

PHYS 1301 Course Syllabus

Course Overview

Everything you need to know about time travel, the Big Bang Theory, Schrodinger's cat, the Higgs boson ... and more. This is an introductory course designed specifically for non-science majors. In a descriptive, non-mathematical framework, it presents the deepest ideas in modern physics – Relativity and Quantum Mechanics - and their impact on life, the universe, and everything, including the nature of space, time, matter, energy, reality and the high technology we take for granted. A variety of practical work, such as measuring the age of the universe, the speed of the fastest thing in the universe, the structure of the smallest atom, etc. illustrates the course material in a form accessible to all.

Instructor

Prof. Dalley has been teaching physics courses at SMU from non-science majors to graduate students since 2006. He has received both an Outstanding Professor Rotunda Award and the Provost's Teaching Recognition Award. At SMU he also directs science outreach programs and professional development courses for high-school physics teachers.

University Curriculum or Common Curriculum "tags"

- Exploring Science (ES) Breadth (matriculation from Fall 2020)
- Science and Engineering (SE) Breadth and Quantitative Reasoning (QR) Proficiencies & Experiences requirements of requirement of the University Curriculum

Student Learning Outcomes

(ES) Students will demonstrate an ability to engage in scientific inquiry.

Class Meeting: **lecture** 09:00 – 09:50 am, lab 10:00 -11:50 am, lecture 1:00 – 1:50 pm

Instructor: Dr. S. Dalley, sdalley@smu.edu

Office Hour: 8:00 - 8:45 a.m. each day

Requirements:

- [***Ideas of Modern Physics, S. Dalley, 2nd, Kendall Hunt, 2016.***](#) Buy the e-book directly from the publisher <https://he.kendallhunt.com/product/ideas-modern-physics>
- You will need a free account at **PollEverywhere.com**. ONE account using your SMU email address and REAL NAME. No other accounts will be recognized. Login at PollEV.com and join session *dalleyphysicsto* submit polls.
- **Zoom**meeting ID 477 628 4599 Passcode *dalleyphys*. You will only be able to join Zoom meetings while signed in to your SMU account via SSO. [How to sign in via SSO.](#)

Statement on Communication

For personal messages, please contact me via your smu email. I will respond to your email within a few hours typically. Responses might be slightly delayed on holidays and weekends. I will communicate with the class via Canvas Announcements. It is your responsibility to check Canvas Announcements and your SMU email.

Netiquette

Netiquette is a set of rules for behaving properly online. Something about cyberspace makes it easy for people to forget that they are interacting with other real people. The following bullet points cover some basics to communicating online:

- Be sensitive to the fact that there will be cultural and linguistic backgrounds, as well as different political and religious beliefs, plus just differences in general.
- Use good taste when composing your responses in Discussion Forums. Swearing and profanity is also part of being sensitive to your classmates and should be avoided. Also consider that slang can be misunderstood or misinterpreted.
- Don't use all capital letters when composing your responses as this is considered "shouting" on the Internet and is regarded as impolite or aggressive. It can also be stressful on the eye when trying to read your message.
- Be respectful of your others' views and opinions. Avoid "flaming" (publicly attacking or insulting) them as this can cause hurt feelings and decrease the chances of getting all different types of points of view.
- Be careful when using acronyms. If you use an acronym it is best to spell out its meaning first, then put the acronym in parentheses afterward, for example: Frequently Asked Questions (FAQs). After that you can use the acronym freely throughout your message.
- Use good grammar and spelling, and avoid using text messaging shortcuts.
- [Emoticons\(Links to an external site.\)](#) and [emojis \(Links to an external site.\)](#) can be used to add emotion to your text or convey invisible body language, as long as they are used tastefully.
- For synchronous meetings, make sure you are in a safe and private place (please do not connect while you are driving or when there might be distractions around you). Also, for a better experience, make sure to use headphones (except during exams) and make sure you are not interrupted.

Institutional Policies & Procedures

Disability Accommodations

Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit <http://www.smu.edu/Provost/SASP/DASS> to begin the process. Once approved and registered, students will submit a DASS Accommodation Letter to faculty through the electronic portal *DASS Link* and then communicate directly with each instructor to make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

Religious Observance

Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (<https://www.smu.edu/StudentAffairs/Chaplain/ReligiousHolidays>).

Excused Absences for University Extracurricular Activities

Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (See [2020-2021 SMU Undergraduate Catalog](#) under “Enrollment and Academic Records/Excused Absences.”)

Student Academic Success Programs

Students needing assistance with writing assignments for SMU courses may schedule an appointment with the Writing Center through Canvas. Students wishing support with subject-specific tutoring or success strategies should contact SASP, Loyd All Sports Center, Suite 202; 214-768-3648; <https://www.smu.edu/sasp>.

Pregnant and Parenting Students

Accommodations for pregnant and parenting students: Under Title IX students who are pregnant or parenting may request academic adjustments by contacting Elsie Johnson (elsiej@smu.edu) in the Office of the Dean of Students, or by calling 214-768-4564. Students seeking assistance must schedule an appointment with their professors as early as possible, present a letter from the Office of the Dean of Students, and make appropriate arrangements. Please note that academic adjustments are not retroactive and, when feasible, require advance notice to implement.

Covid-19 Attendance

Students who are experiencing COVID-19 symptoms or who have been notified through contact tracing of potential exposure and need to self-quarantine or isolate must follow the protocols laid out in [SMU's Contact Tracing Protocol](#). To ensure academic continuity, students in these situations will not be penalized and will be provided appropriate modifications to assignments, deadlines, and testing. Please also note that SMUFlex classes might, in rare circumstances, go remote for two-week periods to accommodate COVID-related issues. To ensure these necessary accommodations, affected students must:

- Provide as much advance notification as possible to the instructor about a change in circumstances. Students must notify their instructor about a potential absence as well as

plans for a return to class. For cases in which students test positive for COVID-19, they should fill out a [CCC form at this link](#).

- Communicate promptly with the instructor to establish, as necessary, alternative assignments and/or changes to deadlines and exams. Students are then responsible for meeting the expectations laid out in these alternative arrangements.
- Continue participation in class via Zoom, as health circumstances permit. Attend class regularly, when not in a situation outlined above, in accordance with safety measures laid out by SMU CAN in the [Pledge to Protect](#) (including wearing masks, maintaining social distancing, and cleaning personal space after class). In-person participation in SMUFlex classes is required on students' assigned red/blue rotation days except in cases when students are experiencing illness, are in self-quarantine or in isolation.
- Students facing multiple or extended COVID-19-related absences or illness can work with the Office of the Dean of Students to consider options such as fully remote learning or medical withdrawal.

Academic Dishonesty

Students are expected to embrace and uphold the [SMU Honor Code \(Links to an external site.\)](#). Violations of the Honor Code will be acted upon in accordance with the policies and procedures outlined in the [Mustang Student Handbook \(Links to an external site.\)](#). Examples of academic dishonesty are:

- Communication via any method with anyone else, whether real or virtual, during any exam.
- Sharing or copying an assignment intended to be done individually.
- Fabricating lab data or using published information without citation in an essay-style assignment.
- This course operates a policy of zero tolerance toward Academic Dishonesty in any form in any graded assessment. It will usually result in an F grade for the course and a filing with the Dean of Student Life (Honor Code Violation).

Grading

Your course grade will be calculated according to the following weighting:

- PRE-CLASS QUIZZES (22%). No late quizzes are accepted but the lowest two textbook quiz scores will be dropped, including absence for any reason.
- LABS (38%)
- HOMEWORK ASSIGNMENTS (30%). No late homeworks are accepted but the lowest homework score will be dropped, including absence for any reason.
- FINAL EXAM (10%)

If your average lab score is below 60 %, your final grade will be determined by your lab score alone.

Grading Scale

A	A -	B +	B	B -	C +	C	C -	D +	D	D -	F
100-	90-	85-	80-	75-	70-	65-	N/A	N/A	60-	N/A	below

90% 85% 80% 75% 70% 65% 60% 50% 50%

What you have scored is what determines your grade; not rounding up, effort, attendance, grades in other courses, scores of other students, scholarship requirements, my opinion, your opinion, your desired career path, the orbit of Venus, etc..

Requirement/Description of Assignment Groups

PRE-CLASS QUIZZES

Before each day's lecture class you are expected to read the relevant section of the textbook and answer short multiple-choice quizzes, found in the textbook, which should then be uploaded in Canvas by the deadline. You can either:

1. a) write your answer selection in your paper textbook, sign the page, then take a clear picture, or
2. b) use the menu at the bottom of the quiz page in your e-book (you may have to hit the up arrow there if it is hidden) to print to PDF. Open this PDF and it will allow you to annotate the document to show your choice of answers.

Recommended Time Burden = 1/2 hour per quiz

LABS

Important: this course counts as a lab-based course for the University Curriculum or Common Curriculum general science requirements. If your average lab score is below **60 %**, your final grade will be determined by your lab score alone.

- Labs will be fully remote so you will work with a lab partner on a group assignment in Canvas via Zoom breakout room. You must be present in Zoom for the entire time your group is working.

The lab report should be your own or own group's work. Plagiarism (presenting another's work as your own) or fabrication of data are a serious forms of academic misconduct and will result in a zero on the entire lab for a first occurrence, and an F course grade if repeated. Allowing your lab report to be copied is also academic misconduct, with the same penalty.

The grading rubric is:

- 5 - 6 points – Only a few minor errors or omissions
- 4 points – a major or many minor errors or omissions
- 3 points – several major errors or omissions
- 1 - 3 points - Very little correct or relevant material.
- ½ points may be awarded at the discretion of the grader.

HOMEWORK ASSIGNMENTS

Homework Assignments consisting of 3 questions requiring **hand-written** extended responses are due uploaded in Canvas by the deadline. For each question on an assignment, the grading rubric is:

- 2 points – Mostly correct, some minor errors, omissions, or irrelevant material
- 1 point – some correct but major errors, omissions, or irrelevant material
- 0 points – Nothing correct or nothing relevant to the question asked.
- ½ points may be awarded at the discretion of the grader.

You may use your own words and use wording from other sources with citation. Indiscriminately using material not directly relevant to the question asked will reduce your credit. Quora and other unedited “Ask” websites are not legitimate academic sources of information. Wikipedia is a valid source of information (you do not need to cite original sources). Online references must show the date you accessed it. The best source to answer homework questions from is the course textbook.

The assignment should be your own work. Plagiarism is a serious form of academic misconduct and will result in a zero on the entire homework for a first occurrence, and an F course grade if repeated. Allowing your homework to be copied is also academic misconduct, with the same penalty.

An exemplar assignment answer is shown [here](#)

Recommended Time Burden / Length = 2 hours / 1-2 pages per assignment

FINAL EXAM

The final exam (multi-choice questions covering all chapters) will last 1 hour; the questions will be provided in advance, but not the answer options. The final exam may occur as a quiz in Canvas with your presence required in Zoom. You must be present in Zoom for the entire 1 hour; you will be in your own breakout room. You must have Zoom camera and mic on (volume turned up) with a full face view and share your screen. You may not wear ear phones, talk to or otherwise communicate with anyone else during the final exam. You may not leave camera shot during the exam without permission. Violating any of these rules without good reason will result in the entire final exam % being forfeited. Without documentary evidence of a technical problem, (screenshot or photo) the exam score will be reduced by one question for each minute late that the quiz is submitted in Canvas.

Course Outline/Calendar

Date	Assignments Due 9 am	Lectures and Labs
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By 5/13	Read Chap	
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		Classical Physics	2.1 Space, Time, Motion
Th 5/13	Quiz 2.1	LAB - Numbers in Science	
	Quiz 2.2	Classical Physics	2.2 Gravity
	Hw A	Classical Physics	2.3 Electricity & Magnetism
Fr 5/14	Quiz 2.3	LAB - Measurement and Error	
	Quiz 2.4	Classical Physics	2.4 Light: Into the Modern Era
	Hw B	Special Relativity	3.1 Space, Time, Motion, Revisited
Mo 5/17	Quiz 3.1	LAB - Speed of Light	
	Quiz 3.2	Special Relativity	3.2 Paradoxes (not)
	Hw C	Special Relativity	3.3 Energy and $E = mc^2$
Tu 5/18	Quiz 3.3	LAB - Moving Clocks	
	Quiz 3.4	Special Relativity	3.4 Space-Time
	Hw D	General Relativity	4.1 Equivalence Principle
We 5/19	Quiz 4.1	LAB - Free Fall	
	Quiz 4.2	General Relativity	4.2 Time Dilation and Light Bending
	Hw E	General Relativity	4.3 Curved Space-Time
Th 5/20	Quiz 4.3	LAB - Hubble's Law	
	Quiz 4.4	General Relativity	4.4 Structure of the Universe
	Hw F	Quantum Mechanics	5.1 Wave-Particle Duality of Light
Fr 5/21	Quiz 5.1	LAB - Probability	
	Quiz 5.2	Quantum Mechanics	5.2 Probability & Uncertainty
Weekend	Quiz 5.3		
Reading	Quiz 5.4		

	Hw G	Atoms	6.1 Structure and Properties
Mo 5/24	Quiz 6.1	LAB – Laser Diffraction	
	Quiz 6.2	Atoms	6.2 Quantized Energy
	Hw H	Atoms	6.3 The Nucleus
Tu 5/25	Quiz 6.3	LAB - Hydrogen Spectrum	
	Quiz 6.4	Atoms	6.4 Condensed Matter
	Hw I	Synthesis	7.1 Space-Time Revisited
We 5/26	Quiz 7.1	LAB - Radioactivity	
	Quiz 7.2	Synthesis	7.2 Particles and Force-Fields
Th 5/27		Synthesis	7.3 The Standard Model
	Hw J	LAB - Particle Identification	
Th 5/27	Quiz 7.3	Final Exam (p.m.)	

Disclaimer: The instructor reserves the right to make changes to the schedule of the class. Any alterations will be announced in class, in Canvas or via email by the instructor. Students who do not check Canvas or their email assume full responsibility for missing alterations to the course.

Tech Requirements & Help

Please be sure that your device or devices meet the **technical requirements** for Canvas. [Technical requirements](#) and [browser requirements](#) for Canvas are located in the [Canvas Student Guide](#). If you need Technical Support with Canvas, click the Help link on the left side [Global Navigation](#). From there you can Search Canvas Guides, Chat with Support, or Submit a Request for assistance. You can also contact the SMU [IT Help Desk](#) for assistance with Canvas.

To be successful in this course, students should have basic keyboarding and computer skills, and be comfortable navigating the Internet. This fully remote course occurs primarily via canvas.smu.edu. [Zoom](#) Web Conferencing is used in this course as well for virtual (i.e., real-time, synchronous) meetings, and [Panopto \(Links to an external site.\)](#) is used for recording audio/video assignments.

IMPORTANT

For remote classes, a **webcam** is required for lab work and taking exams. If your device does not have a built-in webcam, one can be purchased at a local consumer electronics store or through an online retailer like [Amazon](#).

TECHNICAL SUPPORT

If you run into any technical problems, there are a number of resources available to you. First, you can always check with me; in many cases, I can walk you through technical issues. Also, you can contact the [SMU IT Help Desk](#) for assistance with Canvas and Zoom. Otherwise, here are additional useful resources:

- [Canvas\(Links to an external site.\)](#)
 - Click [HelpLinks to an external site.](#) on the [Global Navigation \(Links to an external site.\)](#) to search the Guides, [Chat \(Links to an external site.\)](#) or contact Instructure Support via email or phone
- Panopto
 - Search the [Panopto Support site\(Links to an external site.\)](#) (Links to an external site.) for forums and documentation, or contact the [SMU IT Help Desk. \(Links to an external site.\)](#)
- Zoom
 - Search their [Knowledge Base\(Links to an external site.\)](#) or [Submit a Request \(Links to an external site.\)](#)

PANOPTO VIDEO APP for CANVAS

If requested, you will use the [Panopto \(Links to an external site.\)](#) to submit video assignments. Be sure your device or devices meet the Panopto's [technical requirements \(Links to an external site.\)](#), and if you need Panopto support contact the SMU [IT Help Desk \(Links to an external site.\)](#).

ZOOM

[Zoom \(Links to an external site.\)](#) is used for online synchronous (i.e., real-time) meetings in this course. Please be sure your devices meet the [technical requirements \(Links to an external site.\)](#) for Zoom. Meeting ID 477 628 4599
Passcode *dalleyphys*. **You will only be able to join Zoom meetings while signed in to your SMU account via SSO.** <https://www.smu.edu/OIT/Services/Shibboleth>

PRIVACY POLICIES

- [Canvas by Instructure](#)
- [Panopto Privacy\(Links to an external site.\)](#)
(Links to an external site.)
- [SMU OIT Policies and Legislation](#)
- [Zoom\(Links to an external site.\)](#)

ACCESSIBILITY

- Canvas
 - [Accessibility within Canvas](#)
 - [Voluntary Product Accessibility Template](#)
- [Panopto\(Links to an external site.\)](#)
(Links to an external site.)

- [Zoom](#)

Student Services

The following services and resources are available to SMU students:

- [Altshuler Learning Enhancement Center](#)
 - ALEC offers study-skill workshops and can help you with learning strategies and test preparation. Their phone number is (214) 768-3648.
- [Altshuler Writing Center](#)
 - The Altshuler Writing Center is open to all undergraduate students who need technical advice on their assigned papers. The writing center is open most afternoons and a few evenings. To work with someone at the writing center you must make an appointment in advance. To contact please call (214) 768-3648.
- [DASS](#)
 - Students needing academic accommodations for a disability must first contact [Disability Accommodations & Success Strategies](#)(DASS) at (214) 768-1470 to verify the disability and to establish eligibility for accommodations. They should then schedule an appointment with the professor to make appropriate arrangements. (See an attachment describes the DASS [procedures \(Links to an external site.\)](#) and relocated office.) If you have a disability accommodation you must contact DASS and have a letter of accommodation delivered to the instructor no later than the third day of class. You can email a scanned copy of your letter.
- [SMU](#)
 - Online portal for SMU students that allows you to view personal information, emergency contact information, register for AARO (if applicable), view class schedule, enroll in classes, add/drop/swap classes, view grades and view financial aid packages.
- [SMU Bookstore](#)
 - Information on textbooks, events, buyback, promotions and more.
- [SMU Bursar](#)
 - Information on student finances, bill pay and more.
- [SMU Counseling Services](#)
 - College can be a stressful time. There are many transitions and major life events occurring while you are a college student. If you or a friend is going through a difficult time and needs someone to talk to please seek out the resources provided by the counseling center, located in the Health Center and their phone number is (214) 768-2211. For 24 hour help contact (214) 768-2860.
- [SMU Dedman Recreation Center](#)
 - Regular exercise is one of the best things you can do for your mental and physical well-being.
- [SMU Libraries](#)
 - SMU Libraries has reference librarians happy to help with your research needs. Contact a librarian at <http://askalibrarian.smu.edu> or call (214) 768-2326.
- [SMU OIT](#)
 - OIT provides computing, information processing, and communications resources to satisfy the needs of faculty, students, and staff, and offers comprehensive support services to help them use technology effectively and creatively.
- [SMU Student Affairs](#)

- SMU Student Affairs is a network of [departments, programs and services](#) focused on supporting students' out-of-classroom experiences and co-curricular learning.

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