

LIU – POST

PHY 19

Modern Physics I, Spring 2019

3 credits

- Classes* §1: Tu; 12:55–1:55; PH 209, plus take home readings.
- Website* <http://arvind-borde.org/courses/phy19/>
- Instructor* Arvind Borde | arvind.borde@liu.edu | <http://arvind-borde.org/>
- Office* PH 235; telephone: (516) 299 2447. Hours: T, Th, 12:30–12:55 pm, or by appointment.
- Bulletin* This course is an introduction to the physics of the 20th century. Topics include special relativity, the Heisenberg uncertainty principle, the Schrodinger equation, spin angular momentum, the Pauli principle, atomic and molecular structure, and perturbation theory.
- Text, etc.* *Modern Physics*, 3rd Edition. R. Serway, C. Moses, C. Moyer. Publisher: Thomson Brooks/Cole (2005). [See course website]
- Rules* **Do:** attend all classes, come on time, stay for the duration, pay attention.
Don't: talk among yourselves, be disruptive, text, have your cell phone out. Violating any of these counts as an absence and will lead to further disciplinary action. Three or more violations will lead to an automatic F. You may use a computer or tablet to take notes, but must be prepared to show your notes and sit in the first row if asked.
- Homework & Tests* Homework will be assigned weekly. You must attempt it the day it is assigned. If you have difficulties, see me or a tutor *that week itself*. HW will be discussed in the class immediately following. Specific questions will be answered in class, but not general ones about the whole assignment. You must have the homework available in a separate notebook or folder, with your name on each assignment, or clearly marked as such in the class notebook. You must bring the homework and class notebook with you if you want extra help in my office. It is your responsibility to catch up on material you miss for any reason. You should expect to spend 6 hours a week on this course outside class.
- Tests will be based mainly on material and homework covered since the previous test, but familiarity with all material covered up to that point is expected. You will need a dedicated calculator (not cell phone or tablet computer) on all tests. *There are no make-up tests. If you miss a test for any reason you will get a score of –1 on it.* You must keep all your tests through the term.
- Grades* First see the rules above. There will be 6 tests. Your 5 best scores will each count 20% toward your grade. There will be a grade boost if you have done all the homework over the term.
- Note* Last day to drop: February 4. Last day to withdraw: April 5.

I have understood the syllabus, course requirements, grading method, and rules, and agree to abide by them. I have retained a copy of this syllabus for my records. I have filled out the form overleaf.

Signature: _____ Date: _____

Name: _____

Name (print clearly):

Course section (either number or meeting time):

Major:

Last three physics class taken (what, when, where), latest first:

Last three math classes taken (what, when, where), latest first:

Career goals:

Physics/Math weaknesses (if any):

Physics/Math strengths:

Anything in particular that you wish to learn in this course?:

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**PLEASE PLACE THIS COPY AT THE FRONT OF YOUR NOTEBOOK/FOLDER
YOU MUST HAVE IT WITH YOU IN EVERY CLASS**

Week 1 *Tuesday, January 22*
 Ch. 1: **Introduction & Special Relativity**
 Postulates, Lorentz transformations, consequences

Week 2 *Tuesday, January 29*
 Ch. 1: **Special Relativity**
 Paradoxes, Minkowskian spacetime, causality

Week 3 *Tuesday, February 5*
 Ch. 2: **Special Relativity**
 Momentum and energy

Test 1: Special Relativity

score

%

Week 4 *Tuesday, February 12*
 Ch. 2: **General Relativity**
 Curved spacetime, tests, geodesics

Week 5 *Tuesday, February 19*
 Ch. 2: **General relativity**
 Black holes, cosmology

Test 2: General Relativity

score

%

Week 6 *Tuesday, February 26*
 Ch. 3: **The Quantum Theory of Light**

Week 7 *Tuesday, March 5*
 Ch. 4: **The Particle Nature of Matter**

Test 3: Quantum Theory I

score

%

Spring Break

Week 8 *Tuesday, March 19*
 Ch. 5: **Matter Waves**

Week 9 *Tuesday, March 26*
 Ch. 6: **1d Quantum Mechanics**

Test 4: Quantum Theory II

score

%

Week 10 *Tuesday, April 2*
 Ch. 7: **Tunneling**

Week 11 *Tuesday, April 9*
 Ch. 8: **3d Quantum Mechanics**

Test 5: Quantum Theory III

score

%

Week 12 *Tuesday, April 16*
 Ch. 9, 15: **Atomic Structure, Elementary Particles**

Week 13 *Tuesday, April 23*
 Ch. **Entanglement and other Exotica**

Test 6: Quantum Theory IV

score

%

Letter Grade Key

%:	50–64	65–71	72–77	78–79	80–83	84–87	88–89	90–93	94+
Grade:	D	C ⁻	C	C ⁺	B ⁻	B	B ⁺	A ⁻	A