



PHYS 526 01W – THE QUANTUM UNIVERSE FOR EDUCATORS

ONLINE COURSE SYLLABUS: SPRING 2015



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Course Time Zone: Central Time USA

Online Office Hours will be held each Wednesday and Thursday from 5:30 p.m.-7:30 p.m. I will be active during those times on the discussion threads, and will also start a thread on Live/Chat (accessible from the top menu on LearningStudio) where I can ask and answer questions live.

In emails, please put "PHYS526 Online" in the subject header. I will reply to emails within 24 hours (48 at weekends and holidays). **Note:** *I will exclusively use your TAMUC university email addresses for email communication.*

COURSE INFORMATION

Materials – Textbooks, Readings, Supplementary Readings

The 2 required books can be ordered from online retailers for a total of around \$100.

Textbooks Required

Orzel, C. (2010), *How to Teach Quantum Physics to Your Dog*, Oneworld Publications, ISBN-10: 1851687793, ISBN-13: 978-1851687794

McIntyre, D. (2012), *Quantum Mechanics: A Paradigms Approach*, Addison-Wesley, ISBN-10: 0321765796, ISBN-13: 978-0321765796

Recommended

Baggott, J.M. (2013), *The Quantum Story: A History in 40 Moments*, Oxford University Press, ISBN-10: 0199655979, ISBN-13: 978-0306821448

Course Prerequisites

Math: Students are required to know mathematics through Calculus 3 or equivalent, or have taken the Mathematical Methods for Educators Course (PHYS 530). We'll be making extensive use of algebra, trigonometry, basic differentiation and integration, plus some occasional ordinary differential equations and linear algebra (*especially* matrix algebra).

Physics: A course in calculus-based physics (sometimes called University physics) is required. Some knowledge of basic thermodynamics and statistical mechanics will be an advantage, but I will explain concepts from those subjects when we need to use them.

Course Description

The history of quantum mechanics including the experimental results that required a new theory of the interaction between light and matter at microscopic level. The uncertainty principle, wave-particle duality and wave mechanics. Applications (including simple calculations) to atomic physics, nuclear physics, semiconductors, lasers; how quantum mechanics has shaped the modern world. The impact of quantum mechanics in our culture;

its uses and misuses. Prerequisites: University physics and calculus up to partial differential equations. (2015 TAMUC Graduate Catalog)

Quantum theories underpin our modern world. Without quantum mechanics, modern electronic devices such as computers, cell phones, most modern medical imaging and technology, most development in materials science, the World Wide Web, and many other things would not exist. It is the most accurately tested physical theory that exists - giving numerical predictions verified by experiments to more decimal places than our theories of gravity, Newton's laws of motion or our laws of thermodynamics.

Quantum mechanics is also most misunderstood and abused scientific theory. Misunderstanding is not surprising. Quantum mechanics makes claims on the nature of reality at the microscopic level running counter to our everyday experience. Some principles of quantum mechanics have made it into popular culture in a distorted way; for example the notion reality can be affected by the observer. These vague notions are exploited by those who wish to peddle all manner of pseudoscience. It is therefore very important to understand how to interpret quantum mechanics.

In this class, we will learn about the fascinating history of the development of quantum mechanics, the fundamental principles of the theory and the practical and fundamental physics applications, develop lesson plans introducing the exciting physics of quantum theory to high school students, and explain the ways in which the theory can be misunderstood and misused.

Student Learning Outcomes

At the end of the course students will:

1. Demonstrate knowledge of the history of quantum mechanics, and argue why it is an exemplar of a scientific revolution.
2. Explain the principles of quantum mechanics, express them mathematically, and apply them to make quantitative predictions in fundamental and applied physical situations.
3. Detail current and future practical applications of quantum mechanics.
4. Summarize the ongoing discussion on the interpretation of quantum mechanics and critically analyze articles in the popular media relating to quantum theory.
5. Create lesson plans which accurately and engagingly introduce quantum physical principles to high school students.

COURSE REQUIREMENTS

Instructional Methods / Activities / Assessments

The details of the course structure are given below. Any changes will be communicated via email and announcements on LearningStudio (eCollege). Your TAMUC email account will be used at all times, and it will be your responsibility to check it regularly (at least once every 24 hours).

Introductory week tasks, material and due dates

The semester starts at **12.01 a.m.** Tuesday, January 20th, which is when the introductory week's material will become available. The introductory week will end on Friday, January 23rd at **12 p.m. (noon)**.

During the introductory week, you will complete the following activities:

- (1) Read the instructions in the introductory content area near the top of the left side of **LearningStudio (eCollege)** learn how to access course material and familiarize yourself with the environment.
- (2) Read the **syllabus**
- (3) Watch the syllabus video
- (4) Create an introductory audio/video on **Voicethread** (I will be doing the same), and an introduction in the **introductory chatroom** located under the Live tool in the top toolbar, so we get to know each other a little better. There is a tutorial on VoiceThread on Doc Sharing.
- (5) Take the **syllabus quiz** to make sure you understand the mechanics of the course. This can be taken *any number of times* during the introductory week. The **syllabus quiz** will not be graded, but it must be completed *with 100% correct answers* before the 1st week's material becomes available.
- (6) Complete the **pre-course quiz**, which will be given again at the end of the course to measure Student Learning Outcomes 2 and 4. This quiz *can only be taken once* and once you begin the quiz you will have *40 minutes* to complete it. The **pre-course quiz** is not graded, but it must be completed to access the 1st week's material.
- (7) **Ask any remaining questions and discuss the intro material in the introductory discussion thread** which will remain open to the end of the first week, Friday January 30th at **12 p.m. (noon)**.

NOTE: In order to move on to the rest of the course, you must complete the syllabus quiz with 100% correct answers, and you must complete the pre-course quiz.

Regular week tasks, material and due dates

The course material will be organized by week. The week's material will be located under the week's tab in the left hand menu in LearningStudio (eCollege).

Each week begins on a **Friday 12 p.m. (noon)** and ends the following **Friday 12 p.m. (noon)**. So, e.g., the first week starts at **12 p.m. (noon)** on Friday January 23rd, and ends at **12 p.m. (noon)** on Friday January 30th. All of the week's materials and assignments become available only when the week starts. There will be 15 weeks in total. The 15th week, and the semester, ends 12 p.m. (noon) on Friday, May 15th.

Each week, the following tasks must be completed.

- (1) Complete the **reading assignments**. These will come from the course textbooks, online articles or from key scientific papers in the development of quantum theory, available in Document Sharing or the Webliography in LearningStudio (eCollege), located on the top menu bar. The reading material for each week will be announced each Friday at **12 p.m. (noon)**.
- (2) Watch **2-3 Mini-lectures** each week which will cover one or two key concepts at a time, to reinforce reading material, or give examples of problem solving. Mini-lectures for each week will be made available at **12 p.m. (noon)** each Friday.
- (3) Complete the **1-3 quizzes** designed to assess students' comprehension of the reading assignments, mini-lectures and basic knowledge of key principles. Quizzes for a week's material will become available at **12 p.m. (noon)** each Friday and must be completed by **12 p.m. (noon)** the following Wednesday.
- (4) Participate in the **discussion thread** on the week's topics (up to 5 graded posts/week are required). A week's discussion thread opens at **12 p.m. (noon) each Friday** and remain open until **12 p.m. (noon)** the following Friday.
- (5) Complete the **weekly homework**. Each homework will become available **12 p.m. (noon) Fridays** and will be due **at midnight, the Sunday** 9 days later.

In addition, 3 projects will be assigned at various stages during the semester. You will have around 4 weeks to complete each project.

The table on the next page gives as an example the first three week's timetable. Subsequent weeks repeat the pattern of weeks one and two.

A complete list of due dates for discussion posts, quizzes and homeworks are given on pp. 19, 20 and 21 of this syllabus.

Tuesday 20 th Jan	Semester starts; Introductory week available 12.01a.m.
Wednesday 21 st Jan	
Thursday 22 nd Jan	Online office hours 5:30 p.m.-7:30 p.m.
Friday 23 rd Jan	Syllabus quiz deadline: 12 p.m. Week 1 material available 12 p.m.
Saturday 24 th Jan	
Sunday 25 th Jan	
Monday 26 th Jan	
Tuesday 27 th Jan	
Wednesday 28 th Jan	Week 1 quizzes due: 12 p.m. Online office hours 5:30p.m.-7:30 p.m.
Thursday 29 th Jan	Online office hours 5:30p.m.-7:30 p.m.
Friday 30 th Jan	Introductory and week 1 discussion threads close 12p.m. Week 2 discussion thread opens 12 p.m. Week 2 material available 12 p.m.
Saturday 31 st Jan	
Sunday 1 st Feb	Week 1 Homework due Midnight
Monday 2 nd Feb	
Tuesday 3 rd Feb	
Wednesday 4 th Feb	Week 2 quizzes due: 12 p.m. Online office hours 5:30p.m.-7:30 p.m.
Thursday 5 th Feb	Online office hours 5:30p.m.-7:30 p.m.
Friday 6 th Feb	Week 2 discussion threads close 12 p.m. Week 3 discussion thread opens 12 p.m. Week 3 material available 12 p.m.
Saturday 7 th Feb	
Sunday 8 th Feb	Week 2 Homework due Midnight

Learning Activities and Assessments

The following describes the assignments you must complete which will contribute to your progress through the course and to your final grade, together with how they will be assessed.

- **Quizzes** are designed to assess students' comprehension of the reading assignments, mini-lectures and basic knowledge of key principles, often in response to the mini-lectures.

Quizzes are designed to provide you with initial assessment of your learning and *will not be graded based on whether you got the answer*

correct, but that you have attempted an answer thoughtfully. A small amount of extra-credit will be available for correct responses, however.

You will only be able to take quizzes once. Once you begin taking the quiz, you will have a time limit of one hour to complete it. Once completed, you cannot return to it and revise your answers.

Quizzes address: Learning Outcomes 1-4

- **Ongoing Discussions** will be conducted each week on the concepts introduced in the reading material and lectures. I will get things started with some open-ended questions about the week's material, and take part we brainstorm, analyze and debate the material.

Learning and understanding is significantly enhanced by active engagement in the class through continual discussion of topics. All students are required to participate in the discussions with a number of substantive posts. **Up to 5 posts per student will be graded each week.**

The rubric for grading the online discussions is found on pp.22-23 of the course syllabus.

Of course, continued discussion beyond the minimum posts required is strongly encouraged. I will pitch into the discussion at various times during the week, answering queries and asking new questions to make sure we discuss all the week's material adequately.

The discussion threads will be found underneath each week's tab on the left side of the LearningStudio window.

Discussions address: Learning Outcomes 1-4

- **Weekly homeworks** will be set. These will generally come in three forms: questions requiring a more substantive analysis of the week's reading, problem solving questions, or an online laboratory. Full instructions will be provided each week, together with the method of assessment, in the weekly content area. **Homeworks are due at midnight each Sunday 9 days after they are set, to be delivered to DropBox (under the DropBox tab on the top toolbar).**

Virtual labs as part of some homeworks will be conducted using the open educational resource PhET simulations.

Homeworks address: Learning Outcomes 1-5

- **3 Projects** will be assigned throughout the semester, one after roughly 4 weeks, one after about 8 weeks and one after about 12 weeks. Each one will be due by the date I set the next one (giving you about **4 weeks for each one.**) **They must be submitted to DropBox (under the DropBox tab on the top toolbar).** I will give more details and instructions closer to when they are assigned. For now, I will give you an idea of what each one involves:

Project 1: Write-up, in the manner of a popular science article (i.e. aimed at the general public), a piece of Nobel-Prize winning quantum mechanics research. *Addresses: Learning Outcomes 1,4.*

Project 2: Develop a complete lesson plan, including exercises and evaluation, introducing a topic in quantum mechanics to high school students. *Addresses: Learning Outcome 5*

Project 3: Find and critically analyze an article from the popular media which contains a misuse or misunderstanding (intentional or otherwise) of quantum theory. *Addresses: Learning Outcome 4*

GRADING

Quizzes (worth 1% each week)	15%
Discussion (worth 1% each week)	15%
Homeworks (roughly 3% per HW)	40%
Project 1	10%
Project 2	10%
Project 3	10%
Extra Credit (Correct answers to quizzes)	5%

Current scores will be available for students to see in the Gradebook on LearningStudio (eCollege).

Grading Scale:

90-100%	A
80-89.99%	B
70-79.99%	C
60-69.99%	D
<59.99%	F

TECHNOLOGY REQUIREMENTS

- To fully participate in online courses, you will need to use a current, Flash enabled browser. For PC users, the suggested browser is Internet Explorer 9.0 or 10. For Mac users, the most current update of Firefox is suggested.
- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
 - 512 MB of RAM, 1 GB or more preferred
 - Broadband connection required courses are heavily video intensive
 - Video display capable of high-color 16-bit display 1024 x 768 or higher resolution
- You must have a:
 - sound card, which is usually integrated into your desktop or laptop computer
 - speakers or headphones.
- Depending on your course, you might also need a:
 - webcam
 - microphone

For courses where interactive tools are used, like VoiceThread or Class Live Pro, headphones are suggested for use with recording and playback. We recommend a webcam with an integrated microphone, such as the Microsoft LifeCam Cinema. All devices should be installed and configured before class begins.

- Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. Java can be downloaded at: <http://www.java.com/en/download/manual.jsp>
- Current anti-virus software must be installed and kept up to date.
- You will need some additional free software for enhanced web browsing. Ensure that you download the free versions of the following software:
 - Adobe Reader
 - Adobe Flash Player
- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized

by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.

- For additional information about system requirements, please see: <https://secure.ecollege.com/tamuc/index.learn?action=technical>

ACCESS AND NAVIGATION

Pearson LearningStudio Access and Log in Information

Note: eCollege has recently changed its name to LearningStudio.

This course will be facilitated using Pearson LearningStudio, the learning management system used by Texas A&M University Commerce. To get started with the course, go to: <http://www.tamuc.edu/myleo.aspx>.

You will need your CWID and password to log in to the course. If you do not know your CWID or have forgotten your password, contact Technology Services at 903.468.6000 or helpdesk@tamuc.edu.

It is strongly recommended that you perform a "Browser Test" prior to the start of your course. To launch a browser test, login to Pearson LearningStudio, click on the 'myCourses' tab, and then select the "Browser Test" link under Support Services.

Pearson LearningStudio Student Technical Support

Texas A&M University Commerce provides students technical support in the use of Pearson LearningStudio.

Technical assistance is available 24 hours a day/ 7 days a week.

If at any time you experience technical problems (e.g., you can't log in to the course, you can't see certain material, etc.) please contact the Pearson LearningStudio Help Desk, available 24 hours a day, seven days a week.

The student help desk may be reached by the following means 24 hours a day, seven days a week.

- **Chat Support:** Click on '*Live Support*' on the tool bar within your course to chat with an Pearson LearningStudio Representative.
- **Phone:** 1-866-656-5511 (Toll Free) to speak with Pearson LearningStudio Technical Support Representative.
- **Email:** helpdesk@online.tamuc.org to initiate a support request with Pearson LearningStudio Technical Support Representative.

Accessing Help from within Your Course: Click on the '*Tech Support*' icon on the upper left side of the screen inside the course. You will then be able to get assistance via online chat, email or by phone by calling the Help Desk number noted below.

Note: Personal computer problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, an Internet cafe, or a bookstore, such as Barnes & Noble, etc.

Policy for Reporting Problems with Pearson LearningStudio

Should students encounter Pearson LearningStudio based problems while submitting assignments/discussions/comments/exams, the following procedure **MUST** be followed:

1. Students must report the problem to the help desk. You may reach the helpdesk at
2. helpdesk@online.tamuc.org or 1-866-656-5511
3. Students **MUST** file their problem with the helpdesk and obtain a helpdesk ticket number
4. Once a helpdesk ticket number is in your possession, students should email me to advise me of the problem and to provide me with the helpdesk ticket number
5. At that time, I will call the helpdesk to confirm your problem and follow up with you

PLEASE NOTE: Your personal computer/access problems are not a legitimate excuse for filing a ticket with the Pearson help desk. You are strongly encouraged to check for compatibility of your browser **BEFORE** the

course begins and to take the Pearson LearningStudio tutorial offered for students who may require some extra assistance in navigating the Pearson LearningStudio platform. **ONLY** Pearson LearningStudio based problems are legitimate.

Internet Access

An Internet connection is necessary to participate in discussions and assignments, access readings, transfer course work, and receive feedback from your professor. View the requirements as outlined in Technology Requirements above for more information.

myLeo Support

Your myLeo email address is required to send and receive all student correspondence. Please email helpdesk@tamuc.edu or call us at 903-468-6000 with any questions about setting up your myLeo email account. You may also access information at <https://leo.tamuc.edu>.

Learner Support

Go to the following link [One Stop Shop](#)- created to serve you by attempting to provide as many resources as possible in one location.

Go to the following link [Academic Success Center](#)- focused on providing academic resources to help you achieve academic success.

COMMUNICATION AND SUPPORT

The following is the list of communication methods used in this class and their purposes. These include student-instructor, instructor-student and student-student communication.

You will be expected to check your university email account and log onto eCollege at least once every 24 hours Monday-Friday in order to keep abreast of the latest class announcements.

- **Email** will be used by me to communicate to the class as a whole general information about upcoming assignments, due dates, and any changes in the schedule or syllabus that might occur.

I will also email students individually with occasional feedback from assignments and on the class as a whole.

Students can use email to ask me any questions about (i) course logistics (upcoming assignments, due dates...) (ii) as any questions about the way their specific assignments were graded and feedback they have been given (iii) constructive feedback to me about how the course is going and any problems/concerns with the course structure (and even things that work particularly well!)

In emails, please put "PHYS526 Online" in the subject header. I will reply to emails within 24 hours (48 at weekends and holidays)

I will always send emails to your official University Email address as given through MyLeo. It will be your responsibility to check your university email regularly.

- **Announcements** on LearningStudio (eCollege) will be used to communicate to the class as a whole general information about upcoming assignments, due dates, and any changes in the schedule or syllabus that might occur. New announcements will appear to you the next time you log in to LearningStudio (eCollege).
- **Discussion threads** for each week should be the main way in which you ask and debate the answer to questions you have about the course material itself. Here you can brainstorm problem solving techniques and analyses of reading material. These questions should be continually addressed by your fellow students, and by myself, although in the spirit of discussion concrete answers will only be given after an honest and sustained attempt to figure out the answers

yourselves.

- **Virtual Office** is another place to discuss questions you have about the course individually with me. As well as questions about course logistics, **if anything about the material is unclear to you and preventing you tackling the concepts in the discussion**, this is the place to ask those questions. Any questions that could be answered in the discussion thread, I will only answer here after an honest and sustained discussion on them in the thread. Like emails, I will reply to Virtual Office questions within 24 hours (48 at weekends) unless they are asked during virtual office hours, in which case I'll answer them during those hours.
- **LearningStudio Chat**, accessible under the **Live** tab on the top toolbar, will be used for live communication during virtual office hours. Chatrooms for each week, or for specific topics that come up about the course and its material over multiple weeks, will be set up by myself. In the non-topic specific weekly chatrooms, you can ask questions about class logistics, short questions about the material that clarify meaning rather than explain core concepts, and give feedback as a whole on how the class is going. During virtual office hours, we can engage in real-time conversation there when necessary. Virtual office hours will be when the Chatrooms will be most useful to use, as it is when you have the opportunity to interact with each other and myself live.

Online Office Hours will be held each Wednesday and Thursday from 5:30 p.m.-7:30 p.m. I will be active during those times on the discussion thread, **LearningStudio chat** and **Virtual Office**.

- **Student Lounge** is located on the left hand menu under Course Home, and is a place to chat with fellow students about anything you like – as trivial or as deep as you like. This is a place I will NEVER visit, intended for yourselves only.

The following table summarizes the information on the previous pages: where to engage in the variety communications you are likely to have during the course.

Communication from you to me, between yourselves	Appropriate venue for it (and who sees it)	Where to find it on LearningStudio (eCollege)
Course logistics (due dates, etc.)	Email (Me) Virtual Office (Me) Chatroom (All)	-Top Toolbar, or via Leomail -Left menu under "Course Home" -Top toolbar under "Live"
Concerns/feedback about what is/isn't working well in class	Email (Myself) Virtual Office (Me) Chatroom (All)	-Top Toolbar, or via Leomail -Left menu under "Course Home" -Top toolbar under "Live"
Questions about understanding of assignments, grading	Email (Myself) Virtual Office (Me) Chatroom (All)	-Top Toolbar, or via Leomail -Left menu under "Course Home" -Top toolbar under "Live"
Short questions to clarify meaning of course material	Email (Myself) Virtual Office (Me) Chatroom (All)	-Top Toolbar, or via Leomail -Left menu under "Course Home" -Top toolbar under "Live"
In-depth discussion of concepts, problem solving techniques and analysis of material	Weekly discussion thread (All)	-Left menu under the relevant Week tab.
General Conversation	Chatroom (All)	-Top toolbar under "Live"
Student-only conversation	Student Lounge (Students only)	-Left menu under "Course Home"
Audio/video messages to myself/class about assignments, logistics, or anything you want to share relevant to the class	Voicethread (can choose who sees it)	-Left menu under "Course Home"

Communications from me to you	Location	Where to find it on LearningStudio (eCollege)
Class announcements	Email (All) Announcements (All)	-Top Toolbar, or via Leomail -New announcements appear when you log on to LearningStudio
Feedback on classwork	Email (to individual student)	-Top Toolbar, or via Leomail
Latest Grades	Gradebook	-Top Toolbar

COURSE AND UNIVERSITY PROCEDURES/POLICIES

Course Specific Procedures

Academic Honesty

Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including (but not limited to) receiving a failing grade on the assignment, the possibility of failure in the course and dismissal from the University. Since dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. In **ALL** instances, incidents of academic dishonesty will be reported to the Department Head. Please be aware academic dishonesty includes (but is not limited to) cheating, plagiarism, and collusion.

Cheating is defined as:

- Copying another's test or assignment.
- Communication with another during an exam or assignment (i.e. written, oral or otherwise).
- Giving or seeking aid from another when not permitted by the instructor.
- Possessing or using unauthorized materials during the test.
- Buying, using, stealing, transporting, or soliciting a test, draft of a test, or answer key.

Plagiarism is defined as:

- Using someone else's work in your assignment without appropriate acknowledgement.
- Making slight variations in the language and then failing to give credit to the source.

Collusion is defined as:

- Collaborating with another, without authorization, when preparing an assignment.

If you have any questions regarding academic dishonesty, ask. Otherwise, I will assume that you have full knowledge of the academic dishonesty policy and agree to the conditions as set forth in this syllabus.

Attendance Policy

In an online class, attendance means active participation; students are expected to spend at least 2 hours/week on the discussion threads and at least 10 hours/week is required to complete all the assignments, including reading. At least five substantive discussion posts are required by each student each week to gain full points on the discussion part of the grade. If you are unable to log on for an extended period of time (greater than a week) then contact me *in advance* to discuss how to proceed.

Assignment policy

All homework assignments will become available with the week's material and will be due 9 days later as outlined in the Course Requirements Section. The due dates for projects will be announced when they are set. Quizzes must be taken between 12 p.m. (noon) Friday when they are made available and the following Wednesday 12 p.m. (noon).

Late work

Late homeworks will be penalized by 10% by each day they are late (i.e. a Homework submitted more than 10 days late gets no credit). Late projects (except the last one, which is due by the last day of classes) will be penalized by 10% by each day they are late. Quizzes and discussion posts will not be accepted past the due date. The following week's material will only become available when the current week's homework, quizzes and discussion posts are complete.

Netiquette: Communication Courtesy Code

Students are expected to follow rules of common courtesy in all email messages, threaded discussions and chats. The same rules apply online as they do in person. Be respectful of other students. Foul discourse will not be tolerated. Please take a moment and read the following links concerning "netiquette". <http://www.albion.com/netiquette/>
<http://www2.nau.edu/d-elearn/support/tutorials/discrubrics/netiquette.php>

UNIVERSITY SPECIFIC PROCEDURES

Discrimination statement

A&M-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

ADA Statement: Students with Disabilities

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

Office of Student Disability Resources and Services
Texas A&M University-Commerce
Gee Library- Room 132
Phone (903) 886-5150 or (903) 886-5835
Fax (903) 468-8148
StudentDisabilityServices@tamuc.edu

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See *Code of Student Conduct from Student Guide Handbook*).

COURSE OUTLINE / CALENDAR

This schedule is tentative.

A scientific revolution: the history of quantum mechanics

Week 1: 19th century physics and blackbody radiation

Week 2: Max Planck and the introduction of the quantum

Week 3: Einstein and the photoelectric effect

Week 4: The Bohr-Sommerfeld atom

Week 5: Heisenberg's matrix mechanics and the Uncertainty Principle

Week 6: Schrodinger's wave mechanics

Week 7: The Copenhagen Interpretation

Quantum principles

Week 8: Quantum measurement

Week 9: Bell's theorem

Week 10: Quantum computing

Week 11: Identical particles and path integrals

Week 12: Feynman diagrams and the standard model

Applications and mis-applications of quantum physics

Week 13: The standard model of particle physics

Week 14: The transistor

Week 15: The Pseudoscience of Quantum Mechanics

COURSE DUE DATES: DISCUSSION POSTS

The introductory week discussion thread is intended for the discussion of the syllabus and how the course works in general. It opens Tuesday Jan 20th at **12.01 a.m.** and is open for a longer time than all other discussion threads, closing at **12 p.m. (noon)** Jan 30th.

Tuesday, January 20 th , 12.01 a.m.	Introductory week discussion thread opens
Friday, January 23 rd , 12 p.m.	Week 1 discussion thread opens
Friday, January 30 th , 12 p.m.	Introductory week discussion thread closes

Discussion threads for a particular week open at **12 p.m. (noon)** each Friday, and close at **12 p.m. . (noon)** the following Friday. You must make your 5 posts for credit during that week.

WEEK	OPENS	CLOSES
1	Jan 23	Jan 30
2	Jan 30	Feb 6
3	Feb 6	Feb 13
4	Feb 13	Feb 20
5	Feb 20	Feb 27
6	Feb 27	Mar 6
7	Mar 6	Mar 13
8	Mar 13	Mar 27
9	Mar 27	Apr 3
10	Apr 3	Apr 10
11	Apr 10	Apr 17
12	Apr 17	Apr 24
13	Apr 24	May 1
14	May 1	May 8
15	May 8	May 15

COURSE DUE DATES: QUIZZES

The introductory week's syllabus quiz becomes available on Tuesday Jan 20th at **12.01 a.m.** and closes Friday Jan 23rd at **12 p.m. (noon)**.

For the introductory quiz only, you may take the quiz as many times as you like. You will only gain access to the rest of the course once you have made 100% on the syllabus quiz.

Tuesday, January 20 th , 12.01 a.m.	Introductory week syllabus quiz opens
Friday, January 23 rd , 12 p.m.	Introductory week syllabus quiz closes Week 1 quizzes open
Wednesday, January 28 th , 12 p.m.	Week 1 quizzes close

Quizzes on the week's reading material become available on Fridays at **12 p.m. (noon)** and close the following **Wednesday** at **12 p.m. (noon)**.

NOTE: *Apart from the introductory quiz, quizzes can only be attempted once. Once you begin taking the quiz, you will have a time limit of one hour to complete it. Once completed, you cannot return to it and revise your answers.*

WEEK	QUIZ AVAILABLE	QUIZ DUE
1	Jan 23	Jan 28
2	Jan 30	Feb 4
3	Feb 6	Feb 11
4	Feb 13	Feb 18
5	Feb 20	Feb 25
6	Feb 27	Mar 4
7	Mar 6	Mar 11
8	Mar 13	Mar 25
9	Mar 27	Apr 1
10	Apr 3	Apr 8
11	Apr 10	Apr 15
12	Apr 17	Apr 22
13	Apr 24	Apr 29
14	May 1	May 6
15	May 8	May 13

COURSE DUE DATES: HOMEWORKS

Homeworks for a given week are given each Friday at **12 p.m. (noon)** and are due 9 days later on **Sundays at Midnight**.

WEEK	HW AVAILABLE	HW DUE
1	Jan 23	Feb 1
2	Jan 30	Feb 8
3	Feb 6	Feb 15
4	Feb 13	Feb 22
5	Feb 20	Mar 1
6	Feb 27	Mar 8
7	Mar 6	Mar 22
8	Mar 13	Mar 29
9	Mar 27	Apr 5
10	Apr 3	Apr 12
11	Apr 10	Apr 19
12	Apr 17	Apr 26
13	Apr 24	May 3
14	May 1	May 10

WEEKLY ONLINE DISCUSSION RUBRIC

Each week (except the introductory week) your discussion posts will be graded using the following rubric. Each week's discussion posts contribute up to 1% to your final grade.

Note: One post counts as 75 words or more on topic. Posts with less words or posts not addressing the week's class topic will not be considered for grading. Of course, the discussion should be allowed to flow naturally, and shorter posts will naturally occur, including one word posts of the type "I agree!" and "Yes!" or "No!". This is fine, and indeed necessary – it is just that the grading will be based upon posts of 75 words or more.

A reminder that netiquette should be observed at all times: please make sure you visit and understand the following resources:

<http://www.albion.com/netiquette/>

<http://www2.nau.edu/d-elearn/support/tutorials/discrubrics/netiquette.php>

Criteria	Unacceptable(0)	Poor (1)	Good (2)	Excellent (3)
Number of posts	No posts during the week.	1-2 posts during the week.	3-4 posts during the week.	5 or more posts during the week.
Spelling and Grammar	Posts are not in complete sentences, or more than half of the sentences have spelling or grammatical errors.	Between a quarter and half of sentences have spelling or grammatical errors.	Less than a quarter of sentences have spelling or grammatical errors.	No spelling or grammatical errors.
Knowledge	Posts demonstrate no evidence of knowledge of the week's reading.	Posts demonstrate evidence of only a cursory reading of the week's material, and little attempt to critically analyze it.	Posts demonstrate reasonable knowledge of the week's reading, and an attempt to critically analyze it.	Posts demonstrate evidence of comprehensive knowledge of the week's reading, and significant attempts to critically analyze it.

Appropriateness and awareness of other student contributions	Posts rude/disrespectful. No attempt to build upon other students' posts or support other people's arguments.	Minimal acknowledgment of other students' posts. Little attempt to build upon arguments.	Reasonable attempts to build upon other students' posts and contribute to their arguments.	Excellent awareness of other students' posts and substantial efforts to contribute to their arguments.
References and support	Arguments are unsupported, come across as unsubstantiated opinion.	Minimal support for students' arguments. Student's thinking unclear, hard to discern how student arrived at their conclusions.	Reasonable attempt to justify arguments made, with some references to the week's reading and external sources where appropriate.	Arguments are fully backed up, with clear explanations of how the student arrived at their conclusions, with full references to the week's reading or to external sources where appropriate.

Credit: The following online rubrics have been used to inform the development of the rubric above:

<http://www.udel.edu/janet/MARC2006/rubric.html>

<http://www2.nau.edu/d-elearn/support/tutorials/discrubrics/discrubric.php>

https://topr.online.ucf.edu/images/f/f0/IDL6543_Discussion_Rubric.pdf