

Physics 110L §1–2
Introductory Astronomy Lab
North Dakota State University
Fall Semesters, 1 Credit
Mondays in SE316

Instructor: Noah Seekins

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Office Hours: T/R 1-2 PM, F 2-3 PM or Online

Primary Text: Laboratory instructions provided in Stellarium through Google Classroom

Secondary Text: Seeds & Backman. *Foundations of Astronomy*, 3rd Edition. Cengage Learning, 2017.

Materials: Notebook, pen, personal computer (recommended but not necessary).

Laboratory Coordinator: Paul Omernik

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Phone: 231-7047

Bulletin Description: Qualitative survey of the current understanding of the universe including planetary explorations, solar phenomena, stars, black holes, nebulas, galaxies.

General Education Approved Course for the Science & Technology (S) Category: This course has been approved by the NDSU Faculty Senate to meet the requirements for the Natural and Physical Sciences Learning Outcome. Students will:

- i. analyze components and dynamics of natural and physical worlds
- ii. develop models to explain phenomena within the natural and physical worlds
- iii. apply methods of scientific inquiry to enhance their understanding of the natural and physical world

Course Objective: This laboratory course is designed to expand upon some of the concepts learned in Physics 110 by using computer simulations to reinforce the theory and ideas developed during the lecture. By the end of the semester, students should have a good working knowledge of the concepts that were presented, be able to communicate these ideas effectively, and understand the importance of working in collaboration with their peers.

Class Expectations: Students are expected to complete *all* laboratory exercises. Students are expected to treat the instructor and fellow students with respect; this includes arriving to the lab in a timely fashion to avoid disturbing the class.

Students should sit *no more than two* to a table. Obvious caveats are if there are more than 24 students in the lab, or if a piece of equipment is broken and irreplaceable on short order. If you feel the desire to sit near friends, sit at adjoining tables, but the two-student-per-table requirement still exists, and each student is expected to turn in their own lab.

Students are also expected to treat all lab equipment properly. This includes, but is not limited to, experiment-specific equipment, lab computers, desks, and stools. Damaging or defacing department property in any way is *not* acceptable.

The only personal effects students are expected to provide are a pen or pencil, and a notebook. Other personal items should be kept stowed away from the lab tables. Lab rooms are active environments: people are moving around, equipment is constantly in flux, and some labs deal with liquids.

Specifically, it is department policy that phones should be silenced and put away during your time in the lab. If your phone is damaged because it was not put away, *you* are responsible for anything that happens to it.

Class Procedure: This semester is a little bit different than past semesters as we pilot new labs that will eventually be a fully remote version of this lab. Each lab period will begin with a brief discussion of theory and ideas which are relevant to the lab, as well as an overview of the lab procedure. In order for me to keep this brief, it is necessary for you to have read the lab material before class begins.

After work on the lab has begun, I will check with each group to make sure the experiment is proceeding satisfactorily. If you have any questions during the lab or are in need of clarification, please do not hesitate to ask me immediately. You will also be asked to provide feedback about places in the labs that need to be clarified or updated before a final draft.

Assignments and Grading: I will grade your assignments based on several criteria. Taken into account will be demonstration of your knowledge of the material, your ability to use the scientific method to arrive at a conclusion, and your ability to effectively communicate that conclusion. Error in your results will not affect the grade you receive, so long as you provide a reasonable explanation for the error. If you notice errors in your results during class time, please let me know and we may be able to correct the problem.

Each lab will be accompanied by a lab worksheet. These worksheets must be completed and returned one week after the associated lab period in order to receive expedient feedback on each assignment. This does not, however, mean that the work is officially due, as the only hard due dates in the class are in the final Memo assignment (which requires peer interaction and thus has a hard due date). All other work is due on the last day of the semester.

Your grade is calculated from the sum of your weekly worksheet scores. Each worksheet will be worth ten (10) points.

Your final grade in Physics 110L will be based on the following scale:

- A - $\geq 90\%$
- B - $\geq 80\%$
- C - $\geq 70\%$
- D - $\geq 60\%$
- F - $< 60\%$.

General Education Outcomes & Student Learning Assessment: Weekly worksheets will assess the degree of having reached our General Education Approved learning outcomes in the three categories outlined above, and reiterated here.

In completing each lab, students will build on their knowledge of the Earth and Solar System, and gain extensive insight into solar physics. In making observations and taking measurements, students will

- i. analyze components and dynamics of natural and physical worlds.

Students will employ computer-based simulations and take measurements to make calculations and generate graphical representations of data to

- ii. develop models to explain phenomena within the natural and physical worlds.

Additionally, students will build on hypotheses and collect, analyze, and interpret data relating to astrophysical systems. Students will develop the tools to make further observations of the physical world and form their own questions about new phenomena, and be able to

- iii. apply methods of scientific inquiry to enhance their understanding of the natural and physical world.

Attendance: Completing all lab exercises is mandatory. Make-up labs will be considered at the discretion of the lab instructor. Unless explicitly noted, assume class is occurring as scheduled. Labs can also, with permission from the Lab TA, be made up at home utilizing the online nature of the course as long as a personal device with Stellarium is accessible. If you are experiencing COVID-19 symptoms contact your lab instructor and DO NOT COME TO CLASS. This includes if you receive a positive test and are in your isolating period.

In person lab make-ups must be attended by your teaching assistant or arranged with another teaching assistant. Make-ups cannot be done without a TA present unless an online make-up is permitted.

Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders.

Feedback: Students are invited to share any concerns they have about the course or their performance with the instructor at any time.

Labs: An approximate list of labs are as follows:

Lab 1	Using Stellarium
Lab 2	Observing the Sky
Lab 3	Mapping the Sky
Lab 4	Motions of the Planets
Lab 5	Kepler's Third Law
Lab 6	The Seasons
Lab 7	Eclipses and the Moon
Lab 8	Tansit of Venus and Mars
Lab 9	Star Magnitudes and Distances
Lab 10	The Milky Way
Lab 11	Exoplanet Report
Lab 12	Exoplanet Peer Review
Final Project	Final Exoplanet Memo

Health and Safety Expectations: While masks are not required as we begin the 2022 fall semester, NDSU administration has determined that faculty may request mask use in their classroom. In this class, I ask that you wear a mask to help protect my health and the health of your peers.

Where possible, please spread out within the classroom, including not sitting in the first row of the classroom, to maximize social distancing.

Please do not come to class:

- if you are feeling ill, particularly if you are experiencing COVID-19 symptoms, or
- if you are infected, during your five-day isolation period.

If you were exposed to COVID-19, please follow CDC guidance available here.

If you tested positive for COVID-19, please follow CDC guidance available here.

Free testing kits can be picked up at the NDSU Bookstore, Library or Student Health Service. Rapid and PCR testing is available at the Student Health Service by appointment Monday through Friday during regular business hours for both symptomatic and asymptomatic students.

If public health conditions and directives from NDSU administration change, I will let you know in writing the expectations for our class moving forward.

Given the broad scope of Physics 110 lecture, labs are subject to change.

Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor and contact the Disability Services Office (www.ndsu.edu/disabilityservices) as soon as possible.

The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.