### جامعة آل البيت دائرة ضمان الجودة والتخطيط



 العلو د	 كلية

قسم الكيمياء

### توصيف مساق : Physical Chemistry 3 403441

### 1. معلومات مدرس المساق (Instructor)

Dr. Raed Ghanem and Dr Khaldoun Al Soud	اســــــم ( مدرس / منسق ) المساق :
	الساعـــــــــــــــــــــــــــــــــــ
Chemistry Department	رقم المكتب و الرقــــــــــــــــــــــــــــــــــــ
raedag@aabu.edu.jo. khaldoun@aabu.edu.jo	البريــــــــــــــــــــــــــــــــــــ
	مساعد البحث والتدريس/المشرف/الفَني (إن وجد):

### 2. وصف المساق (Course Description)

Modern synthetic organic chemistry including Carboxylic acids. Amines Amino acids and Proteins. Carbohydrates .Lipids synthesis of Malonic acid and esters

3. بيانات المساق (Course Title)

قِم المساق: 403441	Physical chemistry 3	المستوى: 3
لبيعة المساق: Theory	المتطلب السابق / المتزامن:4033411	وقت المحاضرة: 9:00-9:00
لعام الجامعي:2019/2020	الفصل الدراسي: First	عدد الساعات الدراسية:3

### 4. أهداف المساق (Course Objectives)

General Objectives: Understand the Basics of quantum mechanics and its application in chemistry, which includes: Quantum Mechanics and Atomic Structure.: Electromagnetic Radiation and the Old Quantum Theory. Bohr's Atomic Theory. The Foundations of Quantum Mechanics. Schrödinger's Wave Mechanics. Quantum-Mechanical Postulates. Quantum Mechanics of Some Simple Systems. Quantum Mechanics of Hydrogenlike Atoms. Physical Significance of the Orbital Quantum Numbers. Angular Momentum and Magnetic Momen. The Rigid Linear Rotor. Spin Quantum Numbers. Many-Electron Atoms. And The Chemical Bond. Foundations of Chemical Spectroscopy.

### (المعرفة والمهارات والكفايات)

يفترض بالطالب بعد در استه لهذا المساق أن يكون قادرا على:

# After completing this course, the student should demonstrate the knowledge and ability to:

After finishing this course, students will be able to understand and apply the concepts quantum mechanics to tackle common problems in chemistry, including spectroscopy.

### 5. السياسه العامه والحضور (Course Policies: Attendance Policy)

Course participants are expected to master the material from Calculus I and II.

- 1. This course will require weekly problem sets. A thorough understanding of each problem set will help you master the concepts.
- 2. The course will have two exams plus a final exam.
- 3. Classes will involve hands-on worksheets to summarize key ideas/results and to practice new material. Participating in the in-class exercises will help you master the concepts.
- 4. Students will be expected to prepare course material as indicated in reading assignments.
- 5. It is your responsibility to get copies of the lecture & recitation material
- 6. **Attendance at all classes will be recorded and is mandatory**. Please make sure you read and fully understand the University of Al Al Bayte Attendance Policy. This policy will be strictly enforced.

تنبيه: في حال التغيب عن اي امتحان لن يكون هناك امتحان تعويضي الا في حالة وجود عذر و حالة طارئة من المستشفى و على الطالب ابراز العذر في فتزة لا تتجاوز الثلاثة ايام مه تاريخ االمتحان, و للمدرس الحق في قبول او رفض العذر، و حسب التعليمات

### 6. محتوى المساق (Course Content)

الأسبوع
الأول
الثاني

The Quantum Mechanical Postulates	
	الثالث
The Schrodinger Equation	
	الرابع
Using Quantum Mechanics on Simple systems	
The second secon	الخامس
The Particle in A box	السادس
الامتحان الأول	
The Harmonic Oscillator system	الثامن
The Harmonic Oscillator system	التاسع
A Quantum Mechanical Model for the Vibration and Rotation of Molecules	
	العاشر
A Quantum Mechanical Model for the Vibration and Rotation of	
Molecules	الحادي عشر
الامتحان الثاني	
Quantum Mechanics of Hydrogenlike Atoms	الثالث عشر
Physical Significance of the Orbital Quantum Numbers	
	الرابع عشر
The Hydrogen Molecular-Ion, H2+	
	الخامس عشر

Foundations of Chemical Spectroscopy	السادس عشر
الامتحان النهائي	

1. استراتيجيات التعليم والتعلم وطرق التقويم (Teaching and learning Strategies and Evaluation Methods)

A MARIE MARIE MA	(Teaching and rear	mig strategies	and Evaluation Methods)	
نوع التقويم/القياس (امتحان/عروض صفية/مناقشة/واجبات)	أنشطة التعلم	استراتيجيات التدريس	مخرجات التعلم	Ü
In class Questions, Presentation, Exam	Class notes - Problem sets and solutions Class Discussions, website development	Lecture, Presentation, quizzes, Case studies, and in class questions	Understand the needs of quantum mechanics.	1
In class Questions, Presentation, Exam	Class notes - Problem sets and solutions Class Discussions, website development	Lecture, Presentation, quizzes, Case studies, and in class questions	Understand basic concepts of quantum mechanics	2
In class Questions, Presentation, Quizzes, Exam	Class notes - Problem sets and solutions Class Discussions, website development	Lecture, Presentation, quizzes, Case studies, and in class questions	Understand basic concepts of Schrodinger equation.	3
In class Questions, Presentation, Quizzes, Exam	Class notes - Problem sets and solutions Class Discussions, website development	Lecture, Presentation, quizzes, Case studies, and in class questions	Understand basic concepts of Particle in a box	4
In class Questions, Presentation, Quizzes, Exam	Class notes - Problem sets and solutions Class Discussions, website development	Lecture, Presentation, quizzes, Case studies, and in class questions	Understand basic concepts of the application of particle in a box in spectroscopy	5
In class Questions, Presentation, Quizzes, Exam	Class notes - Problem sets and solutions Class Discussions, website development	Lecture, Presentation, quizzes, Case studies, and in class questions	Understand basic concepts of vibrational spectroscopy	6
In class Questions, Presentation, Quizzes, Exam	Class notes - Problem sets and solutions Class Discussions, website development	Lecture, Presentation, quizzes, Case studies, and in class questions	Understand basic concepts of rotational spectroscopy	7
In class Questions, Presentation, Quizzes, Exam	Class notes - Problem sets and solutions Class Discussions,	Lecture, Presentation, quizzes, Case	Understand basic concepts of Bonding	8

website development	studies, and in class	
	questions	

# 1. تقييم الطلبة (Assessment)

توزيع الدرجات لكل أسلوب	توقيت التقييم	الأساليب المستخدمة
-	خلال الفصل	1-أعمال الفصل: (تقرير، وظائف، حضور)
25	الأسبوع السابع	2-امتحان تحريري أول
25	الأسبوع الثاني عشر	2-امتحان تحريري ثاني
50	أسبوع الامتحانات النهائية	3-امتحان تحريري نهائي

### 2. الكتاب المقرر (Text Book)

Physical Chemitry	المرجع الرئيس
Atkins	المؤلف
Oxford press	الناشر
2017	السنة
11 edition	الطبعة
https://oup-arc.com/access/pchem11e	الموقع الالكتروني للمرجع

## 3. المراجع الإضافية (References)(وتشمل الكتب والبحوث المنشورة في الدوريات او المواقع الالكترونية)

Physical Chemistry" by Thomas Engel and Philip Reid, 3rd edition. Pearson	
Prentice Hall, 2011 The companion website corresponding to this publisher is:	-1
http://wps.pearsoned.co.uk	
Physical Chemistry" K. J. Laidler and J.H. Meiser, 3rd Edition, Houghton Mifflin	2
Company, 1998.	-2