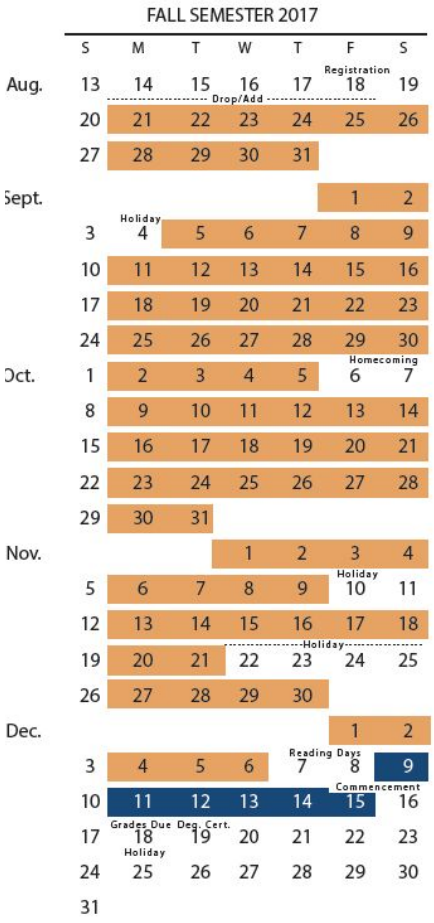
CHM 4412: Physical Chemistry: Quantum Mechanics and Spectroscopy

Fall 2017 (Aug 21 - Dec 15) Section 0823
(4 Credit Hours)
T R Periods 7-8 (13:55 - 15:50) JHH 211

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 Brucat if you have questions...}

Instructor: PJ Brucat
Office Location: CLB311E
Office Hours: M F per 4, W per 7 and *by appointment*
Contact method: Use Canvas Messaging *only* (see below)

Teaching Assistant: **TBA**
Office Location: TBA
Office Hours: TBA
Contact Method Use Canvas Messaging *only*



Course Website: https://ufl.instructure.com/courses/341414

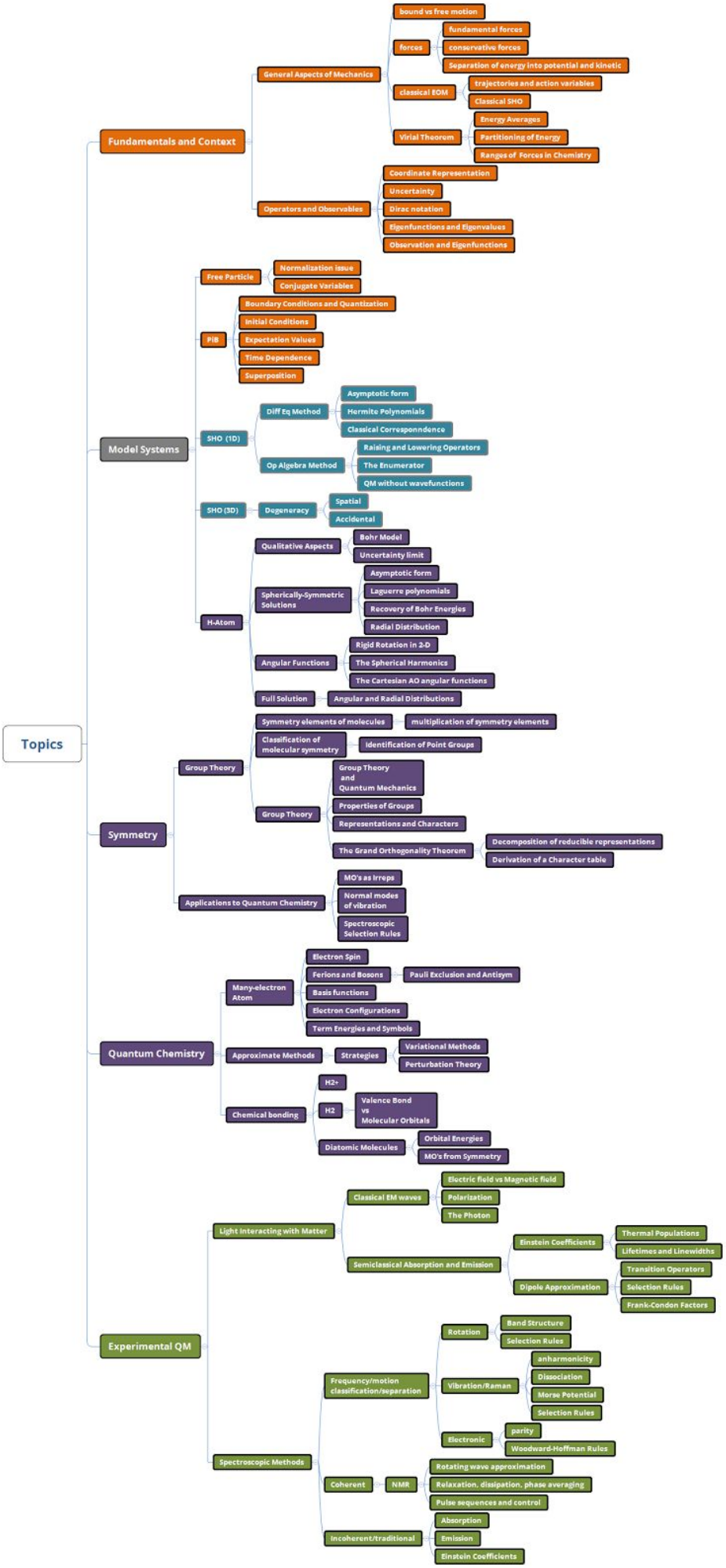
All course materials, course communications, and many assessments will be delivered from within UF's eLearning system Canvas at the above listed URL. Please become familiar with our course website as soon as possible. Note that some of the materials there will be subject to change, so pay attention to announcements of change and avoid printing or downloading materials too far in advance (or at all).

Course Learning Objectives:

- Knowledge
  - Postulates of Quantum Mechanics
  - Solutions to Simple QM Systems (PiB, SHO, H Atom, H_2, etc)
  - Nature of Chemical Bonding (MO, VB, & Ionic bonding. Resonance)
  - Molecular Symmetry (Elements of a Point Group, Representations, Character Tables)
  - Common Spectroscopic Methods (UV-Vis, IR, μ λ , MPI, NMR, etc)
- Skills
  - Apply Useful Approximate Methods (Perturbation Theory. Variational Methods)
  - Apply Linear Algebra and Group Theory to Chemical Systems
  - Analyze and Interpret Molecular Spectra
- Values
  - Taste the Flavor of The Quantum World
  - Embrace New and Weird Theories and Ideas with an Open Mind
  - Improve Your Capabilities as a Scientist

Tentative Topics

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



Course Operation and Philosophy

The structure of the course, as determined by the UF Registrar, consists of meetings twice a week in a classroom. I *could* simply lecture on the material, while y'all sit and watch. This is a traditional method of teaching, but isn't the best use of our time together. Instead, you will prepare for engaged discussions at these meeting times by studying online materials and perhaps even your textbook, *before* class. Then, we will discuss what is confusing, skip what is understood, and delve deep into the implications of the subject, *together*. The learning objects you will start your preparation for class with are suggestively called "Readings', because they should lead you to knowledge the way reading a textbook could. (Of course, you will need to *actually read* a textbook as well. Many are available on this subject ; Ask your instructor for recommendations optimized for your reading and learning style)

The course website: < https://ufl.instructure.com/courses/341414 > is where the 'Readings' are found. These objects each have due dates before the related class discussions. The 'Readings' for the entire term are posted on our site --- feel free to use them anytime --- but make sure you have thoroughly mastered them before we discuss them in class.

Classwork

We are going to learn Quantum Mechanics and Spectroscopy as a team. After a brief review and questions clarifying our 'Readings' are answered, we will tackle exemplary problems related to the material together, in class, with everyone involved. Since we are working together, your timely presence in our class meetings is kindly requested (read: **required**). *You* are an integral part of the classwork sessions, and these class meetings are crucial to our collective success. It is hoped that a significant part of your learning and course experience will come from peer-to-peer interaction. Embrace and foster that idea.

If you choose not to attend, that is your choice, but this action lets down your classmates, and forfeits your classwork points (see below) *and* access to instructor office hours, scheduled or by appointment. Naturally, if you cannot attend class due to a medical/justifiable reason, exceptions are made. Please contact your instructor in advance using the Canvas website messaging tool of such circumstances.

Communication with your Instructor

All course communications with your Instructor(s) are to occur within the **Canvas** environment using the embedded Announcement, Discussion, or **Messaging** tools (Messaging for all grade-related topics). All Canvas account profiles must be configured for immediate automatic notification of announcements and course communications via the individual's preferred communication/email method. *Do this now*. Responsibility for accessing and responding to electronic course communication in a timely fashion is that of the student.

Office Hours and Scheduling Meetings

Office hours held by Brucat are intended for one-on-one discussion of a student's standing in the class (grades), learning strategy and habits, remediation of specific hindrances to individual learning, and any other things not appropriate for group discussion. Private discussions will be held at times *you* arrange, since scheduled Office Hours are open to the class. If you want a meeting of this sort, **message** your instructor (from within Canvas, *only*) ***3 options*** for meeting times that are convenient for you, and your instructor will reply with a choice that works best and a location for the meeting. Make sure to put at least three distinct time options in your *initial* message --- don't make me beg.

Office hours held by TA's are to provide perspective potentially different from Brucat on the subject material. TA office hours will be posted on the course website calendar as soon as they are known, or by appointment. Details will be announced as available.

--- Course Activity Types ---

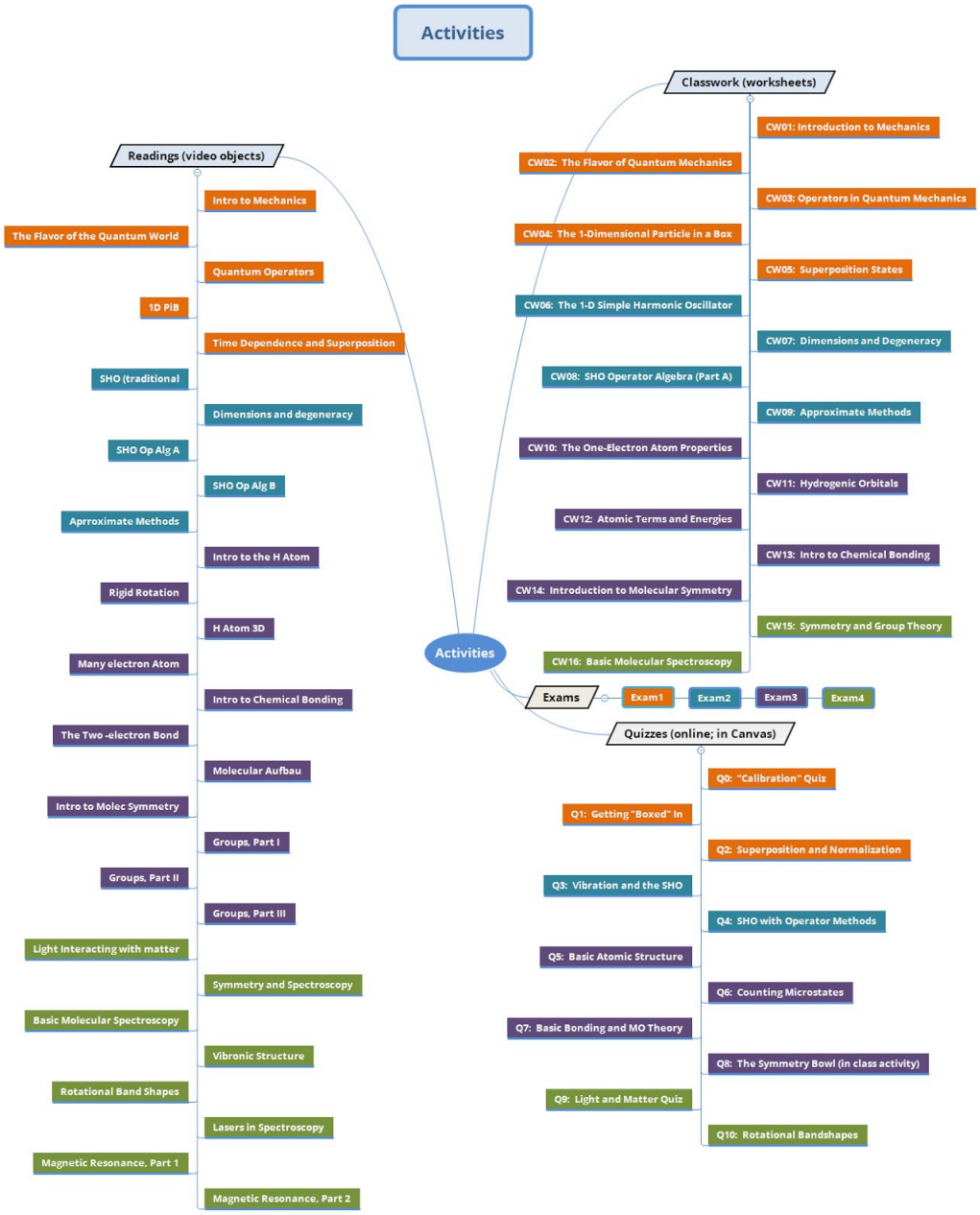
'Readings' Brucat's 'Readings' are really 'lecture' videos objects, delivered online. These videos are not meant to provide you with complete coverage of the material, but rather guide you through the study of what is to be covered. You will need to seek other sources of wisdom to complete the experience, i.e., your textbook. A few embedded assessment questions are included in these activities, but these scores do not count towards your grade. These scores are merely there to monitor your 'reading' progress.

Classwork Traditional classes have you, the student, work exemplary problems to cement your mastery. These are often worked outside of class, usually alone. We are going to work those problems *in class*, ***together***. A portion of your grade will be derived from these problem sessions, so be prepared.

Online Quizzes Periodically throughout the term, short on-line assessments will be delivered through the course website. These 'Quizzes' will appear in the course website Modules list (as well as several other places) with well-defined due dates. *Most* (but not all) of these quizzes will have unlimited attempts, so getting full credit is up to you and your dedication.

Exams There will be **four in-class** exams during the term. These are 5-6 page white-space tests.

All activity dates are posted in Canvas



Course Grade Computation

Course grades will be computed from the weighted-average of the earned percentages of each graded item submitted by the student. The weighting factors are as follows:

Grade Category	% of Course Grade
Exams	70
Readings	0
Quizzes	10
Classwork (Participation)	20

Your letter grade will be computed from your weighted-average grade percentage using the following scale:

Course Grade	*Minimum* percentage
A	**87.5**
A-	**80.0**
B+	77.5
B	72.5
B-	70.0
C+	67.5
C	62.5
C-	60.0
D	50.0
E	< 50.0

UF's Grading Policy: http://www.registrar.ufl.edu/grades/gradepolicy.html

Expected Behavior Students, faculty, and all participants in UF's Academic activities are bound by an Honor Code.

Accommodations Students with disabilities may request special accommodations through the Dean of Students. https://drc.dso.ufl.edu/

Counseling Useful non-academic services are available in many forms at UF. A good source of information is the Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/

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

---- PJ Brucat 2017 ----