



CHM 4412: Physical Chemistry, Quantum Mechanics and Spectroscopy

Summer C 2014 (May 12 - August 08) Section 7397
(4 Credit Hours)
M WRF Period 2 09:30 - 10:35 UST 0108

No (specifically) Required Textbook: Useful texts include *the one you have* or something like: "Physical Chemistry", P. W. Atkins, or similar titles by McQuarrie & Simon, Levine, Raff, Castellan, etc.
{See Brucaat if you have questions...}

Instructor: PJ Brucaat
Office Location: LEI214A
Office Hours: by appointment
Contact method: Use iTeach Messaging

Teaching Assistant: Shuai WANG
TA Office Location: TBA
TA's Office Hours: TBA

Course Website: <http://iteach.chem.ufl.edu/26>

Tentative Syllabus (for exact ordering and schedule of lectures, see the course website)

An Introduction to Quantum Mechanics

Compare and Contrast Classical and Quantum Descriptions of Matter
Fundamental Principles (Postulates) of Quantum Mechanics
Operators, Observables, Wavefunctions, Eigenvalues, and Boundary Conditions

Exactly Soluble Systems in One Dimension

Free Particle Particle in a Box The Harmonic Oscillator
Traditional (Diff. eq.) Treatment
Operator Algebra Treatment

Systems in More than One Dimension

3D Particle in a Box 3D SHO
Rigid Rotation and the Spherical Harmonics
The Hydrogen Atom
Many-Electron Atoms

Approximate Methods in Quantum Mechanics

Perturbation Theory Variational Principle

Independent Particle Approaches to Electrons in Molecules

Molecular Orbitals (Qualitative Aspects) Molecular Symmetry and its Consequences

Understanding Molecular Motion *Spectroscopically*

The Separation of Molecular Motion by Time/Energy Scale
The Measurement, Excitation and Control of Molecular Motion with Light
A Survey of Spectroscopic Techniques
Magnetic Resonance, Coherence, and Pure vs. Mixed States

SUMMER SEMESTER 2014							
S	M	T	W	T	F	S	
May	4	5	6	7	8	9	10
		--Drop/Add--				Registration	
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	Holiday	27	28	29	30	31
June	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	Grades Due	23	Deg Cert.	24	Summer Break	25
	26	Drop/Add	30			Registration	27
July	29	Drop/Add	30			Holiday	
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31		
Aug.						1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
		Grades Due	Deg Cert.				Commencement

This course is unique

That is not as bold a statement as it may seem. First, the subject matter (Quantum Mechanics and its applications) is so odd that we will ask (and answer) questions about the world around us in ways that you might not have imagined before.

The organization of this class blessed with the luxury small enrollment and Summer term. The eduspeak [sic] people call this organization a 'flipped' class, and this is quite *en vogue* these days. 'Lectures', which will now be called 'readings', will be absorbed outside of class (at 'home'), and traditional 'homework' activities will be performed during our class meetings.

Naturally, the 'organized' part of our studies is not complete enough to satisfy every individual learners needs for mastery of this tricky material. Therefore, it is up to the student to seek additional stimulation from whatever source you feel appropriate: your textbook, the library, smart people you know, etc. See one of your instructors for assistance if you have difficulty finding material on any particular topic.

Oh, and you're going to need a computer

The course website: < <http://iteach.chem.ufl.edu/26> > is where the 'lecture' ⇒ 'reading' materials are found. Naturally, all course operation details and communication tools are there, too. The format of these materials is somewhat varied, and some 'work' better than others. Some delivery formats may have bugs and not work on all devices equally well. For example, some smartphones or tablets might not work correctly when viewing the modules. You are going to have to be a little more flexible, understanding, and tech savvy with in this environment than in a typical lecture-based class, but it will be worth it. *Successors in this subject will be told stories of your valor and bravery.* The Science Library computers have all the tech requirements for this course, in case you don't, and there are knowledgeable and helpful people around them as well.

Attendance

This term, we are going to learn Quantum Mechanics and Spectroscopy as a team. Therefore, your timely presence in our class meetings is kindly requested. You are an integral part of the classwork sessions, so class meetings are very important. If you choose not to attend, that is your choice, but this action lets down your classmates, and forfeits your rights to classwork points (see below) and Instructor office hours, scheduled or by appointment. If you cannot attend class due to a medical/justifiable reason, contact your Instructor in advance using the website messaging tool.

Office Hours

Office hours held by Brucat are intended for one-on-one discussion of a students standing in the class (grades), learning strategy and habits, and any other things not appropriate for the group discussion. They will be held at times *you* arrange. If you want a meeting of this sort, message (within iTeach) your instructor 3 options for meeting times that are convenient for you, and your instructor will message make the choice that works.

Office hours held by TA's are to provide perspective different from Brucat and his 'Readings' on the subject material. TA office hours will be posted on the course website calendar or by appointment.

--- Graded Activities ---

On-line Quizzes and 'Readings'

Periodically throughout the term, short on-line assessments will be delivered through the course website. These 'Quizzes' will appear in the website topics list and on the course calendar. Instructions for each quiz will be explicitly stated for each one at its start; Please read these instructions carefully.

Brucat's 'Readings' are also delivered on-line, and have a few embedded assessment questions which are graded.

As the course is presently crafted, there are 10 on-line 'Quizzes' and 30 'Readings' which have been assigned a total of 160 grade points.

'Homework' is now 'Classwork'

We do what would normally be called 'Homework' in class; 'flipped' remember? Problems relevant to the material and concepts covered in our 'readings' will be worked in class, by you, the TA and the Instructor together as a team. No more frustrating nights not knowing where to start. 'Classwork' will be valued at 20 grade points per week for a total of 240 grade points

Exams

There will be **four** in-class exams during the term, which determine the bulk of your course grade, *tentatively* to be held on the following Thursdays:

May 30 June 20 July 18 August 06

I write the Songs... but **you** write the Exams. That's right! For each of the 4 parts of the course, there will be a discussion board (or equiv) for you the class to construct the *actual* exam you will take (filtered by Brucat, naturally). Not as easy as you think, really. Exam grades will be based partially on your individual work on Exam day and partially on the grade your instructor gives the exam instrument. So, do a good job writing the Exam, and everyone wins. Exams are assigned 150 grade points each.

Course Grade Computation

Course grades will be computed from the sum of earned points by the student. Each exam has a maximum value of 150 grade points for a category total of 600 points. Your 'Readings' + 'Quiz' (160 points) and 'Classwork' (240) bring the grade point total for the term to 1000. Your letter grade will be computed from this 1000 grade point total using this scheme:

Course Grade	<i>Minimum</i> Total Score
A	875
A-	800
B+	775
B	750
B-	725
C+	675
C	650
C-	625
D	500
E	< 500

Students, faculty, and all participants in UF's Academic activities are bound by an [Honor Code](#). [Students with Disabilities](#) may request special accommodations through the [Dean of Students](#). [Counseling services](#) are available in many forms at UF.

UF's Grading Policy: <http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html>

Any and all course policies and procedures are subject to change at any time at the sole discretion of Brucat

We, the members of the University of Florida Community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.