where it give them good idea about the characterization of polymers and physical properties of many kind of polymer.

Weekly Teaching Plan:

Week 1&2&3&4	Description and preparing of the experiment: 1-Fractional precipitation of polymers 2-determination of average molecular weight of polymer

first Quiz

Week 5&6&7&8	Description and preparing of the experiment: Determination of degree of crystallinity in polymer:

	PVC, PE, PP, PS , PAN , PMMA

Second Quiz

Week 9&10&11&12	Identification of polymers

Third Quiz

2nd course Final Term Examination

Students Behaviour in Class : They behave well and all listen to the lectures and operators

Computer Usage:

Teaching Techniques: **polymer laboratory apparatuses**

Prof. Dr. …Abdelrahman Basil Fadhil……

Subject name: The chemistry of Petroleum (كيمياء النفط)

Academic Year : 2020-2021

Credit Hour : 2hr. *15 weeks

Catalog Description: Teaching students principles relating to the chemistry of petroleum.

Reference Book: The chemistry and Technology of Petroleum by James G. Speight (5th Edition,2014); Petroleum Science and Technology by Chang Samuel Hsu and Paul R. Robinson (2018).

Course Outcomes: Providing students with more advanced information on petroleum origin, recovery, processing, evaluation, and upgrading.

Weekly Teaching Plan:

Week 1&2&3	Definition of petroleum; Elemental composition ; Chemical composition.

First Quiz

Week 4&5&6&7	Origin of petroleum; Occurrence of petroleum ; In-situ transformation of petroleum.

Second Quiz

Week 8&9&10&11	Classification of petroleum; Evaluation of petroleum and its derived fractions; Refining and fractionation methods of petroleum.

Third Quiz

Week 12&13&14	The chemistry of Transformation processes; Upgrading of petroleum products.

1st course Mid Term Examination

Week 15	Properties and composition of petroleum fractions.

1st course Final Term Examination

Students Behaviour in Class :V. Good
Computer Usage: Computer and other electronic facilities were used.

Teaching Techniques: More advanced information on the upgrading process will be covered in the next year.

Prof. Dr. …Abdelrahman Basil Fadhil……

Subject name: Experiments in Petrochemicals (تجارب في البتروكيمياويات)

Academic Year : 2020-2021

Credit Hour : 3hr. *15 weeks

Catalog Description: Adding several practical knowledge to students on petrochemical industry.

Reference Book: Fundamentals of Petroleum and Petrochemical Engineering by s of chemistry of Petrochemical processes by Uttam Ray Chaudhuri,2011; Petroleum and Petrochemical Engineering by Andy Margo,2015.
Course Outcomes: Teaching students how to do some experiments in petrochemicals.

Weekly Teaching Plan:

Week 1&2&3	Explanation of the experiments

First Quiz

Week 4&5	Separation of n-paraffines from petroleum fractions; Separation of iso-paraffines from unknown petroleum fractions .
	Second Quiz
Week 6&7	Thermal cracking of heavy distillates for the production of Oleffines.
	Third Quiz
	2nd course Mid Term Examination
Week 8&9&10	Extraction of oil from vegetable seeds ; Purification of Al-Mishraq crud Sulfur.
Week 11&12	Determination of the oil content of unknown seeds samples
	2nd course Final Term Examination

Students Behaviour in Class : V. Good

Computer Usage: It was used to show videos relating to the experiments.

Teaching Techniques: Blackboard; Data show; Computer.

Dr. Fawzi Habeeb Jabrail

Subject name: Biopolymers {MSc. Course} 2nd Course

Pre-requisites : Class room

Course web page : **https://classroom.google.com**

Class code : SCCH22-F4032

Credit Hour : 2h for 15 week

Catalog Description: Give good idea for biopolymers and their behavior and concentrated on recognition at a glance for its technologies.

Reference Book: Polymer Science and Technology (plastics, Rubbers, Blends and Composites) By Premamoy Ghosh

Smart Polymers for Bioseparation and Bioprocessing By I.Y.Galaev and B. Mattiasson

Polymer Science and Technology By Fried J.R.

Course Outcomes: The course is applied on MSC students which it gives the students good idea about the biopolymers and their technologies. Explain the physical and thermal properties of biopolymers. In addition to, details about the hydrogels and their applications.

Weekly Teaching Plan:

Week 1&2&3 Feb. 2022	Basic concepts of high polymer systems, principles of polymer
First Quiz	
Week 4&5&6&7 Mar. 2022	Morphology and order in crystalline polymers,crystalline behavior of the polymers.
Second Quiz	
Week 8&9&10&11 App. 2022	Biopolymer and their applications, controlled drug release, prodrug , biodegradable polymers. Biomedical polymers.
Week 12&13&14 May 2022	Polymeric smart hydrogels, temperature stimuli hydrogel, pH stimuli hydrogel
2st course Mid Term Examination	
Week 15, May 2022	Important Physical Testing and Evaluation of Polymers
2st course Final Term Examination	

Students Behaviour in Class: They behave Very well and all listen to the lecture
Computer Usage: The computer was used for preparing the lectures and used for data show

Teaching Techniques: classroom + Meet for discussion with the students

Students Behaviour in Class

Copy and Paste Policy

Email Policy

Computer Usage:

Teaching Techniques:

Grading Policy:

Two quizzes, (each 5pt)	10pt	Attendance is compulsory and absenteeism of more than 30% of classes will cause grade "NA".
2nd term Exam	20pt	
Final Exam	60pt	
Total	100pt	

Dr. Asaad Faisal Khattab

Subject name: Industerial chemistry 1st semester for Ms.C. student.

Academic Year : 2020-2021

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: chemical process calculation by A. Asokan **.** chemical process technology byJ. Mouliyn.

Course Outcomes: The course is useful for Ms.C student where it give them good idea about the industrial chemistry and chemical processes technology.

Weekly Teaching Plan:

Week 1&2&3&4	Chemical technology definition Important consederation in chemical technology
	first Quiz
Week 5&6&7&8	Feasibility of chemical reactions Reactors in chemical processes.
	Second Quiz

Week 9&10&11&12	Material balance in chemical technology Energy balance in chemical technology

Third Quiz

Week 13&14&15	Stoichiometry Catalyst: types and reactors.

1st course Final Term Examination

Students Behaviour in Class : They behave good and all listen to the lectures

Computer Usage: yes

Teaching Techniques: **books, computers and internet.**Prof. Dr. …Abdelrahman Basil Fadhil……

Subject name: Petrochemicals (البتروكيمياويات)

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Teaching students principles relating to petrochemicals.

Reference Book: Fundamentals of Petroleum and Petrochemical Engineering by Uttam Ray Chaudhuri,2011; Petroleum and Petrochemical Engineering by Andy Margo,2015.

Course Outcomes: Providing students with more advanced information on petroleum origin, recovery, processing, evaluation, and upgrading.

Weekly Teaching Plan:

Week 1&2&3	Introduction to petrochemicals ;Types of processes;/Raw materials used in petrochemicals industry.

First Quiz

Week 4&5&6&7	Purification of the raw materials ; Synthesis gas production ; Purification of raw materials used in synthesis gas manufacture ; Purification of products.

Second Quiz

Week 8&9&10&11	Petrochemicals from synthesis gas; Production of intermediates by thermal cracking process; Petrochemicals from ethylene and propylene.

Third Quiz

2nd course Mid Term Examination

Week 12&13&14	Petrochemicals from acetylene; Production of aromatics ; Petrochemicals from aromatics.
Week 15	Properties and composition of petroleum fractions.

2nd course Final Term Examination

Students Behaviour in Class : V. Good

Computer Usage: Computer and other electronic facilities were used.

Teaching Techniques: More advanced information on the recent methods for producing petrochemicals will be covered in the next year.

Prof. Dr. …Abdelrahman Basil Fadhil……

Subject name: Petrochemicals (البتروكيمياويات)

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: Teaching students principles relating to petrochemicals.

Reference Book: Fundamentals of Petroleum and Petrochemical Engineering by Uttam Ray Chaudhuri,2011; Petroleum and Petrochemical Engineering by Andy Margo,2015.

Course Outcomes: Providing students with more advanced information on petroleum origin, recovery, processing, evaluation, and upgrading.

Weekly Teaching Plan:

Week 1&2&3	Introduction to petrochemicals ;Types of processes;/Raw materials used in petrochemicals industry.

First Quiz

Week 4&5&6&7	Purification of the raw materials ; Synthesis gas production ; Purification of raw materials used in synthesis gas manufacture ; Purification of products.
	Second Quiz
Week 8&9&10&11	Petrochemicals from synthesis gas; Production of intermediates by thermal cracking process; Petrochemicals from ethylene and propylene.
	Third Quiz
	2nd course Mid Term Examination
Week 12&13&14	Petrochemicals from acetylene; Production of aromatics ; Petrochemicals from aromatics.
Week 15	Properties and composition of petroleum fractions.
	2nd course Final Term Examination

Students Behaviour in Class : V. Good

Computer Usage: Computer and other electronic facilities were used.

Teaching Techniques: More advanced information on the recent methods for producing petrochemicals will be covered in the next year.

Dr.Fawzi Habeeb Jabrail

Subject name: Polymer Experiments1st semester

Academic Year : 2021-2022

Credit Hour : 2h for 15 weeks

Catalog Description:

Reference Book: Report of polymer science by Neam Allelay

Course Outcomes: The course is useful for the fourth year class student where it give them good idea about the industrial chemistry and especially monomers and polymers.

Weekly Teaching Plan:

Week 1&2&3&4	Description and preparing of the experiment: 1- (preparation of poly methylmethacrelate polymerization) 2- (preparation of polyester by condensation polymerization)

Mosul University

College of science Chemistry Department

first Quiz

Week 5&6&7&8	Description and preparing of the experiment: Techniques of polymerization Bulk , solution ,suspension polymerization

Second Quiz

Week 9&10&11&12	Description and preparing of the experiment: 1-(Preparing acrylonitrile by emulsion polymerization) 2-(preparing of urea formaldehyde resins

Third Quiz

Week 13&14&15	Description and preparing of the experiment: Preparation of rayon by digestion of cellulose

1st course Final Term Examination

Students Behaviour in Class : They behave well and all listen to the lectures and operators

Computer Usage:

Teaching Techniques: **Polymer laboratory apparatuses** Dr.Fawzi Habeeb Jabrail

Subject name: Polymer Experiments 2nd semester

Academic Year : 2021-2022

Credit Hour : 2h for 15 weeks

Catalog Description:

Reference Book: Report of polymer science by Neam Allelay

Course Outcomes: The course is useful for the fourth year class student where it give them good idea about the characterization of polymers and physical properties of many kind of polymer.

Weekly Teaching Plan:

Week 1&2&3&4	Description and preparing of the experiment: 1-Fractional precipitation of polymers 2-determination of average molecular weight of polymer
first Quiz	
Week 5&6&7&8	Description and preparing of the experiment: Determination of degree of crystallinity in polymer: PVC, PE, PP, PS , PAN , PMMA
Second Quiz	
Week 9&10&11&12	Identification of polymers
Third Quiz	
2nd course Final Term Examination	

Students Behaviour in Class : They behave well and all listen to the lectures and operators

Computer Usage:

Teaching Techniques: **Polymer laboratory apparatuses**

Mosul University

College of science Chemistry Department

Dr. Asaad Faisal Khattab

Subject name: Polymer 1st semester for Bs.C. student.

Academic Year : 2021-20222

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: text book of polymer science by Billmyer

Course Outcomes: The course is useful for f the fourth year class student where it give them good idea about the types and classification of polymers

Weekly Teaching Plan:

Week 1&2&3&4	Polymer definition, nomenclature, classification,chain growth polymerization,
first Quiz	
Week 5&6&7&8	ionic polymerization ,Anionic polymerization , inverse ionic polymerization.
Second Quiz	
Week 9&10&11&12	Copolymerization 1,2 &3
Third Quiz	
Week 13&14&15	industrial applications
1st course Final Term Examination	

Students Behaviour in Class : They behave good and all listen to the lectures
Computer Usage: yes

Teaching Techniques: **books, computers and internet.**

Dr. Asaad Faisal Khattab

Subject name: Polymer 2nd semester for Bs.C. student.

Academic Year : 2021-20222

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: text book of polymer science by Billmyer
Course Outcomes: The course is useful for f the fourth year class student where it give them good idea about the condensation_polymerization and processing technique.

Weekly Teaching Plan:

Week 1&2&3&4	Condensation polymerization, cyclocondensation, equilibrium constant

first Quiz

Week 5&6&7&8	Molecular forces, molecular weight,.

Second Quiz

Week 9&10&11&12	Physical and mechanical properties

Third Quiz

Week 13&14&15	industrial applications

1st course Final Term Examination

Students Behaviour in Class : They behave good and all listen to the lectures
Computer Usage: yes

Teaching Techniques: **books, computers and internet.**

Dr. …Asaad Faisak Khattab……

Subject name: material science for Ph.D. degree

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: any books in material science and polymer
Course Outcomes: **The course is useful for the Ph.D. student where it give them good idea about the classes characterization of materials and their physical properties and applications.**

Weekly Teaching Plan:

Week 1&2&3	Additives and compounding
First Quiz	
Week 4&5&6&7	Electrical conductivity theories
Second Quiz	
Week 8&9&10&11	Electrical conductivity of polymers
Third Quiz	
Week 12&13&14	optical properties
2nd course Mid Term Examination	
Week 15	**Liquid crystal and nanocomposites**

2nd course Final Term Examination

Students Behaviour in Class : They behave well and all listen to the lectures and operators and reacted with the new information.

Computer Usage:

Teaching Techniques: books , computer and internet.

Mosul University

College of science Chemistry Department

Lecturer .Neam Mohammad Teyb

Subject name: **Practical Petroleums Chemistry**

Academic Year : 2020-2021

Credit Hour : 3hr. 9 weeks

Catalog Description: Adding several practical knowledge to students on petroleum industry.

Reference Book: The chemistry and Technology of Petroleum by James G. Speight (5th Edition,2014); Petroleum Science and Technology by Chang Samuel Hsu and Paul R. Robinson (2018).

Course Outcomes: Teaching students how to do some experiments in petroleum chemistry.

Weekly Teaching Plan: (from 6/12/2020 - 5/2/2021)

Week 1&2	Explanation of the experiments
First Quiz	
Week 3&4&	Distillation of crude oil ; Thermal cracking of distillation residue ; Determination of the initial and final boiling point of an unknown oil sample.
Second Quiz	
Week 5&6	Evaluation of petroleum and its products; Properties evolution of an unknown oil sample.
Third Quiz	
1st course Mid Term Examination	
Week 7	Determination of the distillation curve of petroleum; Calculation of the Icing Factor.
Week 8& 9	Determination of the aniline point and API gravity of Kerosene and Diesel fuel; Determination of Diesel Index and Cetane Number.
1st course Final Term Examination	

Mosul
University

College of science Chemistry Department

Mosul
University

College of science Chemistry Department

Lect. Amena farouk sunallah

Subject name: Polymer (Study physical & mechanical properties of polymer) .

مختبر بوليمير (دراسة الخصائص الفيزيائية والميكانيكية للبوليمرات)

Academic Year : 2021-2022

2nd semester

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book:

1- Reports of practical experiment in polymer chemistry by Wafa M. Abbas, Noaman Z. Solayman.

2-Practical experiments in polymers , University of Aleppo , College of Science , authored by Dr. Bahjat Falazi ,Dr. Muhammad Radwan ,Directorate of Books and Publications , 1997.

3- Practical Large Molecular Chemistry , University of Baghdad , College of Science , Authored by Dr. Muhammad Aziz Bryadi ,1983.

4- Contemporary polymer chemistry 3rd. Ed. By Harry R. Allcock , Frederick W. Lamp ,Person Education Inc.2003.

Course Outcomes: the course_ is useful for the fourth year class student where it give them good idea about the characterization of polymers and physical properties of the most of the common polymers used in our daily life . **Weekly Teaching Plan:**

Mosul University

College of science Chemistry Department

Ass. Lecturer Sariya Waleed Zaidan

Subject name: Experiments in Petrochemicals

Academic Year : 2020-2021

Credit Hour : 3hr. *9 weeks

Catalog Description: Adding several practical knowledge to students on petrochemical industry.

Reference Book: Fundamentals of Petroleum and Petrochemical Engineering by s of chemistry of Petrochemical processes by Uttam Ray Chaudhuri,2011; Petroleum and Petrochemical Engineering by Andy Margo,2015.

Course Outcomes: Teaching students how to do some experiments in petrochemicals.

Weekly Teaching Plan:

eek 1&2	Explanation of the experiments
First Quiz	
eek 3&4	Separation of n-paraffines from petroleum fractions; Separation of iso-paraffines from unknown petroleum fractions .
Second Quiz	
eek 5&6	Thermal cracking of heavy distillates for the production of Oleffines.
Third Quiz	
2nd course Mid Term Examination	
Week 7&8	Extraction of oil from vegetable seeds ; Purification of Al-Mishraq crud Sulfur.
eek 9	Determination of the oil content of unknown seeds samples

Mosul University

College of science Chemistry Department

Ass. Lecturer : Sariya Waleed Zaidan

Subject name: Practical Petroleums Chemistry

Academic Year : 2020-2021

Credit Hour : 3hr. 9 weeks

Catalog Description: Adding several practical knowledge to students on petroleum industry.

Reference Book: The chemistry and Technology of Petroleum by James G. Speight (5th Edition,2014); Petroleum Science and Technology by Chang Samuel Hsu and Paul R. Robinson (2018).

Course Outcomes: Teaching students how to do some experiments in petroleum chemistry.

Weekly Teaching Plan: (from 6/12/2020 - 5/2/2021)

eek 1&2	Explanation of the experiments
First Quiz	
eek 3&4&	Distillation of crude oil ; Thermal cracking of distillation residue ; Determination of the initial and final boiling point of an unknown oil sample.
Second Quiz	
eek 5&6	Evaluation of petroleum and its products; Properties evolution of an unknown oil sample.
Third Quiz	
1st course Mid Term Examination	
eek 7	Determination of the distillation curve of petroleum; Calculation of the Icing Factor.
eek 8& 9	Determination of the aniline point and API gravity of Kerosene and Diesel fuel; Determination of Diesel Index and Cetane Number.

Mosul University

College of science Chemistry Department

Lect. Saba Hazem Sedeeq

Subject name: Polymer (Study physical & mechanical properties of polymer) .

Academic Year : 2021-2022

2nd semester

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book:

1- Reports of practical experiment in polymer chemistry by Wafa M. Abbas, Noaman Z. Solayman.

2-Practical experiments in polymers , University of Aleppo , College of Science , authored by Dr. Bahjat Falazi ,Dr. Muhammad Radwan ,Directorate of Books and Publications , 1997.

3- Practical Large Molecular Chemistry , University of Baghdad , College of Science , Authored by Dr. Muhammad Aziz Bryadi ,1983.

4- Contemporary polymer chemistry 3rd. Ed. By Harry R. Allcock , Frederick W. Lamp ,Person Education Inc.2003.

Course Outcomes: the course_ is useful for the fourth year class student where it give them good idea about the characterization of polymers and physical properties of the most of the common polymers used in our daily life . **Weekly Teaching Plan:**

Mosul
University

College of science Chemistry Department

Lecturer.Saba Hazem Sedeeq

Subject name: Polymer(preparation some kinds of polymer)

Academic Year : 2021-2022

1st semester

Credit Hour : 2hr. *15 weeks

Catalog Description:

Reference Book: 1-

1- Reports of practical experiment in polymer chemistry by Wafa M. Abbas, Noaman Z. Solayman.
2-Practical experiments in polymers , University of Aleppo , College of Science , authored by Dr. Bahjat Falazi ,Dr. Muhammad Radwan ,Directorate of Books and Publications , 1997.
3- Practical Large Molecular Chemistry , University of Baghdad , College of Science , Authored by Dr. Muhammad Aziz Bryadi ,1983.
4- Contemporary polymer chemistry 3rd. Ed. By Harry R. Allcock , Frederick W. Lamp ,Person Education Inc.2003.

Course Outcomes: the course_ is useful for the fourth year class student where it give them good idea about the industrial chemistry and especially monomers and polymers .

Weekly Teaching Plan:

Mosul University

College of science Chemistry Department

Dr. Shaymaa Al-Mutlaq

Subject name: Petroleum Chemistry, 4th Class

Academic Year : 2021-2022, 1st semester

Credit Hour : 3 hrs.

Catalog Description: Teaching students principles relating to the chemistry of petroleum.

Reference Book: The chemistry and Technology of Petroleum by James G. Speight (2014); Petroleum Science and Technology by Chang Samuel Hsu and Paul R. Robinson (2018).

Course Outcomes: Providing students with more advanced information on petroleum origin, recovery, processing, evaluation, and upgrading.

Weekly Teaching Plan:

Week 1&2	Definition of petroleum; Elemental composition; Chemical composition.
First Quiz	
Week 3&4&5	Origin of petroleum; Occurrence of petroleum; In-situ transformation of petroleum.
Second Quiz	
Week 6&7&8	Classification of petroleum; Evaluation of petroleum and its derived fractions; Refining and fractionation methods of petroleum.
Third Quiz	
Week 9&10, 11	The chemistry of Transformation processes; Upgrading of petroleum products.
Mid Term Examination	
Week 12	Properties and composition of petroleum fractions.
Final Term Examination	

Mosul University

College of science Chemistry Department

Subject name: Petrochemicals, 4th Class

Academic Year : 2021-2022, 2nd semester

Credit Hour : 3 hrs.

Catalog Description: Teaching students principles relating to petrochemicals.

Reference Book: Chemistry of Petrochemicals Processes (2nd Edition) by **Sami Matar**; Petroleum Science and Technology by Chang Samuel Hsu and Paul R. Robinson (2018).

Course Outcomes: Providing students with more advanced information on petroleum origin, recovery, processing, evaluation, and upgrading.

Weekly Teaching Plan:

Week 1&2	Introduction to petrochemicals; Types of processes;/Raw materials used in petrochemicals industry.
First Quiz	
Week 3&4 &5	Purification of the raw materials; Synthesis gas production; Purification of raw materials used in synthesis gas manufacturing; Purification of products.
Second Quiz	
Week 6&7&8&9&10	Production of intermediates by thermal cracking process; Petrochemicals from ethylene, propylene, Aromatics.
Third Quiz	
Mid Term Examination	
Final Term Examination	

Mosul University

College of science Chemistry Department

Subject name: Chemical Hazards, 2nd Class

Academic Year : 2021-2022, 2nd semester

Credit Hour : 2 hrs.

Catalog Description: Teaching students principles relating to petrochemicals.

Reference Book: Bretherick's Handbook of Reactive Chemical Hazards by Urben P.G. (2017), Industrial Hygiene Control of Airborne Chemical Hazards by William Popendorf (2019).

Course Outcomes: Teaching students the awareness of potential chemical reactivity hazards in university laboratories and general ways with the storage, handling, packing, transport and distribution of chemicals, or emergencies

Weekly Teaching Plan:

Week 1&2	General Lab safety rules for students
	First Quiz
Week 3 & 4	Classification and Labeling of Chemicals
	Second Quiz
Week 5	Safety Handling of Chemicals.
	Third Quiz
Week 6 & 7	Classification OF Hazardous Chemicals
	Mid Term Examination
Week 8	Fire hazards
Week 9	Laboratory Safety Rules and Regulations
	Final Term Examination

Mosul University

College of science Chemistry Department

Subject name: Petroleum Chemistry/ Practical, 4th Class

Academic Year : 2021-2022, 1st semester

Credit Hour : 2 hrs.

Catalog Description: Adding several practical knowledges to students on petroleum industry.

Reference Book: The chemistry and Technology of Petroleum by James G. Speight (5th Edition,2014); Petroleum Science and Technology by Chang Samuel Hsu and Paul R. Robinson (2018).

Course Outcomes: Teaching students how to do some experiments in petroleum chemistry.

Weekly Teaching Plan:

Week 1 & 2	Explanation of the experiments
First Quiz	
Week 3 & 4	Distillation of crude oil ; Thermal cracking of distillation residue ; Determination of the initial and final boiling point of an unknown oil sample.
Second Quiz	
Week 5 & 6	Evaluation of petroleum and its products; Properties evolution of an unknown oil sample.
Third Quiz	
Mid Term Examination	
Week 7	Determination of the distillation curve of petroleum; Calculation of the Icing Factor.
Week 8 & 9	Determination of the aniline point and API gravity of Kerosene and Diesel fuel; Determination of Diesel Index and Cetane Number.
Final Term Examination	

Mosul University

College of science Chemistry Department

Subject Name: Polymer Chemistry/ Practical, 4th Class

Academic Year : 2021-2022, 2nd semester
Credit Hour : 2 hrs.

- **Catalog Description:** Support students to understand physical properties of polymers and their characterization.

Reference Book: Reports of polymer science by Wafa Abbas

Course Outcomes:

- Learn about physical properties of polymers
- Characterize some polymers

Weekly Teaching Plan:

Week 1&2&3 & 4	1- Fractional precipitation of polymers 2- determination of average molecular weight of polymers
First Quiz	
Week 5&6&7&8	1- Determination of degree of crystallinity of PE, PP, PS, PVC, PAN & PMMA. 2- Determination of stress – strain of polymers
Second Quiz	
Week 9&10&11&12	Identification of unknown polymers
Third Quiz	
Mid Term Examination	
Final Term Examination	

Mosul University

College of science Chemistry Department

Subject name: Petrochemicals / Practical, 4th Class

Academic Year : 2021-2022, 2nd semester

Credit Hour : 2 hrs.

Catalog Description: Adding several practical knowledge to students on petrochemical industry.

Reference Book: Fundamentals of Petroleum and Petrochemical Engineering by Utpal Ray Chaudhuri,2011; Petroleum and Petrochemical Engineering by Andy Margo,2015.

Course Outcomes: Teaching students how to do some experiments in petrochemicals.

Weekly Teaching Plan:

Week 1&2	Explanation of the experiments
First Quiz	
Week 3&4	Separation of n-paraffines from petroleum fractions; Separation of iso-paraffines from unknown petroleum fractions .
Second Quiz	
Week 5&6	Thermal cracking of heavy distillates for the production of Oleffines.
Third Quiz	
Mid Term Examination	
Week 7&8	Extraction of oil from vegetable seeds ; Purification of Al-Mishraq crud Sulfur.
Week 9	Determination of the oil content of unknown seeds samples
Final Term Examination	

Mosul University

College of science Chemistry Department

Dr. Ehab Mahal

Subject Name: Industrial Chemistry, 3rd Class

Academic Year : 2021-2022, 1st semester

Credit Hour **:** 2 hrs.

- **Catalog Description:**

- Chapter 1 : Chemical technology
- Chapter 2 :Important considerations for chemical industry
- Chapter 3: Operations, Apparatus and materials used in chemical technology
- Chapter 4: Corrosion
- Chapter 5: Green Chemistry
- Chapter 6: Water in industry and for human usage
- Chapter 7: Composites
- Chapter 8: Fertilizers

Reference Book: A Textbook of Applied Chemistry by Sharma,
Chemical Process industries by Shreve,
Principles of Industrial Chemistry,
Chemical Process Technology by Moulijn J.A., 2013
Chemical Technology by Jess A., 2013

Course Outcomes:

- Learn about principles of industrial chemistry
- Understand the applications of applied chemistry
- Get broad view of the roles of industrial chemistry in human life
- Customization of chemical process
-

Weekly Teaching Plan:

Week 1	Chemical technology
First Quiz	
Week 2 -4	Important considerations for chemical industry Operations, Apparatus and materials used in chemical technology
Second Quiz	
Week 5-6	Corrosion
Third Quiz	
Week 7-9	Green Chemistry Composites

Mid Term Examination	
Week 10	Fertilizers
Week 11-12	Water
Final Term Examination	

Subject Name: Industrial Chemistry, 3rd Class

Academic Year : 2021-2022, 2nd semester

Credit Hour **:** 2 hrs.

- **Catalog Description:**

Chapter 1: Energy & Fuel
Chapter 2: Sulfur and Sulfuric acid
Chapter 3: Soap and Detergent Industry
Chapter 4: Cement Industry
Chapter 5: General Glass Industries
Chapter 6: Paper Industry
Chapter 7: Ceramics

Reference Book: A Textbook of Applied Chemistry by Sharma,
Chemical Process industries by Shreve,
Principles of Industrial Chemistry

Course Outcomes:

- Learn about principles of Energy & Fuel
- Understand the applications of industrial chemistry
- Get broad view of the roles of industrial chemistry in human life
- Knowledge of chemical industry in factories

Weekly Teaching Plan:

Week 1-3	Energy & Fuel
First Quiz	
Week 4-6	Sulfur and Sulfuric acid
Second Quiz	

Week 6-8	Soap and Detergent Industry Glass
Third Quiz	
Week 9-10	Paper
Mid Term Examination	
Week 11-12	Ceramics
Final Term Examination	

Subject Name: Nanotechnology, 4th Class

Academic Year : 2021-2022, 2nd semester

Credit Hour **:** 1 hr.

- **Catalog Description:**

Chapter 1: Introduction, Short History
Chapter 2: Nanotechnology approaches
Chapter 3: Characterizations
Chapter 4: Applications

Reference Book: Introduction to Nanotechnology, Charles P Poole and Frank J Owens
Fundamentals of Nanotechnology, J.J. Moore

Course Outcomes:

- Learn about principles of Nanotechnology
- Get Knowledge about preparation methods
- Learn how to analyze nanomaterials
- Study the application of nanomaterials

Weekly Teaching Plan:

Week 1-2	Introduction, Short History
First Quiz	
Week 4-7	Nanotechnology approaches
Second Quiz	
Week 8-10	Characterizations
Third Quiz	
Mid Term Examination	
Week 11-12	Applications
Final Term Examination	

Subject Name: Nanomaterials, Master of Industrial Chemistry

Academic Year : 2021-2022, 2nd semester

Credit Hour **:** 2 hrs.

- **Catalog Description:**

Chapter 1: Introduction
Chapter 2: Classifications
Chapter 3: Specifications and uniqueness of nanostructures
Chapter 4: Chemical and Physical Properties
Chapter 5: Synthesis methods
Chapter 6: Nanomaterials analysis
Chapter 7: Toxicity of nanomaterials
Chapter 8: Applications of nanomaterials

Reference Book: Physical Fundamentals of Nanomaterials, Bangwei Zhang

Introduction to Nanoscience and Nanotechnology, A. N. Banerjee and Chattopadhyay K.

Course Outcomes:

- Learn basics of Nanomaterials
- Get Knowledge about properties and specialty of nano-matter
- Learn how to prepare and analyze nanomaterials
- Study the application beside the toxicity of nanomaterials

Weekly Teaching Plan:

Week 1	Introduction
First Quiz	
Week 2-5	Classifications Specifications Chemical and Physical Properties
Second Quiz	
Week 6-8	Synthesis methods
Third Quiz	
Mid Term Examination	
Week 9-10	Nano-Analysis
Week 11-12	Toxicity Applications
Final Term Examination	

Subject name: Petroleum Chemistry/ Practical, 4th Class

Academic Year : 2021-2022, 1st semester

Credit Hour : 2 hrs.

Catalog Description: Adding several practical knowledges to students on petroleum industry.

Reference Book: The chemistry and Technology of Petroleum by James G. Speight (5th Edition,2014); Petroleum Science and Technology by Chang Samuel Hsu and Paul R. Robinson (2018).

Course Outcomes: Teaching students how to do some experiments in petroleum chemistry.

Weekly Teaching Plan:

Week 1 & 2	Explanation of the experiments
	First Quiz
Week 3 & 4	Distillation of crude oil ; Thermal cracking of distillation residue ; Determination of the initial and final boiling point of an unknown oil sample.
	Second Quiz
Week 5 & 6	Evaluation of petroleum and its products; Properties evolution of an unknown oil sample.
	Third Quiz
	Mid Term Examination
Week 7	Determination of the distillation curve of petroleum; Calculation of the Icing Factor.
Week 8 & 9	Determination of the aniline point and API gravity of Kerosene and Diesel fuel; Determination of Diesel Index and Cetane Number.
	Final Term Examination

Mosul University

College of science Chemistry Department

Subject name: Petrochemicals / Practical, 4th Class

Academic Year : 2021-2022, 2nd semester

Credit Hour : 2 hrs.

Catalog Description: Adding several practical knowledges to students on petrochemical industry.

Reference Book: Fundamentals of Petroleum and Petrochemical Engineering by Utpal Ray Chaudhuri,2011; Petroleum and Petrochemical Engineering by Andy Margo,2015.

Course Outcomes: Teaching students how to do some experiments in petrochemicals.

Weekly Teaching Plan:

Week 1 & 2	Explanation of the experiments
	First Quiz
Week 3 & 4	Separation of n-paraffines from petroleum fractions; Separation of iso-paraffines from unknown petroleum fractions .
	Second Quiz
Week 5 & 6	Thermal cracking of heavy distillates for the production of Oleffines.
	Third Quiz
	Mid Term Examination
Week 7 & 8	Extraction of oil from vegetable seeds ; Purification of Al-Mishraq crud Sulfur.
Week 9	Determination of the oil content of unknown seeds samples
	Final Term Examination

وصف مقرر الكيمياء اللاعضوية المرحلة الاولى

2021-2022

المرحلة	الاولى صباحي مسائي - نظري
اسم المادة باللغة العربية	كيمياء لاعضوية الكورس الاول
اسم المادة باللغة الانكليزي	Inorganic
عدد الوحدات	2
عدد الساعات	2
اسم التدريسي	ا.م.د خنساء شاكر النعمة م.د. عاصم سلمان
وصف المقرر	دراسة بناء الذرة وشرح عام للترتيب الالكتروني و اعداد الكم وشرح اقسام الجدول الدوري وتفاصيل الخواص الدورية للعناصر مع شرح عام للمركبات التساهمية والنظريات التابعة لها .

المرحلة	الاولى صباحي مسائي نظري
اسم المادة باللغة العربية	كيمياء لاعضوية الكورس الثاني
اسم المادة باللغة الانكليزي	Inorganic
عدد الوحدات	2
عدد الساعات	2
اسم التدريسي	ا.م.د خنساء شاكر النعمة م.د. عاصم سلمان
وصف المقرر	دراسة المركبات الايونية وخواصها ودراسة عنصر الهدروجين وموقعه في الجدول الدوري واهم مركباته بالإضافة الى عناصر الزمرة الاولى والثانية والثالثة والرابعة وشرح مفصل عن خواص عناصر كل زمرة و اهم مركباتها والمقارنة مابين الخواص الكيميائية والفيزيائية لعناصر الزمر الاربعة .

وصف مقرر الكيمياء اللاعضوية المرحلة الثانية

2021-2022

المرحلة	الثانية – نظري
اسم المادة باللغة العربية	كيمياء لاعضوية (1) / الكورس الاول
اسم المادة باللغة الإنكليزي	Inorganic Chemistry (1)
عدد الوحدات	2
عدد الساعات	2
اسم التدريسي	ا.م.د. صهباء علي أحمد ، ا.م.د.فرح طارق سعيد
وصف المقرر	مقدمة عن الكيمياء اللاعضوية والجدول الدوري ،حوامض وقواعد لويس صفاتهم وانواعهم المختلفة ، المذيبات صفاتها المميزة وانواعها واستخداماتها ،عناصر الجدول الدوري مجموعة النتروجين صفاتها مركباتها انواعها طرق تحضيرها استخداماتها المختلفة، مجموعة الكبريت صفاتها مركباتها انواعها طرق تحضيرها استخداماتها المختلفة ،مجموعة الهالوجينات ،مجموعة الغازات النبيلة.

المرحلة	الثانية نظري
اسم المادة باللغة العربية	كيمياء لاعضوية (2) / الكورس الثاني
اسم المادة باللغة الإنكليزي	Inorganic Chemistry (2)
عدد الوحدات	2
عدد الساعات	2
اسم التدريسي	ا.م.د. صهباء علي أحمد ، ا.م.د.فرح طارق سعيد
وصف المقرر	مقدمة عن كيمياء الحالة الصلبة وشبكات برافيز ومعاملات ميلر ،الاشعة السينية وطريقة انتاجها وتطبيقاتها، ال ESR,EPRوكيفية حسابها وتعقيد هايبر والتطبيقات المختلفة للبرم الالكتروني ،الجهد الالكتروني القياسي وتطبيقاته للمركبات اللاعضوية، جهد نصف الخلية والجهد القياسي وامثلة حسابية عليها ،قيمة ال PHللمحاليل المختلفة وقوة الخلية الالكترونية .

وصف مقرر الكيمياء اللاعضوية العملي // المرحلة الثانية

2021-2022

المرحلة	الثانية صباحي – لاعضوية عملي
اسم المادة باللغة العربية	كيمياء لاعضوية عملي / الكورس الاول
اسم المادة باللغة الانكليزي	Practical inorganic chemistry
عدد الوحدات	2
عدد الساعات	12
اسم التدريسي	د.عامرة فارس محمد + د.عاصم سلمان + د. ليلى جمعة + د.رنا عبدالمالك +كواكب عبد العزيز+صبا ممتاز صالح + اسراء عدنان+ اسراء علي +امنة عدنان + خالد نذير +سارية وليد+د. احمد سالم+ فيحاء كمال
وصف المقرر	يتضمن الكورس الاول يتضمن 4 تجارب وكما موضحة ادناه Exp.1 Introduction and important Lab.Notes Experiment No.1:Solubility and Fractional crystallization Experimental No.2: Studying of some Nickel (Ni) compounds (part 1) Studying of some Nickel (Ni) compounds (part 2) Experimental No.3: Cupper chemistry (part 1) Cupper chemistry (part 2) Experimental No. 4: preparation and studying some kinds of alum. Preparation of potassium alum $KAl(SO_4)_2.12H_2O$ Preparation of chromium alum $KCr(SO_4)_2.12H_2O$ Preparation of ammonium alum $NH4Al(SO_4)_2.12H_2O$

المرحلة	الثانية صباحي –لاعضوية عملي
اسم المادة باللغة العربية	كيمياء لاعضوية عملي / الكورس الثاني
اسم المادة باللغة الانكليزي	Practical inorganic chemistry
عدد الوحدات	2

عدد الساعات	12
اسم التدريسي	د.عامرة فارس محمد + .د.عاصم سلمان + .د.ليلى جمعة + د.رنا عبدالمالك +د.احمد سالم+ كواكب عبد العزيز + صبا ممتاز +افياء مؤيد + اسراء عدنان+ اسراء علي +امنة عدنان +خالد نذير + لمى احمد مبارك+ سارية وليد+ فيحاء كمال
وصف المقرر	يتضمن الكورس الثاني يتضمن 7 تجارب وكما موضحة ادناه . Exp. Introduction and important Lab. Notes Experiment No.1 The first group (Alkali metals) Preparation of Potassium Sulfate K_2SO_4 Exp. No. 2: Second group *Preparation of Barium tartarate* Exp. No.3: The Elements of Group III Preparation of Barium borate Exp. No4: the elements Group IV The properties of the $PbCrO_4$ Exp. No. 5: The Elements of Fifth Group Preparation of silver ortho phosphate (Ag_3PO_4): Exp. No. 6: Oxygen group Preparation Sodium ThioSulphate Exp. No.7: Halogen group

وصف مقرر الكيمياء اللاعضوية المرحلة الثالثة

2021-2022

المرحلة	الثالثة ـ نظري
اسم المادة باللغة العربية	كيمياء لاعضوية (1) / الكورس الاول
اسم المادة باللغة الإنكليزي	Inorganic Chemistry (1)
عدد الوحدات	3
عدد الساعات	2
اسم التدريسي	ا.د . وداد طه حامد القطان , ا.م.د. عامرة فارس محمد
وصف المقرر	التعرف على العناصر الانتقالية ومركباتها التناسقية تعريفها وتسميتها وأنواع الايزومرات التي تكونها والنظريات التي فسرت التآصر في المركبات التناسقية مثل نظرية آصرة التكافؤ ونظرية المجال البلوري ونظرية الأوربيتال الجزيئي .

المرحلة	الثالثة نظري
اسم المادة باللغة العربية	كيمياء لاعضوية (2) / الكورس الثاني
اسم المادة باللغة الإنكليزي	Inorganic Chemistry (2)
عدد الوحدات	3
عدد الساعات	2
اسم التدريسي	ا.م.د . عامرة فارس محمد , ا.م.د. ليلى جمعة نجم
وصف المقرر	دراسة طرق تحضير المركبات التناسقية ، انواع المحفزات ، التقنيات المستخدمة في تشخيص المركبات التناسقية مثل القياسات المغناطيسية والاطياف الالكترونية ،دراسة حركية وميكانيكية المعقدات ، اعداد التناسق والاشكال الهندسية للمركبات التناسقية .

وصف مقرر الكيمياء اللاعضوية العملي // المرحلة الثالثة

2021-2022

المرحلة	الثالثة صباحي – لاعضوية عملي
اسم المادة باللغة العربية	كيمياء لاعضوية عملي / الكورس الاول
اسم المادة باللغة الانكليزي	Practical inorganic chemistry
عدد الوحدات	2
عدد الساعات	12
اسم التدريسي	د.خنساء شاكر النعمة +د.صهباء علي أحمد+ .د.سمير سعدالله + .د. فرح طارق + منال عبد الفتاح +افياء مؤيد + اسراء عدنان+ اسراء علي +امنة عدنان + كواكب عبد العزيز +لانا عبد الحميد + لمى احمد مبارك+ فيحاء كمال
وصف المقرر	يتضمن الكورس الاول يتضمن 6 تجارب وكما موضحة ادناه Exp.1 Ggeometrical Isomerism Exp.2 Preparation of Cobalt (lll) Complex with bidentate ligand Exp.3Aluminium complexes Exp.4 Preparation of Cobalt (III) Complex with Hexadentate (Ligand (EDTA Exp.5 Acetylaceton Complexes Exp .6 Linkage Isomers

المرحلة	الثالثة صباحي –لاعضوية عملي
اسم المادة باللغة العربية	كيمياء لاعضوية عملي / الكورس الثاني
اسم المادة باللغة الانكليزي	Practical inorganic chemistry
عدد الوحدات	2
عدد الساعات	12
اسم التدريسي	د.خنساء شاكر النعمة +د.صهباء علي أحمد + .د.سمير سعدالله + د. رنا عبدالمالك + .د.ليلى جمعة + منال عبد الفتاح +افياء مؤيد + اسراء عدنان+

	اسراء علي +امنة عدنان + كواكب عبد العزيز +لانا عبد الحميد +صبا ممتاز+ لمى احمد مبارك+ فيحاء كمال
وصف المقرر	يتضمن الكورس الثاني يتضمن 4 تجارب وكما موضحة ادناه . Exp.1 preparation and spectral study of some copper(ll)complexes Exp.2 Optical Isomers Exp.3 study the complex formation of copper(II) and EDTA in solution Exp. 4 preparation of spectral studies of iron (II) and nickel(II) complexes

وصف مقرر مادة الكيمياء المنهج الجيولوجي

2021-2022

المرحلة	الثالثة ـ نظري
الاسم المادة باللغة العربية	الكيمياء الكورس الاول
اسم المادة باللغة الإنكليزي	Chemistry
عدد الوحدات	3
عدد الساعات	2
اسم التدريسي	م.د. رنا عبد المالك سليمان قبع
وصف المقرر	بنية الذرة العدد الذري وذرة بور الاوربتالات وعلاقتها بالجدول الدوري والجدول الدوري والتصنيف الدوري للعناصر واعداد الكم وبعض الخواص الدورية للذرات طاقة جهد التاين والسالبية الكهربائية والالفة الالكترونية والتاصر الايوني والمركبات الايونية والعوامل المؤثرة على قوة الاصرة واستقرارية البلورة ودرجات الانصهار وقابلية ذوبان المركبات الايونية التاصر الفلزي والتراكيب الفلزية والاواصر التساهمية وشروطتكوين الاصرة التساهمية ونظرية اصرة التكافؤ نظرية الاوربتال الجزئي تكوين الاوربيتالات الجزئية سيكما وباي اشكال عدد من المركبات اللاعضوية البسيطة المركبات التي تتضمن اواصر الاوربيتالات التكافؤ واواصر باي وجزيئات ثنائية الذرة المتشابهة والمختلفة جزيئات مستقيمة ثلاثية الذرة جزيئات ذات شكل رباعي السطوح وجزيئات ذات الهرم المثلثي وجزيئات ثلاثية الزاوية الاثلين الاستلين البنزين.

وصف مقرر مادة الكيمياء لطلبة الجيولوجي/ المرحلة الاولى

2021-2022

المرحلة	الاولى جيولوجي /صباحي عملي
اسم المادة باللغة العربية	كيمياء / الكورس الاول
اسم المادة باللغة الانكليزي	Chemistry
عدد الوحدات	2
عدد الساعات	12
اسم التدريسي	د.رنا عبد المالك +افياء مؤيد يونس +خالد نذير
وصف المقرر	يتضمن الكورس كالاتي Introduction of analytical chemistry , the identification of the glassware used in the laboratory Exp1. Analysis of Group I Exp 2. Systematic Separation and detection of Group II Exp 3. Separation of Group IIA and IIB , Analysis of (Group (IIA Exp. 4 Separation of Group IIA and IIB ,Analysis of Group (IIB)cat ion

وصف مقرر مادة الكيمياء لطلبة الفيزياء/ المرحلة الاولى

2021-2022

المرحلة	الاولى فيزياء /صباحي عملي
اسم المادة باللغة العربية	كيمياء / الكورس الاول
اسم المادة باللغة الانكليزي	Chemistry
عدد الوحدات	2
عدد الساعات	12
اسم التدريسي	د.رنا حسن +صبا ممتاز صالح +د. احمد سالم
وصف المقرر	يتضمن الكورس كالاتي Introduction of analytical chemistry , the identification of the glassware used in the laboratory Exp1. Analysis of Group I Exp 2. Systematic Separation and detection of Group II Exp 3. Separation of Group IIA and IIB , Analysis of (Group (IIA Exp. 4 Volumetric Analysis Exp. 5 Neutralization Reactions (acid- base)

وصف مقرر الكيمياء العملي 2 // المرحلة الاولى // قسم الفيزياء الحياتية

2021-2022

المرحلة	الاولى صباحي – الكيمياء العملي2
اسم المادة باللغة العربية	كيمياء عملي 2 / الكورس الثاني/
اسم المادة باللغة الانكليزي	Practical Chemistry 2
عدد الوحدات	4.5
عدد الساعات	6
اسم التدريسي	م.ايمان موفق + م. لمى احمد+ م.م آمنة عدنان
وصف المقرر	يتضمن الكورس الثاني التجارب ادناه Introduction and important Lab.Notes, discuss of report Experimental No.1: Solubility and Fractional crystallization. Experimental No.2: first group Experimental No.3: second group Experimental No.4: The element of group **III** Experimental No.5: Glassware, Determination of Melting point, discuss of report. Experimental No.6: Determination of boiling point, distillation, discuss of report. Experimental No.7: Recrystallization

وصف مقرر الكيمياء العضوية المرحلة الثانية

2021-2022

المرحلة	الثانية- نظري
اسم المادة باللغة العربية	كيمياء عضوية
اسم المادة باللغة الانكليزي	Organic Chemistry
عدد الوحدات	3
عدد الساعات	6
اسم التدريسي	ا. م. د. عمار حسين عبدالله السبعاوي
وصف المقرر	**First Course:** Alkyl halides, alcohols, aromatic compounds, arenes, aldehydes and ketones, ethers and epoxides. **Second Course:** Carboxylic acids and derivatives, amines, phenols, aryl halides and stereo chemistry.

وصف مقرر الكيمياء العضوية / ماجستير (تشييد عضوي)

2021-2022

المرحلة	ماجستير
اسم المادة باللغة العربية	تشييد عضوي
اسم المادة باللغة الانكليزي	Organic Synthesis
عدد الوحدات	2
عدد الساعات	2
اسم التدريسي	ا. م. د. عمار حسين عبدالله السبعاوي
وصف المقرر	Synthetic Design, Steps in Planning a Synthesis & Choice of Synthetic Method, Formation of Carbon-Carbon Single Bonds via Different Methods, Formation of Carbon-Carbon Double Bonds via Different Methods, Wittig Reaction & Diels-Alder Reaction.

المرحلة	الثاني - نظري
اسم المادة باللغة العربية	كيمياء عضوية
اسم المادة باللغة الانكليزي	Organic chemistry
عدد الوحدات	3
عدد الساعات	6
اسم التدريسي	د.عطاالله محمد شيت محمود . د. عمار حسين عبدالله
وصف المقرر	دراسة تركيب وخصائص وتحضير وتفاعلات هاليدات الالكيل والمركبات الاروماتية (1)والمركبات الاروماتية (2)والارينات والكحولات والالديهايدات والكيتونات والايثرات وهاليدات الاريل ووالفينولات والاحماض الكاربوكسيلية ومشتقاتها والامينات والكيمياء الفراغية

المرحلة	الثاني - عملي
اسم المادة باللغة العربية	كيمياء عضوية عملي
اسم المادة باللغة الانكليزي	Practical Organic Chemistry
عدد الوحدات	1
عدد الساعات	2 لكل مختبر = 2
اسم التدريسي	شهلة احمد يونس . د. هبة محمد امين. د. عطاالله محمد شيت محمود
وصف المقرر	التعرف على قياس درجة الانصهار ودرجة الغليان وأنواع التقطير وكشف العناصر وتحضير عدد من المركبات الكيميائية ودراسة خواصها الفيزيائية

وصف مقرر الكيمياء العضوية العملي المرحلة الرابعة

2021-2022

المرحلة	الرابعة - عملي
اسم المادة باللغة العربية	تشخيص المركبات العضوية
اسم المادة باللغة الانكليزي	Identifical Organic Compounds
عدد الوحدات	1.5
عدد الساعات	3
اسم التدريسي	د. تهاني وليد جهاد. محمد عدنان قبع. د.عطاالله مجمد شيت محمود
وصف المقرر	التعرف على كيفية تشخيص المركبات العضوية نظاميا وطيفيا

Dr. Adnan Othman Omer

Subject ; Advanced Organic Chemistry

Master students course

Academic year 2021 – 2022 === 15 weaks

Cataloge Description ;

Reference book ; Advanced organic Chemistry
Reaction and Mechanism by March

Advanced Organic Chemistry , by Wood

Course Outcomes;-

Weakly Teaching plan;

Weak 1, 2, 3 Intermediates ; Carbocations, Generation , stability , Fate

	Carbanions ; Generation, stability , fate
	Free radicals
Weak 4 , 5, 6	Nucleophilic Substitution Reaction
	Electrophilic Sustitution Reaction
	Addition Nucleophilic and Electrophilic Reaction
Weak 7 , 8 , 9	Aromaticity
	Aromatic Electrophilic Substitution Reaction
	Aromatic Nucleophilic Substitution Reaction
Weak 10 , 11 , 12	Elimition Reaction
	Rearangements
	Electrocyclic Reaction
Weak 14 , 15	Oxidation Reaction
	Reduction Reaction

Students Bhaviour in Class ; very goog
Computer using ; mostly
Teching technique ;giving all lectures and hold sessions of discussion in lectues

---

Dr. Salim Jasim Mohammed

Subject name: Stereochemistry/PhD. students course 1

Academic Year : 2021-2022

Credit Hour : 2hrs. *15 weeks

Catalog Description:

Reference Book: Organic Chemistry by Morrison and Boyd**,** Advanced of organic chemistry , Stereochemistry

Course Outcomes:

Weekly Teaching Plan:

Week 1&2&3	Historical of stereo chemistry, configuration ,conformation ,isomerism
First Quiz	
Week 4&5&6&7	Types of isomerism ,enantiomers & daistereomers ,chirality, Molecular chirality , Optical isomerism, Representation of stereoisomers
Second Quim	
Week 8&9&10&11	Erythro and Threo isomers, Meso compound, Racemization, Multiple Stereo centers, Racemic Mixtures, Fischer Projection
Third Quiz	
Week 12&13&14	y:. Stereo selectivity:.R&S rules Absolute and relative Configuration , Stereoisomerism of Cyclic Compounds
1st course Mid Term Examination	
Week 15	Stereochemistry of Reactions , Prochirality, Chirality at Nitrogen, Phosphorus, and Sulfur
1st course Final Term Examination	

Students Behaviour in Class : very good

Computer Usage: Mostly

Teaching Techniques: Giving all lectures and hold sessions of discussion in lectures .

Dr. Salim Jasim Mohammed

Subject name: Stereochemistry/MSc. students course 2

Academic Year : 2021-2022

Credit Hour : 2hrs. *15 weeks

Catalog Description:

Reference Book: Organic Chemistry by Morrison and Boyd**,**
Advanced of organic chemistry , Stereochemistry
Course Outcomes:

Weekly Teaching Plan:

Week 1&2&3	Historical of stereo chemistry, configuration ,conformation ,isomerism
	First Quiz
Week 4&5&6&7	Types of isomerism ,enantiomers & daistereomers ,chirality, Molecular chirality , Optical isomerism, Representation of stereoisomers
	Second Quim
Week 8&9&10&11	Erythro and Threo isomers, Meso compound, Racemization, Multiple Stereo centers, Racemic Mixtures, Fischer Projection
	Third Quiz
Week 12&13&14	Stereo selectivity:.R&S rules Absolute and relative Configuration , Stereoisomerism of Cyclic Compounds
	1st course Mid Term Examination
Week 15	Stereochemistry of Reactions , Prochirality, Chirality at Nitrogen, Phosphorus, and Sulfur
	1st course Final Term Examination

Students Behaviour in Class : very good
Computer Usage: Mostly

Teaching Techniques: **Giving all lectures and hold sessions of discussion in lectures .**

Dr.Salim Jasim Mohammed

Subject name:Practical Organic chemistry lab. 3rd class / first course

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: **This course covers important experiments in the field of organic chemistry , most of the experiment may take more than one week duration .**

Reference Book: **1- Vogel's Textbook of Practical Organic Chemistry by B. S. Furniss , A. J. Hannaford , P. W. G. Smith and A. R. Tatchell ،L.F. Fieser and** K.L. Williamson Organic Experiments

Course Outcomes: **To improve students scientific knowledge in the field of organic chemistry .**

Weekly Teaching Plan:

THE FIRST SEMESTER OF PRACTICAL ORGANIC CHEMISTRY

Week 1&2&3	Cannizaro reaction
First Quiz	
Week 4&5&6&7	Perkin reaction
Second Quiz	
Week 8&9&10&11	Diazonium salts reaction
Third Quiz	
Week 12&13&14	Synthesis of Sulphanilic acid
1st course Mid Term Examination	
Week 15	Detection of experiments
1st course Final Term Examination	

Students Behaviour in Class : Good .
Computer Usage: Assign students to duties requiring the use of computer .

Teaching Techniques: Different techniques .

وصف مقرر الكيمياء العضوية المرحلة الرابعة

2021-2022

المرحلة	الرابعة ـعملي
اسم المادة باللغة العربية	تشخيص عضوي
اسم المادة باللغة الانكليزي	Identification of Organic Compounds
عدد الوحدات	3.5
عدد الساعات	لكل مختبر = 122
اسم التدريسي	م.م.محمد عدنان (الفصل الاول)
وصف المقرر	تشخيص المركبات العضوية من خلال اجراء عدة طرق من ضمنها (تحليل العناصر, الذوبانية, استخدام الكواشف والمحاليل الكيميائية للكشف عن المجاميع الوضيفية في المركبات العضوية كذلك دراسة خواصها الفيزيائية والكيميائية .

المرحلة	الرابعة ـ عملي
اسم المادة باللغة العربية	كيمياء عضوية عملي
اسم المادة باللغة الانكليزي	Spectroscopic methods for identification of Organic Compounds (MS, IR)
عدد الوحدات	3.5
عدد الساعات	لكل مختبر = 122
اسم التدريسي	م.م.محمد عدنان (الفصل الثاني)
وصف المقرر	دراسة طيف الكتلة لتشخيص المركبات العضوية (دراسة النضائر, الوفرة النسبية, وايجاد الصيغ الكيميائية وكذلك ميكانيكية التكسرلكل من الالكانات, الالكينات, مركبات الذرات غير المتجانسة, ومركبات الكاربونيل. كذلك دراسة طيف الاشعة تحت الحمراء (تشخيص المركبات العضوية من خلال المجاميع الوضيفية التي تحتويها وترددات اهتزازها في مناطق معينة من الطيف)

وصف مقرر السلامة والامن الكيميائي/ المرحلة الاولى

2021-2022

المرحلة	الاولى- نظري
اسم المادة باللغة العربية	السلامة والامن الكيميائي / الكورس الاول
اسم المادة باللغة الانكليزي	Safety and chemical security
عدد الوحدات	1
عدد الساعات	1
اسم التدريسي	د.عزام احمد محمد
وصف المقرر	تضمن المنهج مقدمة عن السلامة اضافة الى مخاطر وتصنيف المواد الكيميائية والممارسة المختبرية الجيدة وقواعد العمل المختبري الصحيح. وايضا مخاطر الحريق و كيفية التصرف في حالات الطوارئ واهم علامات السلامة الارشادية.

المرحلة	الاولى- نظري
اسم المادة باللغة العربية	السلامة والامن الكيميائي / الكورس الثاني
اسم المادة باللغة الانكليزي	Safety and chemical security
عدد الوحدات	1
عدد الساعات	1
اسم التدريسي	د.عزام احمد محمد
وصف المقرر	تضمن الكورس فئة الخطورة للمواد الكيميائية وشروط التخزين وايضا خزائن شفط الغازات والمختبر النموذجي وادارة المواد الكيميائية. كذلك النفايات الخطرة وطرق التخلص منها والسلامة والامن الكيميائي والاصابات واسباب الحوادث في المختبرات واسعافها. وايضا المواد الكيميائية الشائعة الاستعمال واضرارها.

وصف مقرر الكيمياء العضوية المرحلة الثالثة

2021-2022

المرحلة	الثالثة ـ عملي
اسم المادة باللغة العربية	كيمياء عضوية عملي
اسم المادة باللغة الانكليزي	Practical organic chemistry
عدد الوحدات	1
عدد الساعات	2 لكل مختبر = 12
اسم التدريسي	م . د. هبة أمين إبراهيم ،م . م. شيماء يونس ابراهيم، م.م. شهلة أحمد يونس (الفصل الاول والثاني)
وصف المقرر	يتضمن الفصلان الدراسيان اجراء تجارب في مجال الكيمياء العضوية لتحضير بعض المركبات العضوية وقد تستغرق التجربة الواحدة عدة أسابيع

وصف مقرر الكيمياء العضوية المرحلة الثالثة

2022-2021

المرحلة	الثالثة- نظري
اسم المادة باللغة العربية	كيمياء عضوية
اسم المادة باللغة الانكليزية	Organic Chemistry
عدد الوحدات	2
عدد الساعات	4
اسم التدريسي	ا. م. د. منيرة يوسف رؤوف , د. سعيد عبدالقادر سعيد (الفصل الاول والفصل الثاني)
وصف المقرر	**First Course:** This course covers important topics in organic chemistry that include the generation of carbanions from active methylene compounds , and the use of these intermediates in the synthesis of various important organic compounds , further more this course involve a description of the different types of rearrangements and an overview of poly aromatic compounds. These topics involve (Carbanions I, Carbanions II, α,β-unsaturated carbonyl compounds, Rearrangements and neighboring group participation and Poly aromatic compounds). **Second Course**: This course covers important topics in organic chemistry that include heterocyclic compounds (five and six membered ring system) which involve their reactions and synthetic methods , further more this course involve a description of alicyclic compounds and an overview of name reactions. These topics involve (Five membered heterocyclic compounds: pyrrole, furan and thiophene, Six membered heterocyclic copounds: pyridine, pyridine N-Oxide , quinoline and isoquinoline, Alicyclic compounds and Name reactions).

وصف مقرر الكيمياء العضوية المرحلة الثالثة

2021-2022

المرحلة	الثالثة ـ عملي
اسم المادة باللغة العربية	كيمياء عضوية عملي
اسم المادة باللغة الانكليزي	Practical organic chemistry
عدد الوحدات	1
عدد الساعات	2 لكل مختبر = 12
اسم التدريسي	م . د. هبة أمين إبراهيم ،م . م. شيماء يونس ابراهيم، م.م. شهلة أحمد يونس (الفصل الاول والثاني)
وصف المقرر	يتضمن الفصلان الدراسيان اجراء تجارب في مجال الكيمياء العضوية لتحضير بعض المركبات العضوية وقد تستغرق التجربة الواحدة عدة أسابيع

وصف مقرر الكيمياء العضوية المرحلة الثانية

2021-2022

المرحلة	الثانية - عملي
اسم المادة باللغة العربية	كيمياء عضوية عملي
اسم المادة باللغة الانكليزي	Practical organic chemistry
عدد الوحدات	1
عدد الساعات	لكل مختبر = 122
اسم التدريسي	م . د. هبة أمين إبراهيم ،م . م. شيماء يونس ابراهيم، م.م. شهلة أحمد يونس م. د. صالح عويد م. د. اميرة محمد فرج (الفصل الاول والثاني)

وصف المقرر	يتضمن الفصلان الدراسيان اجراء تجارب في مجال الكيمياء العضوية لتحضير بعض المركبات العضوية وقد تستغرق التجربة الواحدة اسبوع او اسبوعين

وصف مقرر الكيمياء العضوية / المرحلة الاولى

2021-2022

المرحلة	الاولى- نظري
اسم المادة باللغة العربية	كيمياء عضوية
اسم المادة باللغة الانكليزي	Organic Chemistry
عدد الوحدات	2
عدد الساعات	3 ساعة * 4 شعب
اسم التدريسي	د. صالح عويد عبود
وصف المقرر	**Second Course:** Introduction, bonds, hybridization, physical properties and molecular structure , **alkanes and cycloalkanes**- nomenclature, stereochemistry, conformational analysis, and an introduction to synthesis- hydrogenation of alkenes and alkynes, reduction of alkyl halides, reduction of carbonyl compounds, decarboxylation, Grignard reagents, Wurtz reaction, Corey- House synthesis. **Alkene, Alkadiene, Alkyne**- nomenclature, Reactions and synthesis- elimination**,** dehydrohalogenation**,** Zaitsev's and Hofmann's rules, dehydration of alcohols, E1-E2 reaction, rearrangements, debromination, syn addition, anti addition, Markovnikov's rules, mechanism, oxidation- *Hydroboration–oxidation*, epoxidation of alkenes.

وصف مقرر الكيمياء العضوية العملي / المرحلة الثانية

2021-2022

المرحلة	الثانية - عملي
اسم المادة باللغة العربية	كيمياء عضوية عملي
اسم المادة باللغة الانكليزي	practical organic chemistry
عدد الوحدات	1
عدد الساعات	2 ساعة *6 مختبرات
اسم التدريسي	د. صالح عويد عبود م . د. هبة أمين إبراهيم ،م . م. شيماء يونس ابراهيم، م.م. شهلة أحمد يونس م. د. اميرة محمد فرج (الفصل الاول والثاني)
وصف المقرر	**first course:** laboratory safety, Glass ware, Melting point , boiling point, Simple distillation , Fractional distillation ,Steam distillation , Recrystallization ,Sublimation . **second course:** Preparation of methane gas, Acetylene gas ،detected for prepared compound, preparation of cyclohexene, propanaldehyde, detected for prepared compound, Preparation of benzoic acid, detected for prepared compound, Preparation of methyl m-Nitrobenzoate ,detected for prepared compound.

وصف مقرر الكيمياء العضوية المرحلة الرابعة

2021-2022

المرحلة	الرابعة -عملي
اسم المادة باللغة العربية	تشخيص عضوي
اسم المادة باللغة الانكليزي	Identification of Organic Compounds
عدد الوحدات	3.5
عدد الساعات	لكل مختبر = 122
اسم التدريسي	م. د. صالح عويد عبود (الفصل الاول)
وصف المقرر	تشخيص المركبات العضوية من خلال اجراء عدة طرق من ضمنها (تحليل العناصر, الذوبانية, استخدام الكواشف والمحاليل الكيميائية للكشف عن المجاميع الوظيفية في المركبات العضوية كذلك دراسة خواصها الفيزيائية والكيميائية .

وصف مقرر الكيمياء العضوية المرحلة الرابعة

2021-2022

المرحلة	الرابعة- نظري
اسم المادة باللغة العربية	طيف عضوي
اسم المادة باللغة الانكليزي	Organic Spectroscopy
عدد الوحدات	3.5
عدد الساعات	4
اسم التدريسي	أ.م. د. شيماء خزعل، د. هيفاء يونس حسين
وصف المقرر	**First Course:** Infrared spectroscopy (IR), Nuclear Magnetic Resonance (NMR). **Second Course:** Mass spectroscopy, Ultraviolet spectroscopy (UV).

Mosul University

College of science Chemistry Department

Dr. Fanar mohammed Al-Healy

Subject name: physical chemistry(thermodynamic)

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: thermodynamic 2nd class- 1st course

Reference Book: physical chemistry, F.Daniels, R.A.Alberty ,2nd edition, 1963,iohn wile&sones,inc.New York .London, Atkins 2013

Course Outcomes: To make students practice of thermodynamics, thermodynamics is concerned with ways energy is stored within a body and how energy transformations, which involve heat and work, Thermodynamics is important for both Chemistry and Physics as it deals with the study of energy, the conversion of energy between different forms and the ability of energy to do work. Introduction to Thermodynamics: work, temperature, systems, 1st Law, heat, state and path functions.

Weekly Teaching Plan: 1st course / 3rd class

Week 1&2&3	Introduction to Thermodynamics, properties of Thermodynamic, Dalton's law.
First Quiz	
Week 4&5&6	Graham's Law of Diffusion and Effusion, Real gases, Deviation from Ideal gas Behavior, Compressibility factor, Van der Waals Equation, Zeroth law of thermodynamics, First law of thermodynamics, Quantity of heat, Work, Internal energy Application, Cyclic procures. (do homework)
Second Quiz	
Week 7&8&9&10	Reversible and Irreversible Processes, Isobaric Process, Isochoric Process, Isothermal Process, Heat Capacity, Relation In adiabatic process, Theoretical calculation of (Cp & Cv).
Third Quiz	
Week 11&12&13&14	Endothermic and Exothermic process, The relation between ΔE and ΔH, Enthalpy of Combustion, Thermochemistry laws, Heat of Formation (Hf), Heat of Solution, Bond energy, Second Low of Thermodynamic. (do homework)
1st course Mid Term Examination	
Week 15	Third low of thermodynamic
1st course Final Term Examination	

Students Behaviour in Class : student interaction Very good .
Computer Usage: good .

Teaching Techniques: using power point, videos and pictures , pdf and word programs.... by classroom.

Mosul University

College of science Chemistry Department

Assist. Prof. Dr. Ammar Abdulsattar Ibrahim

Subject name: Physical Chemistry – Second Class – 2nd Course

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description:

This course give information about the phase equiliria with examples of components and degree of freedom. Besides that, used Clapeyron, Classius-Clapeyron, Trouton and Henrey laws with examples. Also, explaining solutions, azeotropic and freezing or boiling point with examples. Finally, chemical equilibrium and Le-Chatlier principle are explain with examples.

Reference Book: **Physical Chemistry, Farrington Daniels and Robert A. Alberty, 2nd Edition, 1963**

Course Outcomes: gives an experience for students to understand what happen during the chemical reactions to know the reaction happen spontaneously or not.

Weekly Teaching Plan:

Week 1&2&3	Phase equilibria , Component , Independent Component , Degree of freedom Phase rule , Uses of of Phase Rule , examples of phase rule, Triple point ,
First Quiz	
Week 4&5&6&7	Clapeyron equation , Examples Classius – Clapeyron equation , Examples The Trouton's Rule, Examples ,
Second Quiz	
Week 8&9&10&11	Raoult's Law , Examples , Ideal solutions , Deviation from Raoult's law , Positive and negative deviation , examples Solutions, Mole fraction, vapour pressure, Henrey's Law , Boiling point and freezing point , examples
Third Quiz	
Week 12&13&14	Azeotropic, Minimum & maximum boiling azeotropic Elevation of boiling point , examples , Freezing point , examples , Fractional Distillation , examples , Chemical equilibrium , relation between (Kc, Kp and Kx)
2nd course Mid Term Examination	
Week 15	Le-Chatlier Principle , effect of (Temp, Pressure and Conc.) , Relation between K and ΔG, examples
2nd course Final Term Examination	

Students Behaviour in Class : Answer most of equations, discussions, sharing with lecturer.

Computer Usage: when the course needs some applications

Teaching Techniques: different techniques

Mosul University

College of science Chemistry Department

Lecture: Dr. Nada Bashir Sharif

Subject name: **Experimental Physical Chemistry-1st Course**

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: a different eight experiments in thermodynamic of physical chemistry including the density, viscosity, surface tension, molecular weight determination (liquid and solid), enthalpy of neutralization, heat of solution, heat of vaporization.

Reference Book: Physical chemistry (4th edition) ,Robert J. Sillbey et al ,2005

ملزمة التجارب العملية للمرحلة الثانية الكيمياء الفيزياوية الكورس الاول 2018 -2019.

Course Outcomes: an able the students to know the principles of the thermodynamic of physical chemistry.

Weekly Teaching Plan:

Week 1&2&3	Explain in detail about all experiments (theory , procedure ,calculation).
First Quiz	
Week 4&5&6&7	Work experimentally all the (8) experiments by eight group of students .
Second Quiz	
Week 8&9&10&11	Complete the work of the experiments and collection the reports of experiments from the students.
Third Quiz	
Week 12&13&14	An examination theoretical and experimentally about the course**.**
2nd course Mid Term Examination	
Week 15	Calculate the degrees and submission for students.

Students Behaviour in Class : good , listening carefully.

Computer Usage: yes

Teaching Techniques: Google class room and google meet.

Mosul University

College of science Chemistry Department

Lecture: Dr. Nada Bashir Sharif .....

Subject name: Experimental Physical Chemistry- 2nd Course

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: a different seven experiments in physical chemistry including determination of equilibrium constants , water – phenol Miscibility Diagram ,plot of three component diagram ,degree of freedom ,determination the theoretical plates of fractionating column , determination of adsorption ratio determination the heat of reaction and calculation the molecular weight of solids.

Reference Book: Physical chemistry (4th edition), Robert J. Sillbey et al, 2005.
اساسيات الكيمياء الفيزياوية (العملي) طبعة 1429هـ – 2008م

Course Outcomes: an able the students to know the principles of the thermodynamic of physical chemistry.

Weekly Teaching Plan:

Week 1&2&3	Explain in detail about all experiments (theory , procedure ,calculation).
First Quiz	
Week 4&5&6&7	Work experimentally all the (7) experiments by seven group of students .
Second Quiz	
Week 8&9&10&11	Complete the work of the experiments and collection the reports of experiments from the students.
Third Quiz	
Week 12&13&14	An examination theoretical and experimentally about the course**.**
2nd course Final Term Examination	
Week 15	Calculate the degrees and submission for students.

Students Behaviour in Class : good, listening carefully.

Computer Usage:

Teaching Techniques: white board ,google class room and google meet.

Mosul University

College of science Chemistry Department

Dr. Omar Adil Shareef

Subject name: Kinetic reactions 3 rd class first course

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: This course is useful for third class student where it give them good idea about kinetic and reaction mechanisms

Reference Book: 1-Atkins (physical chemistry) Eighth Edition

2-H.E Avery (Basic reaction kinetic and mechanisms)

3-CHEMISTRY 10th edition (Raymond Chang)

4-Physical Chemistry 3 th edition (Robert G.Mortimer)

Course Outcomes : To help students learn the mechanism of reactions and some important theories in the kinetic of reactions

Weekly Teaching Plan:

Week 1&2&3	**Introduction,** Types of Chemical Reactions, Kinetic of simple reactions Stoichiometry & Molecularity, Rate of chemical reactions,
First Quiz	
Week 4&5&6&7	Factors that effect on the Reaction rate, Rate constant reaction, Order of reactions, (differential method, integration method, initial rate method, isolation method.
Second Quiz	
Week 8&9&10&11	Half life of reaction, Theory of reaction rate, Collision theory, Activation theory, **Steady state , pre-equilibrium, Rate determining step**
Third Quiz	
Week 12&13&14	Complex reactions , reversible reaction ,parallel reaction,
2nd course Mid Term Examination	
Week 15	Consecutive reaction , Ionic reaction , Chain reaction
2nd course Final Term Examination	

Students Behaviour in Class : good

Computer Usage: Assign student to duties requiring computer use

Teaching Techniques: different techniques

Mosul University

College of science Chemistry Department

Dr. Firas Ahmed Thanon Al-Lolage

Subject name: Electrochemistry 3rd class Second-course

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: This course provides the students with a good idea about the physical chemistry, electrochemistry has a number of different uses, particularly in industry. The principles of cells are used to make electrical batteries. In science and technology, a battery is a device that stores chemical energy and makes it available in an electrical form.

Reference Book: 1-Atkins (physical chemistry) Eighth Edition

2- D. Pletcher, "A First Course in Electrode Processes", 2nd Edition, RSC Publishing, Cambridge, 2009, ISBN 978-1-85755-893-0. Chapters 1-5

Course Outcomes : To help students learn about the electrochemistry and some important theories in electrochemistry.

Weekly Teaching Plan:

Week 1&2&3	Introduction, Why scientists make electrochemical measurements? Electrochemical Cells, Electroneutrality, Types of electrochemical cells, Conductivity Theory and Measurement, Introduction to conductivity, What is conductivity?, Strong electrolytes, Weak electrolytes, Non- electrolytes, Conductivity Units, What is the difference between conductance and conductivity?, Definition of terms; Resistance, Conductance (G), Cell constant, Conductivity or specific conductance, Resistively, Reference temperature, Equivalent conductance.
First Quiz	
Week 4&5&6&7	Electrolysis, Electrolysis - the process, Electrolytic cells, What are the features of an electrolytic cell?, Comparing galvanic and electrolytic cells, Electrolysis of molten ionic compounds, Electrolysis of water, Electrolysis of aqueous solutions of ionic compounds, Commercial applications of electrolysis, Calculations in electrolysis - Faraday's laws, Problems and solutions, Predicting the Electrolysis Products of Aqueous Ionic Solutions, Quantitative Aspects of Electrolysis, Simple conversion for any type of problem.
Second Quiz	
Week 8&9&10&11	Kohlrausch's law, Equivalent conductance, Molar conductance, Weak and Strong Electrolytes, Effect of dilution on conductance, Experimental basis and theoretical explanation of Kohlrausch law, Applications of Kohlrausch's law, Calculation of equivalent conductance at infinite dilution or weak electrolytes, Calculation of degree of dissociation of weak electrolytes, TYPES OF ELECTRODES, Standard reduction potential (Eo), Electromotive force (EMF), Electrochemical series, NERNST EQUATION, Derivation of Nernst Equation for Electrode potential, APPLICATIONS OF NERNST EQUATION, Single Electrodes or Half Cells: Types, Metal-Metal Ion electrodes, Gas Electrodes, Metal-Insoluble salt electrode, Ion selective electrode (ISE), MEASUREMENT OF pH USING GLASS ELECTRODE.

Second-course Mid Term Examination

Week 12&13	Applications of Conductivity Measurements, Determination of degree of Dissociation, Determination of Solubility Product of a Sparingly Soluble Salt, Conductometric Titration; Acid-Base Titration, Transport number and Ionic conductance, Determination of Transport Number, Concentration Cells, Definition, Construction, Types of concentration cells, How a Concentration Cell Works?, Problems and solutions, Acid Dissociation Constant, pH and pKa Relationship: The Henderson-Hasselbalch Equation, Example pKa and pH Problem.

Third Quiz

Week 14&15	BATTERIES and FUEL CELLS, Primary Batteries, Dry cell, Mercury cells, Secondary Batteries, Lead Storage Battery, FUEL CELLS, Electrochemistry and Thermodynamics, The Nernst Equation, Thermodynamics, Thermodynamics and Equilibrium, Electrochemical Corrosion, MEASUREMENT OF CONDUCTANCE.

Second-course Final Term Examination

Students Behaviour in Class: Good

Computer Usage: Assign student to duties requiring computer use

Teaching Techniques: different techniques; Google Classroom- visual, auditory, reading/writing, and kinesthetic.

Dr. Omar Adil Shareef

Subject name: Surface Chemistry 3 th class, first course

Academic Year : 2021-2022

Credit Hour : 1hr. *15 weeks

Catalog Description: This course is useful for first class student where it give them good idea about the physical proprieties and to know the physical behavior for materials.

Reference Book: 1-Atkins (physical chemistry) Eighth Edition

2-CHEMISTRY (Raymond Chang)

3-Physical Chemistry 3 th edition (Robert G.Nertimer).

Course Outcomes : To help students learn the physical properties and considered introduction of physical chemistry of reactions and some important theories in the kinetic of reactions to take advantage of it in the advanced stages

Weekly Teaching Plan:

Week 1&2&3	Introduction, place of colloid and surface science,state of matter, surface tension

First Quiz

Week 4&5&6&7	Measuring of surface tension, cohesive and adhesive, capillary action forces, effect of temperature on the surface tension.

Second Quiz

Week 8&9&10&11	Surface free energy, interfacial energy , spreading coefficient , the work of cohesion and adhesion.

Third Quiz

Week 12&13&14	*Amphiphiles, determination of hrdrophilic-lipophilic balance value, determination of HLB , attractive forces , Adsorpttion, types of adsorption.*

1st course Mid Term Examination

Week 15	The Gibbs adsorption equation.

1st course Final Term Examination

Students Behaviour in Class : good

Computer Usage: Assign student to duties requiring computer use

Teaching Techniques: different techniques

Mosul University

College of science Chemistry Department

Dr. Ala Aldin Darghouth

Subject name: Practical physical chemistry 3 rd class first course

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description:

This course is useful for third class student where it give them good idea about the practical physical chemistry (kinetic reactions).

Reference Book:

- Shu Hotta; Mathematical Physical Chemistry: Practical and Intuitive Methodology; 2 ed Edition; Springer Nature; 2021
- Haghi, A. K.; M., Praveen K.; Pai, Avinash R.; Thomas, Sabu; Innovations in physical chemistry; Theoretical models and experimental approaches in physical chemistry: research methodology and practical methods; Apple Academic Press Inc, 2019
- Farrington Daniels et al.; Experimental physical chemistry; 6th Edition; New York : McGraw-Hill; 1962
- Alexander Findlay; physical chemistry; Longmans; Green and co;
- J. E. Prichard; Practical physical chemistry
- Walter J. Moore; Physical chemistry; Longman Publishing Group; 5th edition, 1998
- Samuel Glasstone; Textbook of physical chemistry, 2nd Edition
- J. RoseAdvance physical chemical experiments

Course Outcomes:

To help students learn the practical physical chemistry (kinetic reactions)

Weekly Teaching Plan:

Week 1&2	Catalytic decomposition of hydrogen peroxide Part 1 & part 2 , discussion the results that obtained
Week 3&4	Experimental No2: Hydrolysis of methyl ester. Part 1 & part 2 , discussion the results that obtained Examination in experiments 1 &2
Week 5&6	Experimental No3: Saponifcation of ethyl acetate by titration method, Part 1 & part 2 , discussion the results that obtained
Week 7&8	Experimental No4: Catalytic salt effect, Part 1 & part 2 , discussion the results that obtained

Week 9&10	Experimental No5: The determination of the order,rate and activation energy of chemical reaction Examination in experiments 3 -5
Week 11&12	Experimental No6: The effect of temperature on the rate of a reaction. Part 1 & part 2 , discussion the results that obtained
Week 13&14	Experimental No7: M Visible absorption spectroscopy, the ferric thiocyanate.Ion equilibrium discussion the results that obtained And examination
Week 15	Experimental No8: Saponifcation of ethyl acetate by electrical method

first course Final Term Examination

Students Behaviour in Class :

good

Computer Usage:

Assign student to duties requiring computer use

Teaching Techniques:

different techniques

Course development:

This course needs to add some additional experiments to deal with the new modern devices in addition to the new technologies used in modern laboratories.

Mosul University

College of science Chemistry Department

Dr. Ala aldin Darghouth

Subject name: Practical physical chemistry 3 rd class Second course
Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description: This course is useful for third class student where it give them good idea about the practical physical chemistry (electrical chemistry).

Reference Book:

- Shu Hotta; Mathematical Physical Chemistry: Practical and Intuitive Methodology; 2 ed Edition; Springer Nature; 2021
- Haghi, A. K.; M., Praveen K.; Pai, Avinash R.; Thomas, Sabu; Innovations in physical chemistry; Theoretical models and experimental approaches in physical chemistry: research methodology and practical methods; Apple Academic Press Inc, 2019
- Farrington Daniels et al.; Experimental physical chemistry; 6th Edition; New York : McGraw-Hill; 1962
- Alexander Findlay; physical chemistry; Longmans; Green and co;
- J. E. Prichard; Practical physical chemistry
- Walter J. Moore; Physical chemistry; Longman Publishing Group; 5th edition, 1998
- Samuel Glasstone; Textbook of physical chemistry, 2nd Edition
- J. Rose, Advance physical chemical experiments

Course Outcomes:
To help students learn the practical physical chemistry (electrical chemistry)

Weekly Teaching Plan:

Week 1&2	Experimental No1: Equivalent conductance of strong electrolyte. Part 1 & part 2 , discussion the results that obtained
Week 3&4	Experimental No2: Dissociation constant of weak electrolytes from conductivity measurements. Part 1 & part 2 , discussion the results that obtained Examination in experiments 1 &2
Week 5&6	Experimental No3:Condutometric titration, Part 1 & part 2 , discussion the results that obtained
Week 7&8	Experimental No4: The quinhydron electrode, Part 1 & part 2 , discussion the results that obtained

Week 9**&**10	Experimental No5: The glass electrode, Part 1 & part 2 , discussion the results that obtained Examination in experiments 3 -5
Week 11&12	Experimental No6: Dissociation constant (Ka) of a weak acid from its neutralization. Part 1 & part 2 , discussion the results that obtained
Week 13&14	Experimental No7: Measurement of the E.M.F of a concentration cell 4 part in 2 weeks
Week 15	Experimental No8: Thermodynamic of cell

2nd course Final Term Examination

Students Behaviour in Class :

good

Computer Usage:

Assign student to duties requiring computer use

Teaching Techniques:

different techniques

Course development:

This course needs to add some additional experiments to deal with the new modern devices in addition to the new technologies used in modern laboratories.

Mosul University

College of science Chemistry Department

Dr. Ala Aldin Darghouth

Subject name: Quantum chemistry

Academic Year : 2021-2022

Credit Hour : 3hr. *15 weeks

Catalog Description:

- General introduction (the definition of quantum chemistry, classical mechanics).
- Quantum theory (photoelectric effect, Bohr atom, Sommerfeld quantization, the dual nature of light).
- Quantum mechanics (Postulates of quantum mechanics, Schrödinger wave equation, hermitian operator, normalization and orthogonality, orthonormality).
- Applications of quantum mechanics for some simple systems (particle in a box, two-particle rigid-rotor, simple harmonic oscillator, the hydrogen atom, the problem of Schrödinger equation with nonhydrogen like atoms).
- Approximate Methods (the variation principle, perturbation theory).
- The atoms (uncertainty principle, the helium atom, electron spin, Pauli exclusion principle, First excited state of helium atom, Slater determinant, Hartree and Hartree-Fock SCF methods for atoms).
- The molecules (Born-Oppenheimer approximation, valance bond theory (VBT), molecular orbital theory (MOT), Hückel molecular orbital theory (HMOT)).
- A brief sight to computational chemistry (molecular mechanical calculations, quantum mechanical calculations, semi-empirical methods, ab initio methods, density functional theory (DFT)).

Reference Book:

- Peter Atkins, Julio de Paula, James Keeler Physical Chemistry, 11th Edition; Oxford University Press, Oxford, 2018.
- Atkins, P and Friedman R. Molecular Quantum Mechanics, 4th Edition; Oxford University Press, Oxford, 2005.
- Engel T. Quantum Chemistry and Spectroscopy, 3rd Edition; Pearson; 2013.

Course Outcomes:

- Learn what is quantum chemistry.
- Understanding the principles of quantum chemistry and how to use it.
- Understanding how the quantum mechanics explain some chemical behaviors.
- Do some computational chemistry and get important information.

Weekly Teaching Plan:

Week 1&2&3	General Introduction, Classical Mechanics, Quantum Theory.
First Quiz	
Week 4&5&6&7	Quantum Mechanics, Schrodinger Equation, Postulates of Quantum Mechanics.
Second Quiz	
Week 8&9&10&11	Applications of Quantum Mechanics for Some Simple Systems, Approximate Methods,
Third Quiz	
Week 12&13&14	The Atoms, The Molecules.
1st course Mid Term Examination	
Week 15	A Brief Sight to Computational Chemistry.
1st course Final Term Examination	

Students Behavior in Class : Good behavior.

Computer Usage: Yes.

Teaching Techniques: Projector and white board.

Course development:

The course must deal with some computational methods. Such as Ab initio quantum chemistry methods in addition to density functional theory and some comparison between them from point of view their features and failure

Mosul University

College of science Chemistry Department

Dr. Alaa H. Jalil *and* Dr. Ibraheem M. Haies

Subject name: Physical Spectroscopy

Academic Year : 2021-2022

Credit Hour : 3hr. * 12 weeks

Catalog Description:

Reference Book: 1. Physical Chemistry, Atkins, P. W. & de Paula, J., 9th edition, 2010, Oxford University Press.
2. Quantum Chemistry and Spectroscopy, Engel T. 3th Edition, 2012.
3. Quantitative Chemical Analysis, D.C. Harris. 8th edition (2011), or 9th edition Published by Freeman. Chapter 17, 19.

Course Outcomes: This course is useful for the fourth-class student where it gives them a good idea about atoms and molecules due to they have unique spectra. As a result, students can be used these spectra to detect, identify and quantify information about the atoms and molecules.

Weekly Teaching Plan:

Week 1&2	What is Spectroscopy and Electromagnetic Radiation? What is Light? Waves or Particles? Theory of Light, Wave Theory of Light, Huygens' Principle, Young's Double Slit Experiment? Electromagnetic Wave Theory, Properties of Light as waves, Particle Theory of Light, Photoelectric Effect, Velocity of light and Energy of Photon, Electromagnetic Radiation Interaction with Matter, Electromagnetic Spectrum, Spectrometry, Spectrum and Spectrometer, Absorption and Emission, Types of Transitions, Selection Rules.
First Quiz	
Week 3, 4&5	Rotational spectroscopy (Microwave spectroscopy), moment of inertia of a molecule, Classification of Molecules based on Moment of Inertia, Interaction of Radiation with Rotating Molecule, Rotational Spectra of Rigid Diatomic Molecules, Intensities of Rotational Spectral Lines, distribution of molecules over rotational levels, Non-Rigid Rotor.
Second Quiz	
Week 6&7	Infrared Radiation Absorption, Questions Have to be Answered, IR Absorption, Harmonic Oscillator, Bond Strength, Nuclei Mass, Anharmonicity, Fundamental and Overtones Transitions.
Third Quiz	
Week 8&9	Fourier Transform Infrared (FTIR), X and Y axes of the IR Spectrum, Examples, Molecule Vibrational Modes, IR Active Vibrational Modes, Functional Groups.
2^{nd}course Mid Term Examination	
Week 10, 11&12	Ultraviolet-Visible (UV-VIS) spectroscopy, Electronic Spectroscopy, Molecular Orbital Types, Electronic Transitions Types, Chromophore, Auxochrome, Beer-Lambert Law, Spectrophotometer, single beam and Double beam, Ultraviolet-Visible spectroscopy applications.
2^{nd}course Final Term Examination	

Students Behaviour in Class: good

Computer Usage: Assign student to duties requiring computer use.

Teaching Techniques: Power Point, Google meet and google classroom.

Mosul University

College of science Chemistry Department

Prof. Dr. Rabah A. Khalil

Subject name: Physical Chemistry MSc students

Weekly Teaching Plan: 2021/2022

References: Laidler, Keith J.; Meiser, John H.; Sanctuary, Bryan C, Physical Chemistry, 4th Edition, BrookCoIe, 2002.
R. A. Alberty, Physical Chemistry, 7th Edition, Wiley, 1987.
H. E. Avery, Basic Reaction Kinetics and Mechanisms, THE MACMILLAN PRESS LTD, London, 1974.

Week 1&2&3	-General Introduction and outline -Molecular Interactions
First Quiz	
Week 4&5&6&7	Kinetics of Chemical reactions, Minitab software
Second Quiz	
Week 8&9&10&11	-Kinetics of Chemical reactions, Effect of Temperature on chemical reactions
Third Quiz	
Week 12&13&14	Thermodynamics
2nd course Mid Term Examination	
Week 15	Thermodynamics
2nd course Final Term Examination	

Students Behaviour in Class : very good
Computer Usage: yes

Teaching Techniques: data show

Mosul University

College of science Chemistry Department

Lecturer: Mawada Mohammed Sulaiman

Subject name: Computer 1st year 1st course

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description: 1st course **(6/12/2021 – 18/3/2021)**

Reference Book:

1-Introduction to windows 7 tutorial, Copyright 2012, Software Application Training Unit, West Chester University.
2-Step by step office professional 2010.
3-Windows 7 in depth.

Course Outcomes: 1st year students

Weekly Teaching Plan:

Week 1&2&3	Windows 7: Touring windows 7 desktop- exploring your computer. Navigating with windows explorer- operating system.
	Homework 1, First Quiz
Week 4&5&6&7	Adding gadgets-aero peak- the toolbar- pinning an application- the notification area. Customize the desktop- window components- showing the desktop windows accessories- security settings and software.
	Homework 2, Second Quiz
Week 8&9&10&11	Activate a window that is covered by another windows. Save your work of arts on paint. Customize the desktop. Exploring the start menu. Change icon size. Window components View the contents of a folder. View the contents of recycle bin. Open and object shortcut.
	Homework 3, Third Quiz
Week 12&13&14	View the contents of a folder. View the contents of recycle bin. Open and object shortcut. View the contents of a folder. View the contents of recycle bin. Open the jump list, when applications are open on desktop. Remove pinned application from the taskbar. Show the pop-up window to display information.
	1st course, Mid Term Examination
Week 15	Add toolbars to the taskbar. View an application icon for each open window.
	1st course, Final Term Examination

Students Behavior in Class : The students were interactive with the lesson.

Computer Usage: The students were using their own devices to learn and apply knowledge through educational videos from their lecturer.

Teaching Techniques: google classroom, audio lectures explained by the lecturer, google meet, You Tube, white board.

1st Course assessment	Homework	Attendance	Quizzes	Mid Term Examination	Final Term Examination	
	5%	5%	5%	25%	Practical	Theory
					15%	45%

Suggestions: Training students to use e-learning platforms.

Mosul University

College of science Chemistry Department

Lecturer: Mawada Mohammed Sulaiman

Subject name: Computer 1st year 2nd course

Academic Year : 2021-2022

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

Catalog Description: 2nd course **(11/4/2021-22/7/2021)**

Reference Book:

1-Introduction to windows 7 tutorial, Copyright 2012, Software Application Training Unit, West Chester University.

2-Step by step office professional 2010.

3-Windows 7 in depth.

Course Outcomes: 1st year students

Weekly Teaching Plan:

Week 1&2&3	**Introduction to computer:** characteristics of computer: speed-accuracy-versatility-storage capacity. Generations of computer. Classifications of computers. Component of computer system: CPU, ALU, memory unit, Input/Output.
Attendance quiz	
Week 4, 5, 6 & 7	**Computer Hardware:** Central processing unit "CPU". Read only Memory "ROM". Classification of secondary storage devices. Input/output devices. Types of input/output devices. Classification of input/output devices
Attendance practical exam	
Week 8, 9, 10& 11	**Introduction to information technology:** digital world. Application to computer in different fields. IT and your life: the future now. IT jobs and carriers. Online internet, worldwide web and cyberspace. Computer technology
Oral exam and homework	
Week 12&13&14	**Internet services and web technologies:** What's the internet, terms to know. Web page and website, Home pages, web server. Internet providers, IP address, domain name. Parts of URL, Search engines, access information, shopping. Online chat, downloading software, disadvantages of internet Spamming.
2nd course Mid Term synchronous online exam	
Week 15	**Microsoft word 2013:** Getting started, saving the document, toolbars and tabs, formatting, inserting and adding objects, printing, other helpful functions, shortcut keys for Microsoft office.
2nd course Final Term Examination (Attendance practical exam & synchronous online theoretical exam)	

Students Behavior in the Class : The students were interactive with the lectures.

Computer Usage: The computer was used in the practical applications.

Teaching Techniques: google classroom, audio lectures explained by the lecturer, google meet, You Tube, white board in addition to attendance of students at computer lab for practical learning.

2nd Course assessment	Homework & Online oral exam	Students interaction & attendance quizzes	Practical exam	Mid Term synchronous online exam	Final Term Examination	
	8%	7 %	5%	20%	Practical	Theory
					15%	45%

Suggestion: It is important to update the devices used in the computer lab**.**

Mosul University

College of science Chemistry Department

Lecturer: ibrahim Mohammed ahmed

Subject name: Computer 2nd year 1st course

Academic Year : 2021-2022

Credit Hour : 12hr. *15 weeks

Catalog Description: 2nd course

Reference Book:
Introduction to Matlab
Working with Vectors in Matlab
Working with Matrices in Matlab

Loops, Conditions, and Intro to Programming in Matlab
Graphs and Plotting in Matlab

Course Outcomes: 2nd year students

Weekly Teaching Plan:

Week 1&2&3	1. Introduction 2. MATLAB Running 3. Knowledge of Matlab environment 4. Working with Variables in Matlab environment 5. Commands and Functions of I/O 6. Examples & Exercises
Homework 1, First Quiz	
Week 4&5&6&7	Working with Vectors in Matlab a. Dealing with vector b. Display vector on Window c. Dealing with specific element in vector d. Dealing with multi element in vector e. Examples & Exercises
Homework 2, Second Quiz	
Week 8&9&10&11	Working with Matrices in Matlab a. Dealing with Matrix b. Type of Matrix c. Display Matrix on Window d. Dealing with specific element in Matrix e. Dealing with multi element in Matrix f. Examples & Exercises
Homework 3, Third Quiz	
Week 12&13&14	Loops, Conditions, and Intro to Programming in Matlab 1.Condition IF Statement 2. Nested IF Statement 3. For Loop Statement 4. Nested For Statement 5. Writing of the programming code 6.Examples & Exercises
1st course, Mid Term Examination	
Week 15	Graphs and Plotting in Matlab

1st course, Final Term Examination

Students Behavior in Class : The students were interactive with the lesson.
Computer Usage: The students were using their own devices to learn and apply knowledge through educational videos from their lecturer.
Teaching Techniques: google classroom, audio lectures explained by the lecturer, google meet, You Tube, white board.

1st Course assessment	Homework	Attendance	Quizzes	Mid Term Examination	Final Term Examination	
	5%	5%	5%	25%	Practical	Theory
					15%	45%

Suggestions: Training students to use e-learning platforms.

Mosul University

College of science Chemistry Department

ibrahim Mohammed ahmed

Subject name: Computer Science (ChemDraw Chemical Structure Drawing Standard) 2nd Year 2nd course

Academic Year : 2021-2022

Credit Hour : 2hr. *15 weeks

Catalog Description:

- ChemDraw is a tool to enable students to communicate chemical structures. It is designed to work according to conventions the designer's found most intuitive for such users. The designer's goal has been to make ChemDraw as easy to use as possible while providing superior drawing quality.

Reference Book:

- Cambridge Software, ChemDraw Chemical Structure Drawing Standard for Windows and Macintosh , 9.0th Edition; Cambridge University, 2004.

Course Outcomes:

- Identify the parts of the ChemDraw interface.
- Teach the students the fundamental drawing techniques.
- Drawing Chemical Structures.
- Teach the students Advanced Drawing Techniques

Weekly Teaching Plan:

Week 1&2&3	General Introduction, **ChemDraw Basics**. The ChemDraw Graphical User Interface, The Main Tools Palette
First Quiz	
Week 4&5&6&7	Teach the students the fundamental drawing techniques available in ChemDraw like. Reaction Schemes, How to use rings, Show stereochemistry
Second Quiz	
Week 8&9&10&11	Drawing Chemical Structures Drawing Bonds , Drawing Rings, Drawing Acyclic Chains
Third Quiz	
Week 12&13&14	Advanced Drawing Techniques Using Nicknames. Applying Nicknames Drawing Orbitals, Symbols,

	Arrows, Arcs, and Other Shapes

1st course Mid Term Examination

Week 15	Working With Structures Viewing Analysis Information , Viewing Chemical Properties

1st course Final Term Examination

Students Behavior in Class : Good behavior.

Computer Usage: Yes.

Teaching Techniques: Projector and white board.

Course development: