Republic of Iraq
The Ministry of Higher Education and Scientific Research University of Babylon
College of Science for Women

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة بابل
كلية العلوم للبنات

alkaimayad@gmail.com

رقم المقرر الدولي:

العدد:**2**	**Nanotechnology**	Course NO.:
التاريخ: **April 2020**	**استمارة خاصة لاطلاع الطلبة على المقرر**	

1	اسم المقرر	Nanotechnology		النوع	**فصلي**			**إجباري**
2	عدد الوحدات	٣	عدد الساعات الإجمالي	٣	النظري	٣	العملي	
3	المرحلة الدراسية	ماستر						
4	اسم التدريسي	اياد فاضل محمد القيم alkaimayad@gmail.com						

	الشهادة واللقب العلمي	دكتوراه - أستاذ
	التخصص	الكيمياء الفيزيائية

5	لغة تدريس المقرر	**انكليزي**

برنامج المقرر

اولا	**المقدمة**

Lectures: All lectures will support the post graduate students to learn the general basic of materials and synthesis of them as a nanomaterial starting from simple method for preparation and going to top highly techniques for this topic.

Theoretical exercises and applications:. Post graduate student shall be capable to learn the XRD, TEM, SEM, UBV-Vis ban-gap and materials structures.

Learning Objectives

After careful study of this course the student should be able to:

- **I- Type of materials .**
- **II- Macro and nano-materials behaviors.**
- **III- Adsorption of surface**
- **IV- role of nanomaterials in our life .**
- **V- How to calculate the crystal size and particle size .**
- **VI- Role of these materials in industry.**
- **VII- Role of the visible light and UV lights**

اولا	المقدمة

ثالثا	مفردات المقرر او المحتوى
Week 1	Introduction Nanotechnology
Week 2	**Role of the surface by depend on the semiconductor**
Week 3	**Role of metals doping**
Week 4	Adsorption of the surface and models
Week 5	**Photolysis and photofenton**
Week 6	**Photo catalysis**
Week 7	**Exam no. 1**
Week 8	Role of lights and air
Week 9	Role of techniques :
Week 10	XRD, UV-Band Gap
Week 11	XPS, EDX
Week 12	AFM, TEM and SEM
Week 13	Role of Langmuir Hanshilwood model
Week 14	Exam no. 2

رابعا	طرائق التدريس المعتمدة لتنفيذ المقرر

1-Zoom program

2-Free call

3-Google classroom,

4-work shops

اولا	المقدمة

خامسا	توزع درجات المقرر وفق لواحد أو أكثر مما يأتي
16 % 34% 50%	• Active participation, homework assignments, Attendance, quizzes • Do more than 2 formal exams either online of handbook • Preparing material of seminars as a reports

سادسا	المصادر والمراجع

1) Nanomaterials: Biomedical, Environmental, and Engineering Applications By: Part I: Nanomaterials: Synthesis and Characterization 1 "Synthesis, Characterization and General Properties of Carbon Nanotubes 3 Falah H. Hussein, Firas H. Abdulrazzak, and Ayad F. Alkaim/ 2018"

ttps://onlinelibrary.wiley.com/doi/10.1002/9781119370383.ch1

2) Nanostructures and Nanomaterials: Synthesis, Properties, and Applications (2nd Edition) (World Scientific Series in Nanoscience and Nanotechnology) 2nd ed. Edition/2019

3) Lecture notes of Nanomaterial/ 2020

مدرس المادة أ.د. اياد فاضل محمد القيم **التوقيع:**

رئيس القسم:

Republic of Iraq
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جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة بابل
كلية العلوم للبنات

Mohammed29121971@gma

رقم المقرر الدولي:

العدد:	**Application of Bonding Theories in Coordination compounds**
التاريخ: **April 2023**	**استمارة خاصة لاطلاع الطلبة على المقرر**

Course NO.:

1	اسم المقرر	**Application of Bonding Theories in Coordination compounds**		النوع	**فصلي**			**إجباري**
2	عدد الوحدات	٣	عدد الساعات الإجمالي	٣	النظري	٣	العملي	
3	المرحلة الدراسية	ماستر						
4	اسم التدريسي	محمد حامد سعيد الدهيمي Mohammed29121971@gmail.com						

	الشهادة واللقب العلمي	دكتوراه - أستاذ
	التخصص	الكيمياء اللاعضوية

5	لغة تدريس المقرر	**انكليزي**

برنامج المقرر

اولا	**المقدمة**

Coordination Chemistry provides the information on the mode of action of biological molecules based on their structural studies. With such knowledge, scientists have been able to design and modify several important biological molecules. This course will expose students to the applications of previous knowledge acquired in spectroscopic techniques, Chemical kinetics, thermodynamics and reaction mechanisms. The course will open a new world to students with interest in medicine, where knowledge of coordination chemistry is employed in the extraction of metal poison in living systems, and petrochemical industry, where the knowledge of coordination chemistry is important in catalyst design and application

Learning Objectives

At the end of this course, the students should be able to:

- Identify coordination compounds, explain the methods used in preparing them and state areas of their applications.
- Name, classify and identify the possible number of isomers of any given coordination compounds.
- Describe the structures and hybridizations of coordination compounds.
- Apply physical techniques in characterization of coordination compounds.
- Explain the nature of bonding in coordination compounds through the various bonding theories.
- Apply the knowledge of coordination chemistry in stabilization of unusual oxidation states.
- State the theories used to describe bonding in metal complexes
- Explain Valence Bond Theory (VBT)

اولا	المقدمة

- Explain Crystal Field theory (CFT)
- Explain Ligand Field Theory (LFT)
- Explain Molecular Orbital Theory (MOT)

ثالثا	مفردات المقرر او المحتو
Week 1	Introduction Coordination Compounds
Week 2	Nomenclature of Coordination Compounds
Week 3	Ligand , Type of ligand
Week 4	Chain Theory and Werner's Theory
Week 5	Sidgwick Theory Effective Atomic Number Rule
Week 6	Hybridization of Atomic Orbitals
Week 7	Valence Bond Theory , postulates of v.B. theory
Week 8	Hybrid orbitals and bonding in the octahedral
Week 9	Hybrid orbitals and bonding in the square planar, Hybrid orbitals and bonding in the tetrahedral
Week 10	Crystal field theory, Crystal field splitting in octahedral complexes
Week 11	Factors Affecting Crystal Filed Spliting, Limitations of CFT
Week 12	Ligand Field or Molecular Orbital Theory
Week 13	Molecular orbital theory
Week 14	Electronic spectra
Week 15	Exam

اولا	المقدمة

رابعا	طرائق التدريس المعتمدة لتنفيذ المقرر

1-Use the Smart screen as a modern Academy classroom facilities

2-Power Point Data Show presentations,

3-Concentrating on the activities of the students

4-Assessments

خامسا	توزع درجات المقرر وفق لواحد أو أكثر مما يأتي
16 % 34% 50%	• Active participation, homework assignments, Attendance, quizzes • Do more than 2 formal online exams • Solving a several related questions

سادسا	المصادر والمراجع

The References:-

1- Advanced Inorganic Chemistry by F.Albert Cotton ,Geoffrey Wilkinson , Carlos A. Murillo , Manfred Bochmann ; Sixth Edition 2009

2- Concise Inorganic Chemistry by J.D.Lee ; Fifth Edition 2011

3-Introduction to Coordination Chemistry by Geoffrey A. Lawrance ; First Edition 2009

4- Inorganic Chemistry principles of structure and reactivity by James E. Huheey , Ellen A. Keiter , Richard L. Keiter , Okhil K. Medhi ; Fourth Edition 2006

مدرس المادة أ.د. محمد حامد سعيد الدهيمي التوقيع:

اولا	المقدمة
رئيس القسم ومدرس المادة:	

جمهورية العراق

وزارة التعليم العالي والبحث العلمي

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رقم المقرر الدولي:

العدد:**2**	**Advances in Electrochemistry**	Course NO.:
التاريخ: **April 2020**	**استمارة خاصة لاطلاع الطلبة على المقرر**	

1	اسم المقرر	Advances in Electrochemistry	النوع	**فصلي**	**إجباري**			
2	عدد الوحدات	٣	عدد الساعات الإجمالي	٣	النظري	٣	العملي	
3	المرحلة الدراسية	ماستر						

4	اسم التدريسي	حازم يحيى محمد علي الجبوري h.yahya40@yahoo.com
	الشهادة واللقب العلمي	دكتوراه - أستاذ مساعد
	التخصص	الكيمياء الفيزياوية

5	لغة تدريس المقرر	**انكليزي**

برنامج المقرر

اولا	**المقدمة**

Lectures: The lectures will present the general chemical background of the measurement principles and instrumental techniques as well as theory on sampling, data processing, data analysis, quality assurance and method validation.

Theoretical exercises: These exercises will train the students to carry out calculations on the data produced from different instrumental techniques including statistical analysis.

<u>Learning Objectives</u>

<u>After careful study of this course the student should be able to:</u>

- **VIII- List and describe the conductors .**
- **IX- Explain the meaning of the molar conductors.**
- **X- Define conductors unit, specific conductors, molar and equivalent conductors.**
- **XI- Calculate the molar conductors .**
- **XII- Explain the strong and weak electrolyte and the effect of concentration on the molar conductors.**
- **XIII- Derive and use the Nernst equation.**
- **XIV- Define and calculate the free energy.**

اولا	المقدمة

XV- Describe the general procedure for calculation of transport number.
XVI- Describe the types of electrochemical cell.

ثالثا	مفردات المقرر او المحتو
Week 1	Introduction to the **Electrochemistry**
Week 2	**What are the molar and equivalent conductors?**
Week 3	**Effect of dilution on molar conductance of strong and weak electrolyte**
Week 4	Transport number of ions?
Week 5	**Ostwald law of dilution**
Week 6	**Electrochemical cell?**
Week 7	**Galvanic cell and electrolytic cell?**
Week 8	Standard half-cell potentials.
Week 9	Cell potentials and free energy.
Week 10	• The Nernst equation. Concentration cells.
Week 11	• Analytical applications of the Nernst equation. Determination of solubility products
Week 12	• Potentiometric titrations. Measurement of pH.
Week 13	Batteries and fuel cells.
Week 14	• Electrochemical Corrosion. Control of corrosion.

اولا	المقدمة

Week 15	Exam

رابعا	طرائق التدريس المعتمدة لتنفيذ المقرر

1-Use the Smart screen as a modern Academy classroom facilities

2-Power Point Data Show presentations,

3-Concentrating on the activities of the students

4-Assessments

خامسا	توزع درجات المقرر وفق لواحد أو أكثر مما يأتي
16 % 34% 50%	• Active participation, homework assignments, Attendance, quizzes • Do more than 2 formal online exams • Solving a several related questions

سادسا	المصادر والمراجع

[1] Physical Chemistry, Atkins, 6th ed. 2001.

[2] Problems in physical chemistry 1st , by K.K. Shrma,1994.

[3]Physical chemistry 5th by Walter J. Moor, 1972.

Physical chemistry 7th by Robert Al-Berty, 1987.

مدرس المادة أ.م.د. حازم يحيى الجبوري **التوقيع:**

رئيس القسم ومدرس المادة:

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جمهورية العراق
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رقم المقرر الدولي:

العدد:**10**	**Advances of Organic Spectroscopy**
التاريخ: **April 2020**	**استمارة خاصة لاطلاع الطلبة على المقرر**

Course NO.:

1	اسم المقرر	Advances of Organic Spectroscopy	النوع	**فصلي**	**إجباري**			
2	عدد الوحدات	٣	عدد الساعات الإجمالي	٣	النظري	٣	العملي	
3	المرحلة الدراسية	ماستر						
4	اسم التدريسي	صادق عبدالحسين كريم Sadiqkarim77@gmail.com						

	الشهادة واللقب العلمي	دكتوراه - أستاذ مساعد
	التخصص	الكيمياء – الكيمياء العضوية والبوليمرات

5	لغة تدريس المقرر	**انكليزي**

برنامج المقرر

اولا	**المقدمة**

Lectures: The subject will present the general chemical background of the The study of molecular structure and dynamics through the absorption, emission and scattering of light.

Theoretical exercises: These exercises will train the students to carry out investigation of organic compounds which the organic molecules are in a constant state of vibrations, each bond having its characteristic stretching and bending frequencies

Learning Objectives

After careful study of this course the student should be able to:

- **XVII- List of concept of UV-Vis.**
- **XVIII- The Study of effect the UV-Vis of organic compounds.**
- **XIX- List of concept of FTIR.**
- **XX- The Study of effect the FTIR of organic compounds.**
- **XXI- List of concept of HNMR.**
- **XXII- The Study of effect the HNMR of organic compounds.**
- **XXIII- List of concept of 13CNMR.**
- **XXIV- The Study of effect the 13CNMR of organic compounds.**
- **XXV- List of concept of Mass spectroscopy.**
- **XXVI- The Study of effect the Mass spectroscopy of organic compound**

ثالثا	**مفردات المقرر او المحتو**
Week 1	**List of concept of UV-Vis.**

اولا	المقدمة
Week 2	**The Study of effect the UV-Vis of organic compounds**
Week 3	**List of concept of FTIR**
Week 4	**The Study of effect the FTIR of organic compounds**
Week 5	**The Study of effect the FTIR of organic compounds**
Week 6	**The Study of effect the FTIR of organic compounds**
Week 7	**List of concept of HNMR**
Week 8	**The Study of effect the HNMR of organic compounds**
Week 9	**The Study of effect the HNMR of organic compounds**
Week 10	**The Study of effect the HNMR of organic compounds**
Week 11	**List of concept of 13CNMR.**
Week 12	**The Study of effect the 13CNMR of organic compounds**
Week 13	**List of concept of Mass spectroscopy**
Week 14	**The Study of effect the Mass spectroscopy of organic compounds.**
Week 15	Exam

رابعا	طرائق التدريس المعتمدة لتنفيذ المقرر
	1-Use the Smart screen as a modern Academy classroom facilities 2-Power Point Data Show presentations, 3-Concentrating on the activities of the students 4-Assessments

اولا	المقدمة

خامسا	توزع درجات المقرر وفق لواحد أو أكثر مما يأتي
16 % 34% 50%	• Active participation, homework assignments, Attendance, quizzes • Do more than 2 formal online exams • Solving a several related questions

سادسا	المصادر والمراجع

1- P.Crews, J.rodriguez , M.jaspars; Organic structure analysis (1998).

2- J.R.dyer; Applications of absorpation spectrosopy of organic compounds;(1965).

3- F.Scheinmann ; Introduction to spectroscopic methods; (1973).

4- L.Lang ; Absorption spectra in the UV&VIS. Region ; (1995)

مدرس المادة أ.م.د. صادق عبدالحسين كريم **التوقيع:**

رئيس القسم ومدرس المادة:

جمهورية العراق

وزارة التعليم العالي والبحث العلمي

جامعة بابل

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fouadalkaim@yahoo.com

رقم المقرر الدولي:

Course NO.:

Liquid chromatography application	العدد:**2**
استمارة خاصة لاطلاع الطلبة على المقرر	التاريخ: **April 2020**

1	اسم المقرر	Liquid chromatography application		النوع	**فصلي**	**إجباري**		
2	عدد الوحدات	**2**	عدد الساعات الإجمالي	**2**	النظري	**2**	العملي	
3	المرحلة الدراسية	ماجستير						
4	اسم التدريسي	فؤاد فاضل القيم fouadalkaim@yahoo.com						
	الشهادة واللقب العلمي	دكتوراه - أستاذ مساعد						
	التخصص	الكيمياء التحليلية						

5	لغة تدريس المقرر	**انكليزي**

برنامج المقرر

اولا	**المقدمة**

It could be more interested for those are willing to analysis the organic compounds in water and other real samples.

This subject will cover many thing related to high performance liquid chromatography theoretically and practically.

Objectives

- **XXVII- Introducing the HPLC instrument.**
- **XXVIII- Explaining the parts of HPLC.**
- **XXIX- Role of the detector used.**
- **XXX- Study the properties of columns in terms of separation.**
- **XXXI- Calculation the resolution, separation factor and so on**
- **XXXII- Define the *van Deemter* equation**
- **XXXIII- Recognition between retained and un-retained peaks.**
- **XXXIV- Dealing with real sample analysis.**

ثالثا	**مفردات المقرر او المحتوى**
Week 1	Definition of chromatographic separation
Week 2	**Describe the parts of HPLC: solvent reservoir and its properties**

اولا	المقدمة

Week 3	**Describe the parts of HPLC: Pumps and sample injector**
Week 4	**Elution program system**
Week 5	**Describe the parts of HPLC: columns**
Week 6	**Describe the parts of HPLC: detectors**
Week 7	**How to separate two components in HPLC?**
Week 8	**Why chromatographic peak does become broad?**
Week 9	**Monthly examination 1**
Week 10	**Separation factor**
Week 11	**Resolving power**
Week 12	**Solution of problems**
Week 13	**Monthly examination 2**
Week 14	**Analysis of emergent contaminants using HPLC/LC-MS**
Week 15	**Method validation**

رابعا	طرائق التدريس المعتمدة لتنفيذ المقرر

1-Google class room

2-Power Point Data Show presentations with sound

3-Daily homework

4-Whatsapp group for more communication

اولا	المقدمة

خامسا	توزع درجات المقرر وفق لواحد أو أكثر مما يأتي
10 % 40% 50%	• Active participation, homework and Attendance • Quizzes and assignments • Monthly examination

سادسا	المصادر والمراجع
Fundamentals of analytical chemistry, fourth edition, Douglas A. Skoog, Stanford University	

مدرس المادة أ.م.د. فؤاد فاضل القيم **التوقيع:**

رئيس القسم ومدرس المادة:

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جمهورية العراق
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Talat.tariq@yahoo.com

رقم المقرر الدولي:

Bionanoparticles	العدد:**2**

Course NO.:

استمارة خاصة لاطلاع الطلبة على المقرر

التاريخ: **April 2020**

1	اسم المقرر	Bionanoparticles	النوع	**فصلي**	**إجباري**

2	عدد الوحدات	**٣**	عدد الساعات الإجمالي	**٣**	النظري	**٣**	العملي	

3	المرحلة الدراسية	ماستر

4	اسم التدريسي	طلعت طارق خليل الشمري **Talat.tariq@yahoo.com**
	الشهادة واللقب العلمي	دكتوراه - أستاذ مساعد
	التخصص	الكيمياء الحياتية

5	لغة تدريس المقرر	**انكليزي**

برنامج المقرر

اولا	**المقدمة**

Lectures: The lectures will explain the nanoparticlesl background and methodology of nanopartcle as well as bionanoparticles, then classification of nanoparticles and bionanoparticles using for diagnosis and treatment in diseases.

Theoretical exercises: These exercises will ask the students to know different between micronanoparticles

اولا	المقدمة

and nanoparticles . using of nanoparticles is in medicin

Learning Objectives

After careful study of this course the student should be able to:

XXXV- List and describe the nanoparticles .
XXXVI- Explain the meaning of the nanoparticles .
XXXVII- Classification of nanoparticles
XXXVIII- Explain different between Micronanoparticles and nanoparticles
XXXIX- Define Bionanoparticle
XL- Types of Bionanoparticles
XLI- Explain using of nanoparticles for treatment and diagnosis in diseases
XLII- Toxicology of nanoparticles

ثالثا	مفردات المقرر او المحتو
Week 1	Introduction to the Nanoparticles
Week 2	Classification of nanoparticles?
Week 3	What are difference between Micronanoparticles and nanoparticles?
Week 4	Using of nanoparticles.
Week 5	Methodology for preparation of nanoparticles .
Week 6	Physical methods.
Week 7	Chemical methods.
Week 8	Definition of Bionanoparticles
Week 9	History of Bionanoparticles

اولا	المقدمة

Week 10	**Classification of Bionanoparticles**
Week 11	**Using of Bionanoparticles for diagnosis of disease**
Week 12	**Using of Bionanoparticles for treatment of disease**
Week 13	**Methodology for estimation of bionanoparticles in medicine**
Week 14	**Toxicology of nanoparticles**
Week 15	Exam

رابعا	طرائق التدريس المعتمدة لتنفيذ المقرر

1-Use the Smart screen as a modern Academy classroom facilities

2-Power Point Data Show presentations,

3-Concentrating on the activities of the students

4-Assessments

خامسا	توزع درجات المقرر وفق لواحد أو أكثر مما يأتي

• Active participation, homework assignments, Attendance, quizzes	16 %
• Do more than 2 formal online exams	34%
• Solving a several related questions	50%

سادسا	المصادر والمراجع

[1] Handbook of Nanoparticles, Mahmood Aliofkhazraei, 2015.

اولا	المقدمة

[2] Nanobiomaterials Handbook, *Balaji Sitharaman 1st d, 2017.*

.

[3] The delivery of nanoparticles, Abbass A. Hashim, 2012.

مدرس المادة أ.م.د . طلعت طارق خليل **التوقيع:**

رئيس القسم ومدرس المادة:

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رقم المقرر الدولي:

Course NO.:

Extraction	العدد:**2**
استمارة خاصة لاطلاع الطلبة على المقرر	التاريخ: **April 2020**

1	اسم المقرر	**Extraction**	النوع	**فصلي**	**إجباري**			

2	عدد الوحدات	**٣**	عدد الساعات الإجمالي	**٣**	النظري	**٣**	العملي		

3	المرحلة الدراسية	ماستر

4	اسم التدريسي	اسيـــــل مشتاق كاظم annenayad@gmail.com
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	التخصص	الكيمياء التحليلية

5	لغة تدريس المقرر	**انكليزي**

برنامج المقرر

اولا	**المقدمة**

Lectures: All lectures will support the post graduate students to learn the general basic of analytical chemistry and its role for sharing with Physical chemistry applications, this topic will rehabilitate the post graduate student to have a new terms of extractions in solid/liquid and a liquid-liquid.

Learning Objectives

After careful study of this course the student should be able to:

XLIII- Extraction by a solvent

اولا	المقدمة

XLIV- The different between distribution constant and percentage
XLV- How to do a fast separation of materials
XLVI- Type of mixtures
XLVII- Type of adsorption
XLVIII- How to control on the pollutants
XLIX- Types of dyes

ثالثا	مفردات المقرر او المحتوى
Week 1	Introduction of Extraction
Week 2	**Liquid-Liquid Extraction**
Week 3	**Distribution constant and effect of temperature**
Week 4	Partition coefficient
Week 5	**Selectivity of the extraction**
Week 6	**Role of thermodynamic parameters in Extraction.**
Week 7	**Exam no. 1**
Week 8	Nature of partition force
Week 9	Separation factors
Week 10	Adsorption
Week 11	Models of adsorption
Week 12	Solvent extraction systems
Week 13	Dyes and it is removal
Week 14	Exam no. 2

اولا	المقدمة

رابعا	طرائق التدريس المعتمدة لتنفيذ المقرر

1-Zoom program

2-Free call

3-Google classroom,

4-work shops

خامسا	توزع درجات المقرر وفق لواحد أو أكثر مما يأتي
16 % 34% 50%	• Active participation, homework assignments, Attendance, quizzes • Do more than 2 formal exams either online of handbook • Preparing material of seminars as a reports

سادسا	المصادر والمراجع

4) Analytical Chemistry / Skoog/ Ed. 7 2010

5) Ionic Liquid as Novel Solvent for Extraction and Separation in Analytical Chemistry

By Li Zaijun, Sun Xiulan and Liu Junkang/ 2011

6) Lecture notes of Extractions/ 2020

7) Adamson/ surface chemistry/ ed.4/ 1978

مدرس المادة أ.م. د. أسيل مشتاق الجبوري **التوقيع:**

اولا	المقدمة
	رئيس القسم: