

PHY390 Quantum Mechanics

Gustavus Adolphus College Fall 2020

Instructor: Dr. Steven Mellema

Office: Olin Hall 210

Office Hours: Any time; by appointment

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Textbooks:

Required – *A Modern Approach to Quantum Mechanics*, Second Edition, by John S. Townsend, University Science Books, ©2012

– *Mathematical Handbook of Formulas and Tables*, by Murray R. Spiegel
(Schaum's Outline Series)

Course Policy and Evaluation:

1. **Class Meetings and Reading Assignments:** The class will meet five days a week from 9:00-9:50 AM for lecture, small-group problem solving, homework review and exams. Class meetings will be either in person or online via Zoom meeting. Attached is a daily calendar of activities for the course. When reading assignments are made for a class session, the reading is expected to be completed **before** coming to the class.
2. **Homework:** Homework problems will be assigned according to chapters in the textbook and are due at the beginning of class on the due date listed on the calendar. Late homework may be accepted at the discretion of the instructor with a reduction in credit.
3. **Group Problems:** Occasionally in class, students will work together, in assigned groups of 2-3 members, to cooperatively solve problems. A group solution will be submitted, with all group members receiving the same grade. There will be no make-up for group problems missed due to absence.
4. **Problem Presentations:** After completing the lectures for each chapter in the textbook, we will take one day to have example problem solutions presented to and discussed by the class. These problems will be assigned to specific student presenters approximately one week in advance, and all students will take turns to present problem solutions. Students will earn credit both for their presentations and for their thoughtful discussion of others' presentations.
5. **Exams :** There will be three hour exams and a two-hour final exam (see the calendar below). Students must arrange in advance to take an exam at other than the scheduled time and may do so only for a valid health or school-related reason. (It is the responsibility of the student to inform the instructor during the first week of the semester regarding any anticipated absences due to required field trips, athletic events, musical performances, or other extra-curricular activities.) Exams missed without pre-arrangement are entered as zero credit and cannot be made up.

6. Evaluation :	Homework	25%
	Group Problems	5%
	In-Class Problem Presentations	10%
	Hour Exams	15% each
	Final Exam	15%

Assignment of final letter grades will be based upon the following guidelines:

	B+ = 86-90%	C+ = 74-78%	D+ = 62-66%
A = 94-100%	B = 82-86%	C = 70-74%	D = 58-62%
A- = 90-94%	B- = 78-82%	C- = 66-70%	

7. **Attendance :** Regular attendance at all class meetings is expected. Students will be held responsible for informing themselves of all announcements/assignments made in class.
8. **Academic Honesty:** Having signed and agreed to abide by the College’s Honor Code, students thereby pledge that, in all academic exercises, examinations, papers, and reports, they shall submit their own work. In the context of this course, students are expected to collaborate and to discuss their out-of-class assignments. However, submitting under one’s own name work that is merely copied from another is a violation of the Honor Code. Furthermore, seeking outside assistance during exams is expressly forbidden. A full description of the Academic Honesty Policy and the Honor Code can be found in the Academic Catalog (online at: www.gustavus.edu/general_catalog/current/acainfo).
9. **Multilingual Student Support:** Some Gusties may have grown up speaking a language (or languages) other than English at home. If so, we refer to you as “multilingual.” Your multilingual background is an incredible resource for you, and for our campus, but it can come with some challenges. You can find support through the Center for International and Cultural Education’s (<https://gustavus.edu/cice/>) Multilingual and Intercultural Program Coordinator (MIPC), Pamela Pearson (ppearson@gustavus.edu). Pamela can meet individually for tutoring in writing, consulting about specific assignments, and helping students connect with the College’s support systems. If you want help with a specific task (for example, reading word problems on an exam quickly enough or revising grammar in essays), let your professor and Pamela know as soon as possible. In addition, the Writing Center (<https://gustavus.edu/writingcenter/>) offers tutoring from peers (some of whom are themselves multilingual) who can help you do your best writing.
10. **Requesting Accommodations:** Gustavus Adolphus College is committed to ensuring equitable and inclusive learning environments for all students. If you have a disability and anticipate or experience barriers to equal access, please speak with the accessibility resources staff about your needs. A disability may include mental health, attentional, learning, chronic health, sensory, physical, and/or short-term conditions. Students with a documented elevated risk of COVID-19 may also request academic accommodations. When appropriate, staff will guide students and professors in making accommodations to ensure equal access. Accommodations cannot be made retroactively; therefore, to maximize your academic success at Gustavus, please contact them as early as possible. Accessibility resources staff are located in the Academic Support Center (<https://gustavus.edu/asc/accessibility/>) (x7227). Accessibility Resources Coordinator, Katy Clay, (clayk@gustavus.edu), can provide further information.
11. **Social Distancing:** I expect that students will comply with “social distancing” rules regarding acceptable distance (no less than six feet) from other students and the instructor, as well as with rules regarding staged entering and exiting classrooms and passing through hallways, as an expectation of the College and this class. I will provide you with guidance on my expectation of classroom entry, exit, and

transitional movements on the first day of class. As your faculty instructor, I will not create activities or conditions that will require you to be within 6 feet of another, except during “pass-by” or “transitional movement” occurrences.

Although we will be conducting small group work in this class, I expect that you will meet with your group remotely OR in a location where every group member can abide by social distancing guidelines. I will not require you to conduct this work in a confined space that does not allow for social distancing. If you choose to meet in-person with your small group, please know that any interaction with group members that is within 6 feet for 15 minutes or more (even with masks) will identify you as a contact trace for any other group members who test positive for COVID. As a faculty member, I will not create activities that require you to interact with other students in a “close contact” format.

12. **Food and Beverages in Classrooms and Laboratories:** No food will be permitted in classrooms during the fall 2020 semester unless there is a medical accommodation. Eating and drinking will be allowed when seated in public lounge spaces in academic buildings and private offices. It is **not** allowed in hallways or classrooms before, during, or after class. Eating and drinking is also not allowed while standing or walking in buildings. These restrictions are based on the risk that happens when removing a face covering to eat and drink.
13. **Copyright and Recording:** Recordings and videos of the class, produced as part of class instruction, are not to be posted or distributed in any format or on any platform without the written consent of the instructor. Posting any class recordings or materials (including excerpts and clips) to external sites or to social media will be considered a violation of this policy.

Some class materials may be copyrighted. Access to these materials is restricted to students registered for the class using a Gustavus password. These materials may not be reproduced, shared, or distributed by students, and are made available only to those currently enrolled in this class. If a tutor needs access to these materials in order to provide you with academic support, please ask your instructor for assistance.

14. **Incompletes :** A grade of incomplete will **only** be given for work not completed due to circumstances beyond the control of the student (*this is the College policy*).

SEPTEMBER 2020

SUBJECT

PERIOD

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SAT/SUN
WEEK 1		1	2 Classes begin; Syllabus; Introduction	3 Townsend Sections 1.1-1.2	4 Townsend Sections 1.3-1.4	5/6
WEEK 2	7 Townsend Sections 1.5-1.6	8 Problem Presentations Chapter 1	9 Townsend Sections 2.1-2.2 Chapter 1 Homework Due	10 Townsend Sections 2.3-2.4	11 Townsend Sections 2.5-2.6	12/13
WEEK 3	14 Townsend Sections 2.7-2.8	15 Problem Presentations Chapter 2	16 Townsend Sections 3.1-3.2 Chapter 2 Homework Due	17 Townsend Sections 3.3-3.4	18 Townsend Sections 3.5-3.6	19/20
WEEK 4	21 Townsend Sections 3.7-3.8	22 Problem Presentations Chapter 3	23 Townsend Sections 4.1-4.2 Chapter 3 Homework Due	24 Townsend Sections 4.3-4.4	25 No Class (Move-in Day)	26/27
WEEK 5	28 Townsend Section 4.5	29 Hour Exam #1 Chapters 1-3	30 Townsend Sections 4.6-4.7			

OCTOBER 2020

SUBJECT

PERIOD

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SAT/SUN
WEEK 5				1 Problem Presentations Chapter 4	2 Townsend Sections 5.1-5.2	3/4
	notes				Chapter 4 Homework Due	
WEEK 6	5 Townsend Sections 5.3-5.4	6 No Class: Nobel Conference	7 No Class: Nobel Conference	8 Townsend Section 5.5	9 Townsend Section 5.6	10/11
	notes					
WEEK 7	12 Townsend Section 5.7	13 Problem Presentations Chapter 5	14 Townsend Sections 6.1-6.3	15 Townsend Sections 6.4-6.6	16 Townsend Sections 6.7-6.8	17/18
	notes		Chapter 5 Homework Due			
WEEK 8	19 No Class: Fall Break Day	20 Townsend Section 6.9	21 Townsend Section 6.10	22 Townsend Section 6.11	23 Problem Presentations Chapter 6	24/25
	notes					
WEEK 9	26 Townsend Sections 7.1-7.3	27 Townsend Sections 7.4-7.6	28 Townsend Sections 7.7-7.8	29 Hour Exam #2 Chapters 4-6	30 Townsend Sections 7.9- 7.11	31
	notes Chapter 6 Homework Due					

NOVEMBER 2020

SUBJECT

PERIOD

		MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SAT/SUN
							1
WEEK 10		2 Problem Presentations Chapter 7	3 Townsend Sections 9.1-9.2	4 Townsend Sections 9.3-9.4	5 Townsend Sections 9.5-9.6	6 Townsend Sections 9.7-9.8	7/8
	notes		Chapter 7 Homework Due				
WEEK 11		9 Townsend Sections 9.9-9.10	10 Problem Presentations Chapter 9	11 Townsend Sections 10.1-10.2	12 Townsend Section 10.3	13 Townsend Section 10.4	14/15
	notes			Chapter 9 Homework Due			
WEEK 12		16 Townsend Section 10.5	17 Townsend Section 10.6	18 Problem Presentations Chapter 10	19 Townsend Sections 11.1-11.2	20 Townsend Section 11.3	21/22
	notes				Chapter 10 Homework Due		
WEEK 13		23 Townsend Section 11.4	24 Hour Exam #3 Chapters 7,9, and 10	25 No Class: Thanksgiving Recess	26 No Class: Thanksgiving Recess	27 No Class: Thanksgiving Recess	28/29
	notes						
WEEK 14		30 Townsend Section 11.5					
	notes	Online Classes Resume					

DECEMBER 2020

subject

SUBJECT

period

PERIOD

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SAT/SUN
WEEK 14		1 Townsend Section 11.6	2 Problem Presentations Chapter 11	3 Townsend Section 12.1	4 Townsend Section 12.2	5/6
				Chapter 11 Homework Due		
WEEK 15	7 Townsend Section 12.3	8 Townsend Sections 12.4- 12.5	9 Problem Presentations Chapter 12	10 No Class: Reading Day	11	12/13
			Last Day of Classes	Chapter 12 Homework Due		
WEEK 16	14 8:00-10:00 AM Final Exam (40% on Chapters 11-12; 60% comprehensive review)	15	16	17	18	19/20
WEEK 17	21	22	23	24	25	26/27
WEEK 18	28	29	30	31		