

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 of Common Curriculum (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: WF 1:00 p.m. – 1:50 p.m. (lab M either 12-1:50 pm or 2:00 - 3:50 pm see separate Canvas courses)

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

Office Hour: In person F 11:00 a.m. - Noon, or Zoom by appointment

Requirements:

- [Ideas of Modern Physics, S. Dalley, 2nd ed., Kendall Hunt](https://he.kendallhunt.com/product/ideas-modern-physics), 2016. Buy the e-book directly from the publisher <https://he.kendallhunt.com/product/ideas-modern-physics>

Mask Policy

Masks are required in this course for students. This masking policy is subject to change during the semester, and any changes will be posted clearly in Canvas announcements.

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

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%	90-85%	85-80%	80-75%	75-70%	70-65%	65-60%	N/A	N/A	60-50%	N/A	below 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 lecture class you are expected to read the relevant section of the textbook and answer a short multiple-choice quiz, found in the textbook, which should then be uploaded in Canvas by the deadline. You can either:

- a) a write your answer selection in your paper textbook, sign the page, then take a clear picture, or
- 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. The PDF should show your identification stamped at the top.

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 are group assignments with 2 or 3 students in a group. You must be present in the lab for the entire time your group is working. One student in the group should upload the lab report to Canvas.
- The lab report should be your 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 will be multi-choice questions covering all chapters and will last 1 hour. The questions will be provided in advance, but not the answer options. You will not be allowed any reference resources during the exam. Phones should be placed face down on the table - handling your phone for any reason or communicating with others during the exam will result in a zero score.

Course Calendar

Date	Assignment Due	TOPIC
Mo 8/23		LAB - Numbers in Science
We 8/25		Scientific Discovery 1.1 Numbers in Science (no quiz)
Fr 8/27		Classical Physics 2.1 Space, Time, Motion
Mo 8/30		LAB - Measurement and Error
We 9/1		Classical Physics 2.2 Gravity
Fr 9/3	A	Classical Physics 2.3 Electricity & Magnetism
Mo 9/6		Labor Day - No Class

We 9/8		Classical Physics	2.4 Light: Into the Modern Era
Fr 9/10		Special Relativity	3.1 Space, Time, Motion, Revisited
Mo 9/13	B	LAB - Speed of Light	
We 9/15		Special Relativity	3.2 Paradoxes (not)
Fr 9/17		Special Relativity	3.3 Energy and $E = mc^2$
Mo 9/20	C	LAB - Moving Clocks	
We 9/22		Special Relativity	3.4 Space-Time
Fr 9/24		General Relativity	4.1 Equivalence Principle
Mo 9/27	D	LAB - Free Fall	
We 9/29		General Relativity	4.2 Time Dilation and Light Bending
Fr 10/1		General Relativity	4.3 Curved Space-Time
Mo 10/4	E	LAB - Hubble's Law	
We 10/6		General Relativity	4.4 Structure of the Universe
Fr 10/8		Quantum Mechanics	5.1 Wave-Particle Duality of Light
Mo 10/11		Fall Break - No class	
We 10/13	F	Quantum Mechanics	5.2 Probability & Uncertainty
Fr 10/15		Quantum Mechanics	5.3 Matter Waves
Mo 10/18	G	LAB - Probability	
We 10/20		Quantum Mechanics	5.4 Quantum Measurements
Fr 10/22		Atoms	6.1 Structure and Properties
Mo 10/25	H	LAB – Laser Diffraction	
We 10/27		Atoms	6.2 Quantized Energy
Fr 10/29		Atoms	6.3 The Nucleus
Mo 11/1	I	LAB - Hydrogen Spectrum	
We 11/3		Atoms	6.4 Condensed Matter
Fr 11/5		Synthesis	7.1 Space-Time Revisited
Mo 11/8	J	LAB - Radioactivity	
We 11/10		Synthesis	7.2 Particles and Force-Fields
Fr 11/12		Synthesis	7.3 The Standard Model
Mo 11/15	K	LAB – Magnetic Particle Accelerator	
We 11/17		"Particle Fever" documentary	
Fr 11/19		"Particle Fever" documentary	
Mo 11/22		LAB - Particle Identification	
Mo 11/29	L	LAB - Quark Puzzles / Dark Matter	
We 12/1		Synthesis	7.4 Unsolved Mysteries
Fr 12/3		Final Review	
Mo 12/6		LAB – makeup	
Fr 12/10		Final Exam 11:30 am	

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.

Institutional Policies & Procedures

Title IX and Disability Accommodations

Disability Accommodations	<p>Students who need 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 they are registered and approved, students then submit a DASS Accommodation Letter through the electronic portal, <i>DASS Link</i>, and then communicate directly with each of their instructors to make appropriate arrangements. Please note that accommodations are not retroactive, but rather require advance notice in order to implement.</p>
Sexual Harassment	<p>All forms of sexual harassment, including sexual assault, dating violence, domestic violence and stalking, are violations of SMU's Title IX Sexual Harassment Policy and may also violate Texas law. Students who wish to file a complaint or to receive more information about the grievance process may contact Samantha Thomas, SMU's Title IX Coordinator, at accessequity@smu.edu or 214-768-3601. Please note that faculty are mandatory reporters. If students notify faculty of sexual harassment, faculty must report it to the Title IX Coordinator. For more information about sexual harassment, including resources available to assist students, please visit www.smu.edu/sexualmisconduct.</p>
Pregnant and Parenting Students	<p>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.</p>

SMU Requirements

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. Click here for a list of holidays.
COVID-19 and Other Medical-Related Absences	Students who test positive for COVID-19 and need to isolate, or who are notified of potential exposure, must follow SMU's Contact Tracing Protocol . To ensure academic continuity and avoid any course penalties, students should follow the same procedures described by their instructors as they would for any other medical-related absence in order to be provided with appropriate modifications to assignments, deadlines, and exams.
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 that were missed as a result of their participation. It is the responsibility of the student to make arrangements for make-up work with the instructor prior to any missed scheduled examinations or other missed assignments. (See 2020-2021 SMU Undergraduate Catalog under "Enrollment and Academic Records/Excused Absences.")
Final Exams	Final course examinations shall be given in all courses where appropriate, and some form of final assessment is essential. Final exams and assessments must be administered as specified in the official examination schedule. Exams cannot be administered or due during the last week of classes or during the Reading Period. Syllabi must state clearly the form of the final exam or assessment, and the due date and time must match the official SMU exam schedule. Final exams are not required to be provided online.

Student Support

Student Academic Success Programs	Students needing assistance with writing assignments for SMU courses may schedule an appointment with the Writing Center through Canvas. Students who would like support for subject-specific tutoring or success strategies should contact SASP, Loyd All Sports Center, Suite 202; 214-768-3648; https://www.smu.edu/sasp .
Caring Community Connections Program	CCC is a resource for anyone in the SMU community to refer students of concern to the Office of the Dean of Students. The online referral form can be found at smu.edu/deanofstudentsccc . After a referral form is submitted, students will be contacted to discuss the concern, strategize options, and be connected to appropriate resources. Anyone who is unclear about what steps to take if they have concerns about students should either consult the CCC

[Reference Guide](#) or contact the Office of the Dean of Students at 214-768-4564.